Acta Oeconomica 74 (2024) 4, 483–506
DOI: 10.1556/032.2024.00023

Thematic review of financial education and financial literacy in the digital age

LEVENTE KOVÁCS[1,2*] and ELEMÉR TERTÁK[2,3]

[1] Institute of Finance and Accounting, University of Miskolc, Miskolc, Egyetem u. 1, H-3515, Hungary

[2] Hungarian Banking Association, Hungary

[3] Hungarian Economic Association, Hungary

Received: January 26, 2024 • Revised manuscript received: August 22, 2024 • Accepted: August 30, 2024

© 2024 The Author(s)

ABSTRACT

Today's world is characterised by the rapid spread of digital technology in the financial industry. Strongly connected with this development, financial products have become increasingly complex. Globalisation has increased the number of financial products offered worldwide, and almost every daily decision has a financial aspect. Thus, for the last three decades, a widening government-level agreement has emerged that individuals, particularly young people, need appropriate financial literacy to handle their finances successfully, prevent financial exclusion, and protect themselves against possible financial fraud. This deficiency is even more severe in the CEE countries, where savings, borrowing opportunities, and financial self-care options were limited; financial markets were practically non-existent.

This paper reviews the existing efforts in financial education, drawing lessons from traditional methods and established channels. It also highlights recent initiatives that aim to bolster financial literacy.

KEYWORDS

financial education, financial literacy, financial behaviour, digitalisation

JEL CLASSIFICATION INDICES

A20, D91, G40

* Corresponding author. E-mail: levente.kovacs@uni-miskolc.hu

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

"Education is the passport to the future, for tomorrow belongs to those who prepare for it today."
Malcolm X.

1. INTRODUCTION

Societies have used money already for thousands of years; however, financial literacy only became a significant concern in the late 20th century. This historical perspective on financial literacy, which was not a significant concern until the late 20th century, can enlighten us about the evolution of financial knowledge. Until the 20th century, personal finance classes were not part of school curricula, and professions promoting financial literacy were non-existent. Financial knowledge was usually passed on through the family and basic mathematical exercises in schools. Precious metals and banknotes shaped the fundamental understanding of finances until the late 20th century. Banknotes, for instance, were exchangeable for gold or silver upon request, and savings and debt had minimal significance in the financial management of most households, as almost all earnings were needed for subsistence (Greenspan 2013). "Spend less than you earn" was the guiding principle, and at that time, it was indeed sufficient to know the family's income and expenses. Accordingly, in day-to-day life, money's fundamental role and function remained simple and unchanged for generations.

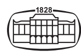
During the 20th century, significant and rapid changes occurred, particularly in the aftermath of World War (WW) I and World War II, which resulted in hyperinflation and economic hardship for many nations. In addition, the global monetary system experienced a critical transformation with the collapse of the Bretton-Woods monetary system after two-and-a-half decades of existence, marked by the termination of the direct international convertibility of the US dollar to gold (Pásztor – Pyatanova 2017). Significant changes occurred in society, family structures, and the demographic conditions following WWII. These changes had a significant impact on household finances. The changed family dynamics and increased earnings had a strong impact on family roles, including, in particular, parenting, care for the elderly and socialisation. The vanishing practice of multiple generations living together led to atomised families moving to cities for better job opportunities and enhanced quality of life, including better education and health. The urbanisation process resulted in a substantial increase in the demand for housing and home ownership. On the revenue side, increased labour income enabled people to build up savings for retirement, entertainment or holidays and created a sufficient financial cushion for loan repayments. On the expenditure side, a higher demand emerged for loans to finance the purchase of a flat, family car, household durables or the children's college education. The gap between financially resilient and financially fragile households widened with the increasing complexity of household finances. Soon, it was recognised that poor financial skills had left many families unprepared to face any substantial increase in the cost of living, rising interest rates, and their consequences. The changed circumstances reduced the efficiency and adequacy of financial education traditionally practised within the families. All these developments highlighted the need to find new ways to improve financial literacy, especially by focusing on the younger generation.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Government-supported efforts, such as the Jump$tart initiative in the United States Jump$tart (1997) or the OECD's financial literacy project in 2002 (OECD 2002), were the most important initial steps to boost financial knowledge nationally and internationally. The 2007–2008 Global Financial Crisis (GFC) has proven that one root cause of the devastating consequences was undeniably the low level of financial literacy (President's Advisory Council on Financial Literacy 2009). The increasing disparities in financial literacy, rooted in many nations' socio-economic inequalities, made this issue even more pressing, particularly in light of the consequences of the pandemic, the global supply chain disruptions and conflicts such as the war in Ukraine (Nykänen 2023). Recent statistics from PwC show a decline in the proportion of the global workforce expecting to have money left at the end of the month, dropping from 47% in the previous year to 38% (PwC 2023). It has been observed that financially literate households are better equipped to adapt to financial shocks, reinforcing their overall financial resilience. As emphasized by the Deputy Governor of the Bank of Finland (Nykänen 2023), financial literacy significantly contributes to a stronger and more stable economy and financial market, underscoring its pivotal role in ensuring financial and social stability. These findings induced a *strong global push factor* aimed at boosting financial education. The attention was focused on fostering financial literacy among young people, as they represent a key demographic group for targeted efforts. Firstly, the availability of helpful financial advice to children of divorced parents and those in patchwork families is quite limited. In addition, in several countries, including the US, young people have to make significant long-term financial decisions shortly after graduating from high school, even though they receive minimal formal education in financial matters. This circumstance often leads to poor financial choices, such as the selection of inappropriate student loans or suboptimal enrolment in retirement schemes, with potentially costly and lasting consequences.

Despite and concurrently with the GFC, the rapid proliferation of mobile phones, the Internet, and telecommunications has immensely changed also the market and the provision of financial services. The financial services' landscape has completely changed due to the digital transformation of major banks and the entry of big tech and fintech companies into the financial sector (Phan 2020). To truly comprehend financial education and literacy in the digital era, it is necessary to continually assess and research the subject, ensuring that individuals are informed on the ever-changing landscape. The rapid pace of technological advancement and the shifting paradigm seen in the financial industry have induced a *strong pull factor* that drives financial education, which, in turn, necessitates ongoing learning to improve financial and digital skills.

Based on the significance and pertinence of financial education and literacy, this study endeavours to contribute to the knowledge in this area by comprehensively examining various factors influencing financial literacy. These factors include the digital transformation of financial and banking services, the globalisation of financial services, and the emergence of digital currencies. The study delves into how digital transformation affects people's daily finances and their ability to access financial information. It also aims to identify the current global trends in financial literacy. Additionally, the study addresses the most pressing challenges in financial education.



Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

2. FACTORS INFLUENCING THE LANDSCAPE OF FINANCIAL LITERACY

2.1. The facets of digital transformation

Although digital transformation is rooted in the 19th century (wire transfers by telegraph), the Mobile Revolution triggered the great transformation much later[1] by introducing Apple and Android smartphones in 2007. This revolution brought about major changes in payment and banking services, causing substantial disruptions. During this stage of digital transformation, most transactions were moved to and executed on the World Wide Web or mobile applications. However, the appropriate use of innovative devices and services also required additional skills and increased personal responsibility for each transaction, as there was no longer an intermediary person, who would caution or provide advice before execution (Kovács – Terták 2016). The aforementioned revolutionary changes occurred at an unprecedentedly fast pace, and thus the affinity and preparedness of successive generations for using these innovative technologies showed increasing gaps – the so-called digital divide emerged. A lack of 'tech readiness', i.e. the confident and independent use of devices, was reported among the elderly; with more than 50% admitting inadequate knowledge of devices and more than one-third reporting a lack of confidence. It became a major challenge for operators to satisfy the expectations of their existing customers and, at the same time, adapt to the ever-changing preferences of younger generations. This circumstance also created a pressing need for financial education aimed at improving financial literacy. Mastering innovative technologies in finances requires a combination of awareness, knowledge, skills, behaviours, habits and specific attitudes. It is a further challenge that all these ingredients of financial literacy vary not only by the age of customers but also by family composition, social and financial situation, domicile and home country. Hence, efficient financial education must be specifically tailored/targeted to each different social group. Besides the above socio-demographic factors, differentiation is also required due to the existence of a variety of proprietary technical systems and applications delivering the aforementioned financial services. The sweeping changes induced by the full digitization of retail services suddenly made most financial practices and knowledge outdated. Hence, the traditional transfer channels and methods of financial literacy skills lost their earlier importance. For the time being the curriculum for financial education must be frequently updated and supplemented. Topics that were earlier not included in the curriculum, such as the use of apps or the protection of cybersecurity, became indispensable parts of the skills required.

