

Is financial knowledge enough? Reviewing impact assessments of financial education interventions

This article reviews 68 studies on financial education interventions in OECD countries from 2010 to 2024. While financial education often improves knowledge, its effects on attitudes and behavior are mixed and vary across contexts. We offer recommendations to improve the comparability of future studies and better identify what makes programs effective.

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Evidence on financial education for children

Financial education for children often begins in secondary school, delivered through short lessons focused on basic financial knowledge. While short-term gains are evident, effects on attitudes and behavior are mixed and long-term impacts remain unclear.



Evidence on financial education for adults

Financial education programs for adults vary widely, from one-on-one coaching to group courses for the general public or vulnerable groups. Many improve participants' short-term financial knowledge and some financial behaviors, but inconsistent study designs hinder comparisons and broader conclusions.



Recommendations for future research

To improve the comparability of future studies, we recommend that, among other suggestions outlined in this paper, researchers and program designers identify key causal pathways