[1]The Mobile Revolution reflected in numbers: Global smartphone sales to consumers exceeded 120 million units in 2007. After 15 years, the number of smartphone users worldwide reached 6.57 billion. By 2027, this number is predicted to increase to 7.69 million. Around 82% of people worldwide have a smartphone, which is anticipated to increase to 92.2%. More than 9 out of 10 individuals are expected to own a smartphone in the upcoming generation. The smartphone has spread faster than any other man-made gadget in history. At the end of 2022, more than half of the world's population used mobile internet, and 1.35 billion registered mobile money accounts processed $1 trillion in transactions annually. That is almost $2 million per minute of transactions. While the cited numbers reflect compelling progress, in some regions, such as West and Central Africa and parts of East Asia and the Pacific, there is a "digital divide" – an uneven distribution in the access to and use of mobile phones and technologies based on age, skills, or economic, geographical, geopolitical or social factors. In these regions, the digital divide is particularly evident between urban areas and hard-to-reach settlements (GSMA, https://www.gsma.com/, Statista, https://www.statista.com).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

The Covid-19 pandemic shaped the preferences of younger generations and forced at the same time the elder generations towards more intense use of mobile apps. Nonetheless, most customers use in-branch services and mobile services in parallel. They prefer digital challengers for "light-touch" services but adhere to incumbents for more sophisticated services. For example, many millennials use a challenger bank to manage their finances on a day-to-day basis but will likely turn to a traditional bank to take out a mortgage (ZayZoon 2023; Kent 2024).

2.2. Financial services in the "global village"

During the past century and a half, the world has become literally a *global village* (McLuhan 1962) due to revolutionary developments in transportation, communication and digitalization. Media streaming enables quick transfer, storage, and replay of video and audio content. Thus, events can be followed practically everywhere in the world in real-time or tracked back later. Remote shopping has become a reality even for individuals, as, based on visual observation and online descriptions, even unknown and unfamiliar goods can be purchased. These developments have also changed the environment for players in the financial sector, as these days, not only classical banks but more and more non-bank businesses are offering financial services across borders, such as bank accounts or wallets, payments and loans. Instead of the former trend of specialization and strict separation based on sectoral affiliation, today non-bank businesses of all types and levels of maturity, including retailers, telcos, big techs, software companies, car manufacturers, insurance providers and logistics firms, are launching embedded financial services to attract and retain customers both in the business and consumer segments. The incentive for customers is convenience: an SME can open a new bank account with the help of its accounting software, or a consumer can send money through a retailer; the person or the physical location of the operator does not make any difference.

However, the situation becomes abruptly different once the service gets interrupted, the remote provider goes bankrupt, or commits fraud or any other major disturbance occurs. In these situations, it becomes immediately clear that the world is still quite fragmented. The applicable laws and regulations often differ from what is typically valid at home, and the competent supervisory authority is usually located in the home country of the service provider. Thus, legal proceedings are carried out primarily abroad and in the official language of the competent supervisory authority. This latter circumstance is a tall order for most customers because only within the EU are 24 official languages, and only 54% of Europeans can converse in at least one additional language (European Commission (EC) 2012).

To cope with financial and banking services in the global village, people must be educated on how to manage unexpected and/or inconvenient situations, often also across borders. A wide-ranging opinion poll reflected the importance of preparedness and self-confidence in such cases. Younger respondents and those with higher qualifications expressed their dissatisfaction more often when they perceived that their rights had been violated (EC 2022).

2.3. The emergence of digital currencies

A further pivotal innovation impacting the payments landscape was the invention and proliferation of cryptocurrencies, which promised to solve long-standing problems of financial markets by fostering financial inclusion and providing efficient, secure, and affordable monetary transfers while preserving cash-like privacy. Blockchain represents the best-known and most

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

frequently used reliable self-contained method, which controls and manages the circulation of cryptocurrencies without the involvement of any central (monetary) authority. However, some important matters related to cryptocurrencies require further attention. Firstly, it has been proven that cryptocurrencies are not suitable to be used as currency or for making payments. Nonetheless, their novelty, the vested belief and the spectacular price hikes fascinated and still attracts many people who acquire and hoard cryptocurrencies (Favorio – Sidoti 2023). In reality, since late 2017, individual investors suffered great losses due to the roller-coaster ride of cryptocurrency prices and the often-fraudulent pyramid schemes used on cryptocurrency markets. Secondly, at the national level, any substitution of national sovereign currencies by crypto assets jeopardizes the financial stability and effectiveness of monetary policy and controls, poses a risk to the monetary sovereignty of countries, and, through the pseudonymous character of crypto assets, facilitates illicit financial flows. Some of these perils can be, of course, addressed by regulation to protect retail users, or by the ring-fencing of existing financial systems, but relevant risks cannot be fully eliminated.

The introduction of Central Bank Digital Currencies (CBDCs) has the potential to improve financial inclusion and monetary stability while ensuring secure and transparent access to digital public money. Although digital money in the form of commercial bank deposits and reserves has already existed for decades, the idea of widely available retail digital money issued by central banks, which resembles banknotes and could replace traditional cash and serve as real money, is new. However, some are sceptical about a substantial future demand for retail digital money (Pásztor 2018). Some even argue that banking services are already fully digitalized, making the introduction CBDCs pointless. Moreover, there are several technical, legal and policy challenges associated with the introduction and use of CBDCs. Thus, it remains uncertain whether and when they will entirely replace traditional cash (Financial Times 2023). Despite the doubts mentioned earlier, it is highly probable that several larger countries will soon issue CBDC, considering that 19 of the G20 countries are now in the advanced stage of development (Atlantic Council 2023). This situation has the potential to create a significant impact globally. Hence, people must be swiftly prepared for the proper handling of digital currencies, by way of financial education. This is all the more important, as, according to a Eurobarometer Survey commissioned by the European Commission in 2022, only one in three respondents replied that they were aware of discussions taking place about the possible introduction of the digital Euro. Of these respondents, however, most admitted not being entirely clear about what these discussions mean, although they would be interested to know more (23% vs 10% who closely follow the discussions). Among respondents who have not heard about the potential introduction of a digital Euro, those interested in finding out more (36%) outnumbered those saying they were not interested (27%) (EC 2022).

3. DISCUSSIONS ON THE MAIN CHALLENGES

3.1. Consequences of digital transformation

The technological revolution described has far-reaching consequences. Innovative adoption happens in every aspect of banking operations. Firstly, there is an observable trend of brick-and-mortar branches reducing in numbers, and this is further exemplified by the emergence of new digital banks like N26 or Revolut that operate without any physical branches. ATMs, once

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

considered the most important financial innovation (New York Post 2009), would continuously be upgraded and updated with more digital functions. Meanwhile, the operation of banking services is no longer limited to traditional working hours, and customers can execute almost all financial transactions in any place and at any time, using smartphones or laptops. Secondly, the market entry of Big-Tech or fintech has fundamentally changed the competition landscape in the financial and banking sectors. Traditional banks have advantages such as the trust of clients, reputation and a deeper relationship with larger customer pools. Meanwhile, newcomers with high-end technological infrastructure offer digital financial solutions to techno-freaks (mainly young people) and tailor-made services at low prices. The tough competition in this market, as well as the advanced digital technologies such as big data, artificial intelligence and cloud computing, enable both traditional banks and fintech companies to understand customer behaviours in more depth and thus offer highly tailor-made services fitting the lifestyles and preferences of individual customers (Tran et al. 2022). Therefore, the financial services industry has shifted from a product-centric to a customer-centric approach. However, not all traditional banks have been successful in the digital transformation process, as some aspects of cultural changes such as social media, have not been adequately addressed. Thirdly, the digital transformation has led to a significant shift in the data flow between banks and customers, moving much of it into cyberspace.

In this new digital age, the protection of data and financial records gained outstanding importance, just as safes and strongboxes were needed in the past to safeguard physical assets. Cyberspace has become a playground for hostile actors seeking to exploit vulnerabilities, and the rise in remote work and digital interconnectedness has increased the risk, frequency, and severity of cyberattacks. Cybercrime has expanded for the same reasons that drove the mega growth of legal online businesses. The internet allows criminals to operate seamlessly across borders, accessing a marketplace of victims anywhere, anytime and at scale. The internet also helps criminals to conceal their own identity, location and size (World Economic Forum 2023). Cybercriminals focus on data theft and phishing to gain access to bank accounts or encrypt files for ransom payments. Financial service providers must continuously increase their efforts to safeguard trusted values. However, customers also have a self-responsibility to protect cybersecurity through careful management of their passwords, computers, and connections. One of the leading causes of harm in the digital realm is the neglect of updating software and protecting personal data. This fact highlights the importance of modern financial literacy, which includes safeguarding against cybersecurity threats.

3.2. Obtaining financial information

In the past, people relied on their relatives, friends, colleagues, specialized magazines, tickers, websites, and the Government for financial information. However, today, social media has become a popular source of financial advice, especially among younger generations like Millennials and Gen Z. Trust in the Government and traditional media is fading, triggering people to seek advice from social media platforms, which are seen as more accessible and relatable. Social media delivers financial advice in easily digestible formats, appealing to younger audiences who prefer succinct content over long analytical articles. Additionally, the widespread use of social media platforms for various purposes, including shopping, bill payments, and money transfers, has turned such platforms into natural places for payments. Platforms such as Meta, Twitter, and Instagram offer payment solutions that allow transactions to be made through user accounts (Figure 1).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

	Europe	North America	Asia	Latin America	Africa
Facebook (Meta)	40	34	43	57	59
YouTube	23	25	42	35	44
WhatsApp	16	6	24	35	55
Instagram	14	10	18	28	29
Messenger (Meta)	11	13	11	11	15
Twitter (now X)	9	11	14	16	34
TikTok	5	6	9	11	14
Telegram	4	2	9	6	15

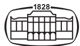
Fig. 1. A considerable portion of users across the world obtain information from social media platforms
Source: Newman et al. 2022, cited in UNDP's 2021–2022 Human Development Report (United Nations Development Program 2022).

Using social media has become a vital necessity in particular for younger generations. For Gen Z investors, social media has become a crucial resource for learning about investing and finances, with 48% of them relying on it (CFA Institute 2023). YouTube is the top source for online content, followed by platforms like Instagram, TikTok, Twitter (X), Reddit, and Facebook. Younger generations spend at least an hour daily on social media, seeking easy-to-understand content like videos, infographics, and short posts to gain financial guidance. A recent publication from Forbes indicates that financial literacy through social media has significantly improved their finances, with 73% reporting positive effects on their finances and 66% believing they are more financially literate than previous generations (Forbes 2023).

Between January and August 2022, there was a notable surge in the popularity of financial influences on social media, especially as the cost-of-living crisis worsened (Shelly 2023). This trend suggests that people are turning more and more to non-traditional sources for financial advice. While Millennials and Gen X investors still rely on financial enterprises, professionals, and internet searches for information, Gen Z investors rather hinge on social media and family. Pinterest's 2022 Predicts report indicated rising interest in financial literacy and independence among their primarily Millennial user base, as reflected in the increasing number of searches for investment tips, financial planning bullet journals and more. Similarly, TikTok, with a large user base aged 16 to 24, has become a platform where many young investors seek financial advice through concise and condensed videos.

Pinterest and TikTok are two examples of alternative platforms that young people use for advice. Meanwhile, Facebook, Instagram, LinkedIn, YouTube, and Twitter continue to be powerhouses for reaching audiences interested in financial literacy or sharing financial news (Moon 2022).

Social media also offers an effective way to foster communication between students and educators. Creating a Facebook group for a specific class or assignment facilitates open and productive discussions among students on financial literacy topics and real-world issues. Students who may be hesitant to ask questions in class can engage more comfortably in the online group. Additionally, social media's ability to share information fast allows students to distribute their completed assignments and projects to their networks, creating a deeper connection with their work. However, maintaining students' interest in financial literacy over time might require additional strategies beyond social media platforms.



Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

A recent report from the Office of Communication in the UK highlighted several trends related to online access and digital exclusion among children. It showed that most children aged 5–15 go online using laptops, tablets and mobiles, but some lacked appropriate devices for online home-learning requirements. In terms of online knowledge and understanding, about half of children using search engines could correctly identify adverts, and two-thirds of 12–15 year-olds recognized that vloggers and influencers might be sponsored to endorse products or brands (Ofcom 2021).

These insights are a warning sign that there is a digital divide even within individual generations determined by the affluence of the children's families,[2] which fact has to be duly considered in financial education. Another important warning sign is that young people, in particular, but also senior people, are mostly not able to distinguish between true and false information or recognize whether the influencer is sharing true or biased information. Accordingly, financial education must prepare people for assessing all information received on social media with caution, and inspire them to seek alternative sources to find out whether the content of available information is true or biased. Otherwise, social media offers an excellent channel for financial education. Lessons or courses can mostly be organized on Facebook or on other popular media platforms, enabling access for people seeking easy-to-reach financial education.

3.3. Recent worldwide trends in financial literacy

Education is a crucial resource for individuals and societies, driving economic growth, employment, and earnings. Over the past two centuries, there has been a significant global expansion in education, with increasing rates of primary, secondary, and tertiary enrolment. In response to the rapid changes that have taken place in the economy and in technology since the mid-20th century, governments, educators, and major employers have identified some key 21st-century skills required for succeeding in the digital workspace. These skills go beyond traditional knowledge-based academic abilities and include more sophisticated skills such as complex problem-solving, teamwork and analytic reasoning. Results of a survey prove that households with higher numeracy and fluency scores are more able and willing to own a more diversified portfolio and earn higher yields (Tsendsuren et al. 2024). The main mission of teaching and learning literacy is to equip people with the skills necessary to fully participate in the social and cultural activities of the modern world. As the world underwent radical changes, the conventional view of literacy proved to be too narrow, leading to the emergence of the theory of New Literacies in education. New Literacies encompass a broader range of skills, including digital technologies, to adapt to the rapidly changing economic, social, and cultural landscape. The purpose of education is to prepare individuals for navigating the ever-evolving real world by transferring relevant skills and knowledge, and this requires a curriculum that reflects the ongoing evolution of knowledge and civilization itself.

Studies in financial literacy have consistently revealed that the financial habits and customs of families play a crucial role in shaping the financial attitudes and behaviours of subsequent generations (Lusardi et al. 2010; Árvai 2017; Hegedűsné Barna, R. et al. 2017). However, the

[2]By the end of 2022, 10.8 million people, 2.4% of the EU population, could not afford an internet connection. As regards the locational factor in the EU: in 2023 99.3% of the individuals had internet access in Luxemburg, while in Bulgaria only 80.4% (https://ec.europa.eu/eurostat).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

rapid digital transformation of financial services now causes a divide between generations due to the quicker adaption of younger people, who – ostensibly paradoxically – often help their parents in navigating the digital world. Furthermore, the intragenerational gap widened from the customary 20–25 years to 35–40 years between the subsequent generations. This shift is caused mainly by the trend of delayed childbearing. To put it simply, the current stage of generational change leads to a new, more digitalised world for future generations, in which the transmittal of parental financial practices has far less relevance. Instead, social media and valued educational sources are gaining more and more significance as transmittal channels of knowledge. If schools have a comprehensive curriculum, possess highly skilled teachers, and are digitally well-equipped, they can offer the necessary financial education and cultural awareness for the digital age, complementing and improving the traditional transmission channel of financial knowledge within families.

Currently, there are two main trends affecting financial education and literacy. Firstly, the speed of technological advancement and the rate at which human knowledge is doubling are increasing simultaneously. In order to keep up with the rapidly increasing amount of knowledge, it is important to carefully design curricula that avoid overload. It is also crucial to teach students skills that will help them identify and select the most relevant information, rather than overstress them with unnecessary lexical knowledge. An important issue that needs to be addressed too, is the widening gap between students' online activities at home and the short online instructional time they get in traditional classrooms. This poses a substantial challenge in enhancing essential skills.

Secondly, economic factors play a significant role in educational output and curriculum development. Schooling is mainly financed using public resources globally, and countries that invest more in education tend to achieve better education outcomes in terms of both quantity and quality. When evaluating educational outcomes, it is important to take into account factors beyond just public spending. These factors can include teacher shortages, stressful school environments, and limited access to digital resources, all of which can also impact financial education. Correlation between expenditure and outcomes does not necessarily imply causation, highlighting the complexity of the education system and the need for comprehensive approaches to achieve the desired results.

Figure 2 presents the relationship between PISA reading outcomes and average education spending per student, splitting the sample of countries by income level. From this figure, there are two important lessons: (1) Greater national wealth or higher expenditure on education does not warrant better student performance. Among high-income economies, the amount spent on education is less important than how those resources are used. (2) Successful school systems in high-income economies tend to prioritise the quality of teachers over the size of classes (Schleicher 2014).

3.4. Financial literacy assessments of students

Empirical studies measuring financial literacy often use surveys with three to five multiple-choice questions, including the option for respondents to indicate when they do not know the answer. The OECD's Program for International Student Assessment (PISA) is one of the most cited and comprehensive surveys, evaluating financial literacy through up to 40 questions. The PISA tests have revealed variations in financial literacy levels across countries, with

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

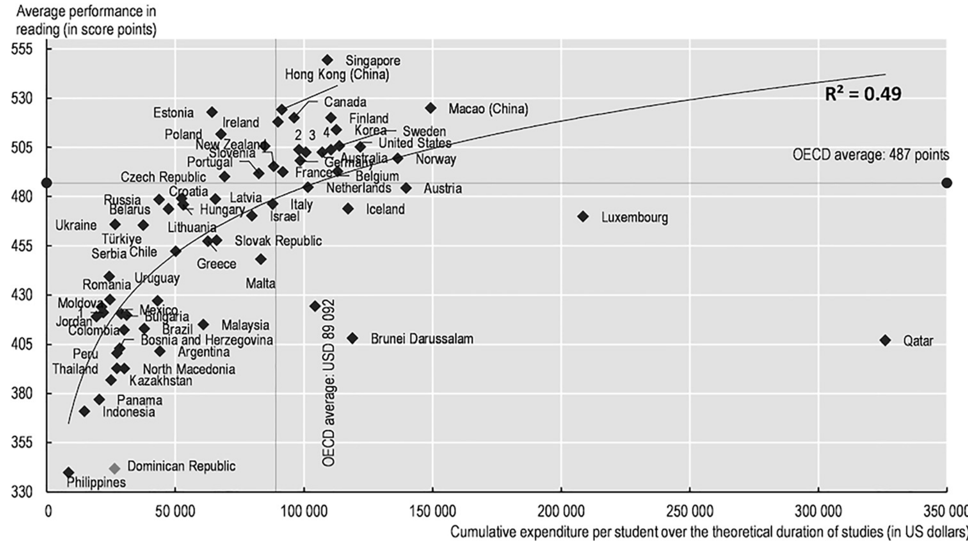


Fig. 2. **Spending per student aged 6–15 years and reading performance in PISA**
Source**: OECD (2022: 218).**

disappointing results and showing limited improvement over the years. Another significant survey is the Progress in International Reading Literacy Study (PIRLS), which measures reading achievement at the fourth-grade level and provides insights into understanding financial documents available on websites. While these studies offer valuable data, they do not delve into the decision-making processes in financial matters or account for the influence of socialization sources and attitudes about money on becoming financially literate, leaving a gap in understanding these aspects.

Over the past 15 years, *behavioural sciences* gained widespread recognition; economics has progressively acknowledged the significance of the biases that drive individuals and firms to behave irrationally, contrary to assumptions of traditional finance theory. This discipline explores the impact of psychological and social factors on decisions by individuals or groups in the economy and financial markets. Behavioural finance, a subfield of behavioural economics, explains why emotions and cognitive biases often influence financial choices stronger than rational calculations. Although behavioural finance has been helpful in explaining market developments, it has limitations in accurately predicting them. This is due to the complexity of human behaviour and the influence of social interactions.

Motivation theory is closely linked to behavioural economics and examines how a person's motivation influences their behaviour. Motivation is the driving force behind human actions, pushing individuals to work with commitment and focus even on challenging situations. Research indicates that young individuals seeking financial literacy are motivated by scepticism towards advertisements and advice, leading them to actively discuss and critically assess the information they receive. Motivated and critical individuals who possess financial literacy make

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

better financial decisions by being aware of risks and exercising better control. Motivational research confirms that financial behaviour is positively correlated with the level of financial literacy, suggesting that motivation plays a significant role in financial decisions, especially when the potential gain is attractive. However, the long-term impact of financial education remains uncertain.

Behavioural economists have developed models to accommodate various behaviours, focusing on limited attention, cognition, and information neglect (Buttenheim et al. 2023). Lack of financial literacy can result in individuals missing out on crucial information regarding tax incentives and allowances that can potentially boost their investment amounts and returns. Furthermore, inaccurate beliefs, cognitive barriers, and present bias contribute to insufficient consideration of long-term implications and limited understanding of financial decisions' consequences. Scholars have also observed a correlation between religiosity and risk aversion (Noussair et al. 2012; Benjamin et al. 2016; Cebula – Rossi 2021), as strong religious beliefs may lead individuals to invest conservatively only in nearly riskless assets with returns much below the market average.

Classical economists traditionally overlooked the influence of culture on individual decision-making, focusing more on individual preferences without exploring their determinants (Fehr – Hoff 2011). However, in recent decades, there has been growing academic interest in how cultural values impact consumption, saving, and investment decisions, as well as household financial growth (Ahmed et al. 2006; Lusardi – Mitchell 2014). Cultural factors, such as customs and beliefs, can either inspire or hinder informed financial decisions, leading to persistent differences in savings composition among countries. For example, the influential cultural value of individualism, particularly in Anglo-Saxon countries, significantly affects investment behaviour. Although individualism has increased in most countries since WWII, relative differences between countries have remained stable due to the persistence of cultural values over time. The tendency to favour home-based financial decisions is strongly influenced by an individual's culture and language knowledge. This is, however, not surprising because people feel more at ease by investing within the familiar context of their own culture.

For the above-mentioned reasons, it is crucial to incorporate insights and findings from behavioural finance and motivational research when providing financial education. Additionally, effective financial literacy courses must consider cultural differences such as education levels, socio-economic status, family values, religious affiliation, traditions, and geographical areas.

3.5. Financial literacy and digital literacy

Digitalization has significantly transformed banking services, requiring more than just understanding financial terms and numeracy for effective personal finance management. The term 'digital financial literacy' emerged, encompassing the ability to access, manage, understand, and communicate information safely through digital technologies. Educators and practitioners now recognize the importance of imparting digital proficiencies and sound financial principles to address the needs of 21st-century learners, who must demonstrate financial skills in both physical and online environments. Expanding the use of technology in financial literacy education is crucial in today's digital economy, as it encompasses knowledge of digital financial

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

products, awareness of digital financial risks, and consumer rights and redress procedures (OECD 2018).

To build public trust and ensure equitable financial access, providers must invest in numeracy and digital financial literacy (DFL) skills, design customer-centric products, and implement robust consumer safeguards. Financial regulators are addressing this need by incorporating DFL in national financial inclusion strategies and policies, and 54 of the 76 member countries of the Alliance for Financial Inclusion have already integrated digital financial services and financial education into their plans. This indicates a growing demand for digital financial services (DFS) stakeholders to collaborate in bridging the financial literacy gap and promoting innovative initiatives and programs to enhance financial literacy (Figure 3).

In 2022, the Banco de Portugal, with financial support from the EC, commissioned the OECD to conduct a comprehensive mapping study on digital financial literacy and education in Portugal. While internet and smartphone usage are widespread in this country, some population subgroups lack the basic skills needed to engage with digital tools, leading to limited use of digital services, including financial services (OECD 2023). According to the survey, about 45% of respondents reported shopping online, 50% used home banking services, and 44% used other DFS like MBWay, digital money transfers, and e-wallets, with higher adoption rates among internet users.

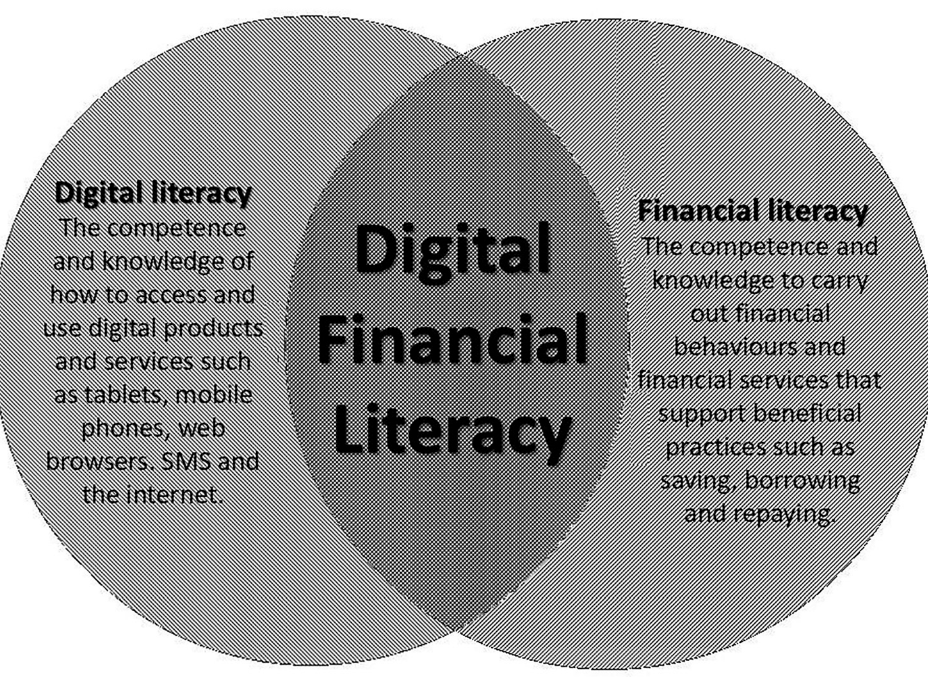


Fig. 3. Graphic representation of Digital Financial Literacy
Source: GSMA (2023: 11).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Key findings of the cited OECD-study are:

- **Digital financial knowledge**: Less than half of Portuguese internet users demonstrate a solid understanding of financial knowledge, particularly in certain aspects such as consumer rights in the online environment and the regulation of online financial service providers. Knowledge of crypto-assets and related risks is also limited.
- **Engagement in safe digital financial behaviours**: While some users exhibit safe behaviours in certain domains, others engage in risky practices, such as not changing passwords regularly when using home banking services.
- **Digital financial attitudes**: A portion of digital financial services users are unaware of the risks associated with using public Wi-Fi networks for online shopping and display less cautious or more impulsive attitudes online compared to in-person transactions.

The report identified several groups in the population who have specific digital financial literacy needs and may need to be prioritised by digital financial education programmes:

- **Young people aged 16 to 24 years** old extensively use the Internet and digital tools, including engaging in digital financial activities like acquiring and trading crypto assets. While they possess strong digital skills in certain aspects such as password creation and antivirus usage, they are less inclined than middle-aged individuals to apply data protection measures, particularly on social media. Moreover, their safety practices, particularly while using home banking, are limited.
- **Older adults aged 55 years and over**, especially the subgroup aged 70 and above, encounter multiple challenges that highlight the need for specific digital financial education. Given the increasing share of elderly individuals in the Portuguese population, this issue requires special attention. Older adults use the Internet and digital tools less frequently than younger age groups due to finding them complicated. As a result, they are at a higher risk of digital exclusion. Additionally, when using the Internet, adults in higher age brackets are more susceptible to online risks due to their limited knowledge and application of basic safety procedures.
- **Low-income and low-education individuals** exhibit significant vulnerabilities in terms of digital inclusion, as they perceive the Internet and digital tools as too complex to use. They also lack basic online safety practices and display notable gaps in digital financial literacy, encompassing knowledge, attitudes, and behaviour.

Despite being specific to Portugal, these findings highlight crucial issues and topics to consider when developing a national curriculum for digital financial education elsewhere, to avoid inefficiencies and shortcomings.

3.6. AI and financial literacy

From a financial services perspective, Artificial Intelligence (AI) refers to the use of advanced algorithms and machine learning (ML) techniques to enhance the efficiency and accuracy of financial services. The financial sector and AI are a perfect match for each other. Financial services companies have been gathering, sorting, and managing data for many years, which makes AI a natural addition to the industry. The advancements in technology and shifts in consumer behaviour have paved the way for creative banking business models to emerge.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Capitalizing on this momentum, the integration of AI technologies in financial services presents banks with the opportunity to enhance revenue generation while reducing costs by adopting novel approaches to customer engagement and service delivery through a new business model. AI technologies have already been widely adopted in the investment and retail banking sectors, but there are still many changes to come.

Leading financial institutions are embracing AI technologies for various applications like instant loan approvals, biometric authentication, and virtual assistants, among others, as they strive to become AI-first in the race to cater to customer-centric demands. The shift from a problem-centric to a customer-centric approach has driven banks to adopt a more holistic strategy, providing services 24/7 at scale and speed. A recent report from Business Insider (2022) indicated that nearly 80% of banks recognize the potential benefits of AI in banking, while McKinsey Company (2021) suggested that AI's potential impact on the industry could be as high as USD 1 trillion. AI presents a breakthrough technology to achieve contextual, personalized, and tailored customer experiences, which 77% of bankers believe will determine the success or failure of banks in gaining a primary competitive advantage.

Many banks are actively implementing AI strategies, with larger organizations leading the way due to their higher investment capacity. These larger firms are better equipped to handle legacy system challenges. Key AI use cases such as chatbots and anti-payments fraud have gained traction, particularly in the front and middle offices (Figure 4). By leveraging AI to manage customer data and provide personalized recommendations, banks aim to enhance customer satisfaction and retention. Customer satisfaction has been linked to significant deposit growth, making superior experiences a vital factor for both growth and customer retention. Two well-known examples of AI in banking are chatbots and financial crime detection. Chatbots,

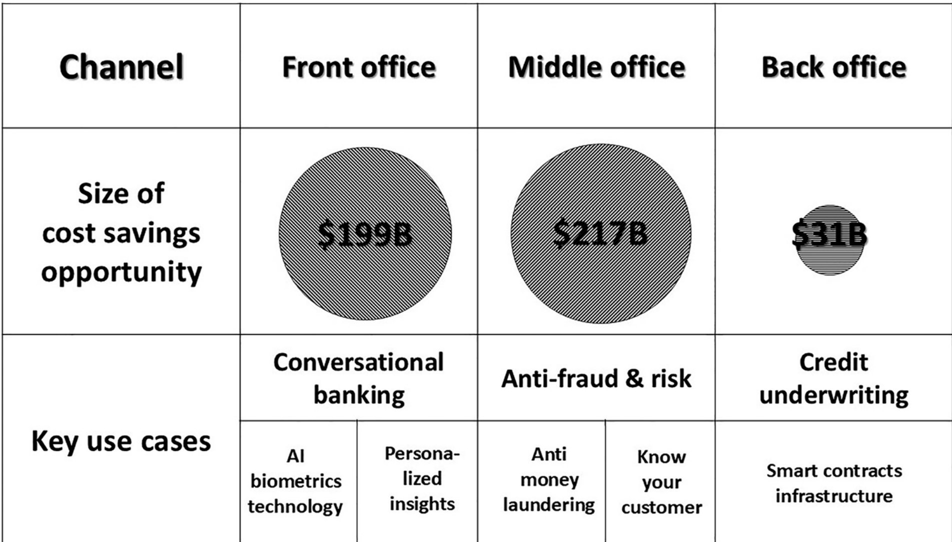


Fig. 4. Which uses AI has in banking, and what are the benefits?
Source: Business Insider Intelligence (2022).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

practical applications of AI in banking, mimic human conversation through text or voice interactions and are available to customers 24/7 once integrated into banking apps. They offer personalized customer support and recommend suitable financial services based on individual usage patterns. Additionally, AI models are used for tracking and combating financial crime by constantly learning from transaction analyses and identifying suspicious cases based on various criteria such as the amount, currency, country, and type of transaction.

AI brings numerous benefits to the banking industry, but it also introduces potential ethical pitfalls and security challenges. Decision-making methods may lead to unintended biases, prompting a need for ethical reflection. Moreover, AI's reliance on vast amounts of data creates security and privacy concerns, with the risk of data breaches exposing sensitive customer information, potentially leading to identity theft and fraud if misused by cybercriminals. To address these challenges, financial service providers need to implement robust security measures to protect customers' data. This includes using encryption to secure data at rest and in transit, implementing multifactor authentication, and monitoring network activity for any suspicious behaviour. Additionally, service providers must ensure that the applied AI algorithms are transparent and explainable. This means that they should be able to explain how the algorithm arrived at a particular decision, and any errors or biases should be identified and addressed promptly.

AI systems heavily rely on the quality and representativeness of the data they are fed, and biases in datasets can perpetuate bias in AI algorithms (Deloitte 2019). The lack of transparency in AI's decision-making process poses significant challenges, as complex algorithms can lead to incorrect decisions with severe consequences for both customers and financial institutions. To prevent unintended discrimination and ensure fairness, banks and fintech companies must make their AI algorithms transparent, understandable, and explainable, providing explanations to customers and regulatory authorities about how decisions were made and how customer data was utilized. This is particularly crucial in areas like lending, where AI's potential bias against marginalized communities requires careful attention and scrutiny.

Financial education should explain in plain language to people what AI is about, including also its potential perils. Of course, customers cannot get insight into the applied AI, nor have the necessary skills to evaluate them. It is also difficult, if possible, to prove any discrimination in decisions made by AI applications. Customers should, therefore, keep in mind the warning of the Latin proverb 'caveat emptor' ('let the seller beware') for the fact that they typically have less information than the service provider about the service they seek purchasing. Such a situation is known as 'information asymmetry', an imbalance between two negotiating parties in their knowledge of relevant factors and details. Asymmetric information can lead to adverse selection and incomplete markets and is thus a sort of market failure. Financial education should make clear that this asymmetry does not imply that the customers' rights are left unprotected; however, it is the customer who has to evidence and denounce the authorities if he feels cheated or discriminated by AI.

4. PERSPECTIVE ON FINANCIAL EDUCATION: LANDSCAPE AND ISSUES

A significant hurdle in advancing the evaluation of financial education lies in comprehending the vast and multifaceted landscape it encompasses. Enhancing this understanding necessitates

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

an examination of the key beneficiary groups of financial education, the distinct evaluation aspects that impact each group, as well as the major challenges encountered by multiple groups. By breaking down the complex realm of financial education into discrete components, these descriptions offer aid in facilitating comprehension for stakeholders and supporters of financial education, enabling them to better grasp the implications derived from evaluations of financial education programs.

The evaluations of financial education programs exhibit wide diversity due to the absence of a standardized approach in terms of program purpose, target groups, content, instructional methods, duration, and other features. For instance, financial education programs for children and youth in formal education settings differ significantly from those tailored for working adults or older individuals planning for retirement. Additionally, variations in cultural traditions and educational systems across jurisdictions further contribute to differences in educational programs. A comprehensive financial education program was proposed by the US National Endowment for Financial Education (2016), which covered the most important groups and relevant issues in financial literacy (See Table 1). The breakdown of the groups corresponds with the homogenous groups identified in the Portuguese population according to the cited OECD study.

4.1. Financial education for children

Starting financial education in elementary grades is essential because young children already have some experience with finances and can grasp financial concepts when linked to numeracy. The goal of financial education for this age cohort should extend beyond rudimentary skills and encompass critical thinking and decision-making abilities, like the approach of teaching reading literacy with foundational knowledge built upon over time.

4.2. Financial education for the youth

Financial education for young people aged about 11–18 aims to build a foundational understanding of basic financial concepts to prepare them for future financial decisions. The critical task is to equip young adults with the necessary skills before they face complex financial challenges in early adulthood. When assessing the curriculum developed for this age group, it is essential to consider the learning content, the time allotted for instruction, and the assessment methods used. These factors can significantly influence the effectiveness of financial education programs. Another issue that must be considered is the intrusion of internet-enabled electronic devices (laptops, tablets, and mobile phones), which transformed the classroom lectures into a divided attention task (Glass – Kang 2019), for which reason one in seven countries ban the use of mobile phones in schools by law.

4.3. Financial education for young adults

Financial literacy is crucial for young adults between 19 and 29 because, at this age, they become financially independent and face important decisions, such as credit card applications or student loans. Unfortunately, many young adults lack sufficient financial knowledge, putting them at risk of making poor financial choices. Financial education for this group can come from various sources, including parents, employers, workshops, and banks. As young adults go through major life changes, it is important for them to receive education on topics such as credit usage, managing debt, or renting a dwelling. Unfortunately, there are limited programs available that cater

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Table 1. List of groups and issues in financial education

Groups	Ages	Method of financial education	Issues	Topics
Children	3–10 years	As an academic subject	What are the goals and how to deliver?	Understanding costs and benefit analysis, and opportunity cost
Youth	11–18 years	As an academic subject	Cost of providing financial education at school.	Understanding of basic financial knowledge and financial behaviours and their application to financial issues.
Young adults	19–29 years	Educational programs from financial institutions or courses from college	This group include both young students and early-career employees.	Using credit-managing debt, finance in home-ownership, retirement, student loans and financial investments.
Working adults	30 to retirement	Workplace financial education (one-time seminars, extended financial education program, online financial education)	Complex financial situations – uncertainty in the labour market.	Understanding interest rate/risk diversification, retirement savings, and financial planning.
Low-income consumers	Adults of all ages	• Product: individual development accounts • Services: integrated into social/human services • Instruction: counsel-ling/coaching • Cost of financial edu-cation covered by local municipalities/ charities.	Highly volatile income – expenses. Low level of education and financial literacy.	Economic well-being and money management behaviours

Source: Walstad et al. (2017).

specifically to young adults, and the ones that do exist tend to be geared towards college and university students. Developing a curriculum that works for everyone in this population is difficult due to its diversity.

4.4. Financial education for working adults

In recent years, workers have faced increasing responsibility for their financial security and well-being due to shifts in pension systems. They faced intricate financial choices in the midst of uncertain career prospects. Thus, financial education has become a priority for working-age

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

adults, and workplaces have emerged as key venues for such education. Employers offer usually various formats of financial education, including one-time seminars, extended programs and online resources, catering to diverse needs. Tailoring financial education to specific audiences is crucial for its effectiveness, and various tools and resources from government agencies, NGOs, and private businesses support financial educators. Although financial education in the workplace, particularly regarding retirement savings, has had palpably positive effects on participation and savings rates, policy recommendations should take into account the unique financial situations and plans of the enrolled workers.

4.5. For low-income consumers

For low-income adults and retirees, the local governments, charities, and employers (where applicable) must lead in providing financial education. In this burdensome role, however, they can utilise existing teaching materials accessible through various streaming services. As necessary as the education of adults with low financial literacy may be, educational institutions and courses targeting this group can efficiently provide only basic knowledge and skills. While the basics are undoubtedly crucial, they will unlikely meet the diverse interests and preparedness of the targeted audience. They may also not provide sufficient guidance for using the thousands of mobile applications offered by financial institutions and fintech companies. Consequently, financial service providers should regularly provide their customers with targeted supplementary learning opportunities. Such targeted courses in financial education make lifelong learning a reality, especially considering the constant emergence of new applications and providers in the market.

4.6. Where and how financial education should be organized

Globally, the Group of Twenty (G20) leaders have recognized and endorsed the significance of financial education, consumer protection, and financial inclusion. The integration of these three components is essential for the financial empowerment of individuals and the overall stability of the financial system. This has been acknowledged through a series of high-level principles: Innovative Financial Inclusion (2010), Financial Consumer Protection (2011), and National Strategies for Financial Education (2012). Collectively, these principles offer a relevant baseline for developing more targeted approaches and international guidance on digital finance. Building on its global leadership on financial education issues, the OECD and its International Network on Financial Education (INFE) are actively involved in developing policy research and guidance on the implications of DFS for financial education and relevant consumer protection issues (G20/OECD-INFE 2016).

OECD-INFE and several other international professional organisations recommend that countries should adopt a national strategy for financial education, and this strategy should entail mandatory financial education at the primary and secondary school levels. The reason for this guidance is that individuals who received structured financial education during their school years usually possess a greater level of financial knowledge. On the other hand, people who lack financial literacy are five times more likely to struggle with paying their monthly bills compared to those who have a good understanding of financial matters. Separate research (Urban et al. 2020) has found that implementing a state mandate for personal finance education led to improved credit scores and reduced delinquency rates.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Meanwhile, nearly all the G20 countries and most OECD member states have a national strategy for tackling the issue of poor financial literacy, either already implemented or in the process of implementation or design. There is rapid growth in the number and range of financial education programmes across OECD countries, particularly in high schools. Fewer programmes are targeted at university or college students.

The teaching of financial knowledge varies greatly from country to country. Some places teach it as a separate subject, while in other places, it is incorporated into social studies or math courses. Moreover, there are several states or regions where financial education is still not a mandatory subject in schools. As an example, it is worth noting that financial literacy is not mandatory in all 51 states of the United States. Even in the remaining 47 states where it is required, the standards can vary greatly (as shown in Figure 5). Figure 6 illustrates a similarly scattered situation across 35 European countries.

The patchwork-like status quo can be attributed to reasons such as:

- limited curriculum space,
- missing curricula,
- limited human and financial resources (e.g. lack of suitable teachers or ringfenced budget for financial education),
- available teachers may lack the qualifications or confidence to teach the subject.

Along with the above-mentioned reasons, some people also present moral arguments against making financial education mandatory. Some, for example, believe that financial education may incite people to become overconfident, complacent, or obsessed with money. Others raise an even more puzzling argument: Since parents provide pocket money to their children, it should be left only to them what their children know about money management and personal finance.

In the authors' opinion, regardless of any above-mentioned objective limitations or personal doubts, children should receive a well-designed, organised, and thorough financial education

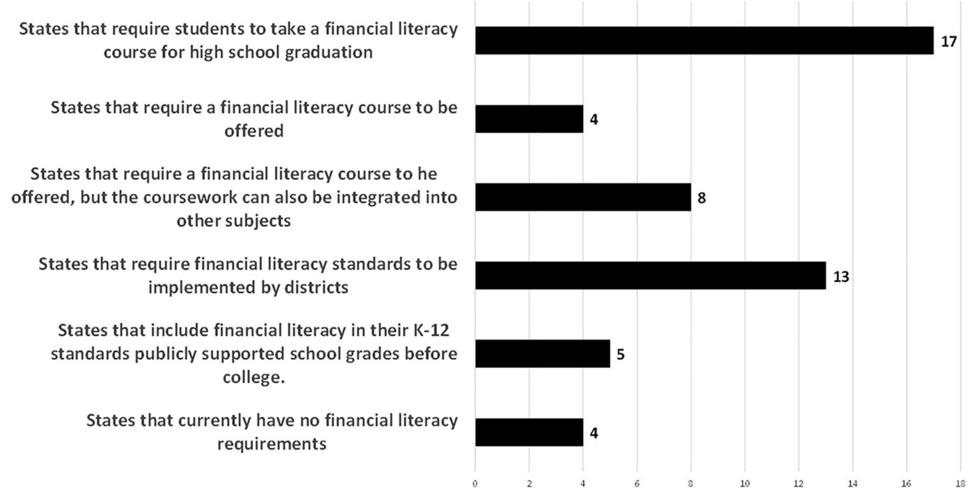


Fig. 5. Financial education requirement in the US
Source: Ramsey Solutions (2023).

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

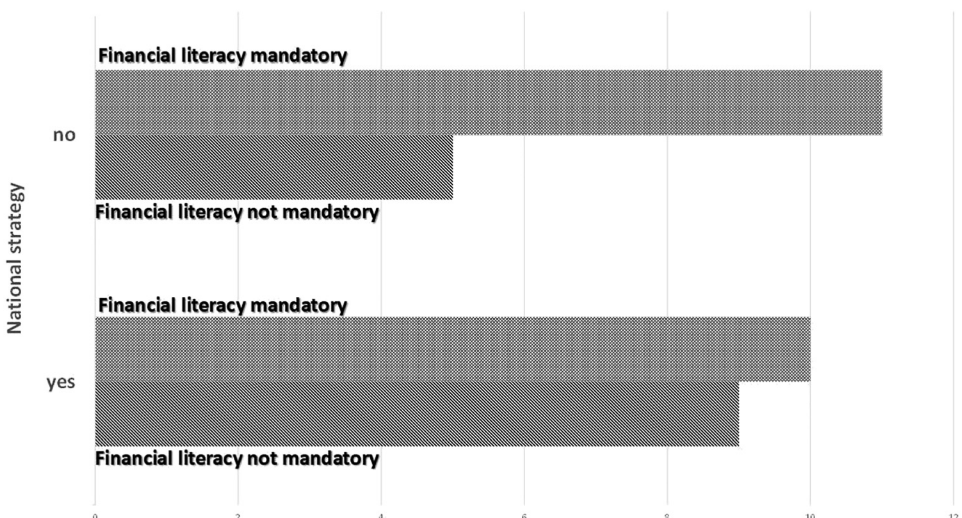


Fig. 6. Existence of a national strategy for financial education and the status of financial literacy in schools across 35 European countries
Source: European Banking Federation (2020).

while in school. This approach will probably become the norm worldwide, as it is the only optimal approach to eliminate the digital and financial literacy divide between underprivileged children and those from more affluent backgrounds.

5. CONCLUSIONS

All the papers reviewed concordantly explore financial education and financial literacy in an era of profound digital transformation, as well as the impact of digital transformation, the globalization of financial services, the emergence of digital currencies, and financial literacy on a global scale. These key factors determine financial education. In addition, the studies reviewed highlighted the challenges arising from these factors and discussed recent trends in financial literacy.

Although challenges faced by most countries are akin because of the global spread of technology and globalisation, financial education will still be best organised and developed at the national level in the near future. Although international organisations, such as OECD-INFE, G20, IMF, World Bank, UN, UNESCO, UNICEF and others, have initiated and continuously support enhanced cooperation regarding financial education between the individual nations, there are still significant differences in cultural, religious, legal, linguistic and curriculum matters that can be better addressed by localised approach in financial education.

However, this does not mean that an internationally coordinated effort is pointless. On the contrary, coordinated national efforts, supported by the abovementioned organisations, support and underpin the development of more efficient curricula and education materials across borders, for example, by exchanging best practices.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

We believe this study's findings provide valuable insights that complement the current understanding of financial education and financial literacy, emphasising the need for regular review and updates in this field. The review hopefully also offers useful guidance to relevant stakeholders in financial education, including governments, financial institutions, and individuals, in formulating strategic action plans to enhance financial literacy.

REFERENCES

Ahmed, M. H. – Zeeshan Atiq, Z. – Butt M. S. – Alam, S. (2006): The Impact of Demography, Growth and Public Policy on Household Saving: A Case Study of Pakistan. *Asia-Pacific Journal of Rural Development*, 13(2): 56–71. https://doi.org/10.18356/8517ea89–en.

Atlantic Council (2023): *Central Bank Digital Currency Tracker*. https://www.atlanticcouncil.org/cbdctracker/.

Árvai, D. (2017): *A Z generáció pénzügyi ismeretei: A hatodik és nyolcadik osztályosok pénzügyi kultúra kutatása (The Generation Z Financial Knowledge: Research on the Sixth and Eighth Graders Financial Literacy)*. Competition paper – University of Szeged. https://eco.u–szeged.hu/download.php?docID=75134.

Benjamin, D. J. – Choi, J. J. – Fisher, G. (2016): Religious Identity and Economic Behavior. *The Review of Economics and Statistics*, 98(4): 617–637. https://doi.org/10.1162/REST_a_00586.

Business Insider Intelligence (2022): *The Impact of Artificial Intelligence in the Banking Sector – How AI Is Being Used in 2022*. https://www.businessinsider.com/ai–in–banking–report.

Buttenheim, A. – Moffitt, R. – Beatty, A. (eds) (2023): *Behavioral Economics: Policy Impact and Future Directions*. Washington, D.C.: National Academies Press. https://doi.org/10.17226/26874.

Cebula, R. J. – Rossi, F. (2021): Religiosity and Corporate Risk-Taking: Evidence from Italy. *Journal of Economics and Finance*, 45(4): 751–763. https://doi.org/10.1007/s12197–021–09543–x.

CFA Institute (2023): *Gen Z and Investing: Social Media, Crypto, FOMO, and Family*. https://www.cfainstitute.org/–/media/documents/article/industry–research/Gen_Z_and_Investing.pdf.

Deloitte (2019): *Banking on the Bots: Unintended Bias in AI*. https://www2.ddeloitte.com/uk/en/pages/financial–services/articles/banking–on–the–bots–unintended–bias–in–ai.html.

European Banking Federation (2020): *Financial Literacy Playbook for Europe*. https://www.ebf.eu/wp–content/uploads/2020/11/EBF–Financial–Literacy–Playbook–for–Europe.pdf.

European Commission (2012): Europeans and Their Languages. *Special Eurobarometer,* 386. https://d1wqtxts1xzle7.cloudfront.net/38342278/ebs_386_en–libre.pdf?1438334493=–response–content–disposition=inline%3B+filename%3DEUROPEANS_AND_THEIR_LANGUAGES_REPORT_Spe.pdf.

European Commission (2022): Retail Financial Services and Products. *Flash Eurobarometer*. https://www.europeansources.info/record/retail–financial–services–and–products/.

Favorio, M. – Sidoti, O. (2023): *Majority of Americans Aren't Confident in the Safety and Reliability of Cryptocurrency*. https://www.pewresearch.org/short–reads/2023/04/10/majority–of–americans–arent–confident–in–the–safety–and–reliability–of–cryptocurrency/.

Fehr, E. – Hoff, K. (2011): Introduction: Tastes, Castes and Culture: The Influence of Society on Preferences. *The Economic Journal*, 121(556): F396–F412. https://doi.org/10.1111/j.1468–0297.2011.02478.x.

Financial Times (2023): *The Digital Euro: A Solution Seeking a Problem?* https://www.ft.com/content/7c892d3b–c646–4247–9504–5f755e486101.

Forbes (2023): *Nearly 80% of Young Adults Get Financial Advice from this Surprising Place*. https://www.forbes.com/advisor/investing/financial–advisor/adults–financial–advice–social–media/.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

G20/OECD–INFE (2016): *Ensuring Financial Education and Consumer Protection for All in the Digital Age.* http://www.g20.utoronto.ca/2016/P020160914399346655198.pdf.

Glass, A. L. – Kang, M. (2019): Dividing Attention in the Classroom Reduces Exam Performance. *Educational Psychology,* 39(3): 395–408. https://doi.org/10.1080/01443410.2018.1489046.

Greenspan, A. (2013): *Why the Financial Crisis Took Economists by Surprise.* Https://Www.Foreignaffairs.Com/United–States/2008–Crisis–Never–Saw–Coming?Utm_Medium=Newsletters–Utm_Source=Summer_Reads–Utm_Campaign=Summer_Reads_2023–Utm_Content=20230604–Utm_Term=Fa_Summer.

GSMA (2023): The Digital Financial Literacy Toolkit – Addressing the Gap in Low- and Middle-Income Countries.

Hegedűsné Barna, R. – Hegedűs, Sz. – Molnár, P. (2017): Examination of Financial Literacy Among High School Students. In: *Multudisciplinary Challenges, Diverse Responses*. Budapest: BGE, pp. 72–91.

Jump$tart (1997): *About the Jump$tart Coalition*. https://www.jumpstart.org/about/.

Kent, S. (2024): *Challenger Banks: How They Will Shape Tomorrow's Banking*. https://www.middle–east.kearney.com/industry/financial–services/challenger–banks–how–they–will–shape–tomorrows–banking.

Kovács, L. – Terták, E. (2016): *Financial Literacy, Panacea or Placebo – A Central European Perspective*. Bratislava, Slovakia: Verlag Dashöfer.

Lusardi, A. – Mitchell, O. S. – Curto, V. (2010): *Financial Literacy Among the Young: Evidence and Implications for Consumer Policy*. CFS Working Paper, No. 2010/09. https://www.econstor.eu/bitstream/10419/43224/1/630563187.pdf.

Lusardi, A. – Mitchell O. S. (2014): The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Litrature*, 52(1): 5–44. https://doi.org/10.1257/jel.52.1.5.

McKinsey – Company (2021): *Building the AI Bank of the Future*. https://www.mckinsey.com/~/media/mckinsey/industries.

McLuhan, M. (1962): *The Gutenberg Galaxy: The Making of Typographic Man*. University of Toronto Press.

Moon, A. (2022): *Social Media and Financial Literacy: Where Millennials and Gen Z are Learning about Money?* https://chartwellagency.com/social–media–and–financial–literacy–where–millennials–and–gen–z–are–learning–about–money/.

New York Post (2009): *The Only Thing Useful Banks Have Invented in 20 Years is the ATM*. https://nypost.com/2009/12/13/the–only–thing–useful–banks–have–invented–in–20–years–is–the–atm.

Noussair, C. N. – Trautmann, S. T. – van de Kuilen, G. – Vellekoop, N. (2012): *Risk Aversion and Religion*. Tilburg University, Center for Economic Research Discussion Paper, No. 212-073. https://ssrn.com/abstract=2145276 or http://dx.doi.org/10.2139/ssrn.2145276.

Nykänen, M. (2023): *Opening Remarks at Bank of Finland Financial Literacy Conference*. Helsinki. https://www.suomenpankki.fi/en/media–and–publications/speeches–and–interviews/2023/deputy–governor–marja–nykanen–opening–speech–at–bank–of–finland–financial–literacy–conference–on–12–june–2023/.

OECD (2002): *OECD International Network on Financial Education*. https://www.oecd.org/en/networks/infe.html.

OECD (2018): *G20/OECD INFE Policy Guidance on Digitalisation and Financial Literacy*. http://www.oecd.org/finance/G20–OECD–INFE–Policy–Guidance–Digitalisation–Financial–Literacy–2018.pdf.

OECD (2022): *Multi-Dimensional Review of the Dominican Republic: Towards Greater Well-being for All.* Paris: OECD Development Pathways, OECD Publishing.

OECD (2023): *Digital Financial Literacy in Portugal: Relevance, Evidence and Provision.* https://www.oecd.org/finance/financial–education/digital–financial–literacy–in–portugal–relevance–evidence–and–provision.pdf.

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC

Ofcom. (2021): *Children and Parents: Media Use and Attitudes Report 2020/21*. https://www.connectivityuk.org/2021/04/28/ofcom–reports–on–media–use–and–attitudes–2020–21/.

Pásztor, S. (2018): The Future of Commercial Banks – Survival or Failure. *Izvestiya, Mezhdunarodnyy Teoreticheskiy i Nauchno–Prakticheskiy Zhurnal,* 23(4): 71–88.

Pásztor, S. – Pyatanova, V. (2017): Multinational Corporation Strategies for the Changing Patterns of International Trade. *International Trade and Trade Policy*, 2(10): 136–146.

Phan, D. T. (2020): I Have Seen the Future, and It Rings – What We Know About Mobile Banking Research. *Theory, Methodology, Practice*, 16(2): 69–79. https://doi.org/10.18096/TMP.2020.02.07.

President's Advisory Council on Financial Literacy (2009): *2008 Annual Report to the President*. https://www.academia.edu/6708140/Presidents_Advisory_Council_on_Financial_Literacy_2008_Annual_Report_to_the_President.

PwC (2023): *PwC's Global Workforce Hopes and Fears Survey: Is Your Workforce Reinvention Ready?* https://www.pwc.com/gx/en/issues/workforce/hopes–and–fears.html.

Ramsey Solutions (2023): *Which States Require Financial Literacy for High School Students?* https://www.ramseysolutions.com/financial–literacy/states–require–financial–literacy–in–high–school.

Schleicher, A. (2014): *Equity, Excellence and Inclusiveness in Education: Policy Lessons from Around the World. International Summit on the Teaching Profession*. Paris: OECD Publishing. https://doi.org/10.1787/9789264214033–en.

Shelly, L. (2023): *Finance Influencers Outpace Other Industries in Subscriber Growth*. https://www.performancemarketingworld.com/article/1809271/finance–influencers–outpace–industries–subscriber–growth.

Tran, L. Q. T. – Phan, D. T. – Herdon, M. – Kovács, L. (2022): Assessing the Digital Transformation in Two Banks: Case Study in Hungary. *AGRIS on-line Papers in Economics and Informatics,* 14(2): 121–134. https://doi.org/10.7160/aol.2022.140210.

Tsendsuren, S. – Wong, W–K. – Li, C–S. (2024): Cognitive Abilities and Household Financial Portfolios in Association with Economic Development and National Health System: A Cross–Country Analysis Based on SHARE Data. *Acta Oeconomica,* 74(3): 379–404.

United Nations Development Program (2022): *Human Development Report, 2021/2022*. https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22reportenglish_0.pdf.

Urban, C. – Schmeiser, M. – Collins, M. J. – Brown, A. (2020): The Effects of High School Personal Financial Education Policies on Financial Behavior? *Economics of Education Review*, 78. https://doi.org/10.1016/j.econedurev.2018.03.006.

Walstad, W. – Urban, C. J. – Asarta, C. – Breitbach, E. – Bosshardt, W. – Heath, J., … Xiao, J. J. (2017): Perspectives on Evaluation in Financial Education: Landscape, Issues, and Studies. *The Journal of Economic Education*, 48(2): 93–112. https://doi.org/10.1080/00220485.2017.1285738.

World Economic Forum (2023): *Cybercrime and Violent Crime Are Converging: Here's How to Deal with It*. Oct 31, 2023.

ZayZoon (2023): *What It Will Take for Gen Z to Embrace Traditional Banks*. https://thefintechtimes.com/zayzoon–what–it–will–take–for–gen–z–to–embrace–traditional–banks/.

Open Access statement. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited, a link to the CC License is provided, and changes – if any – are indicated. (SID_1)

Brought to you by MTA Titkárság - Secretariat of the Hungarian Academy of Sciences | Unauthenticated | Downloaded 02/24/25 01:19 PM UTC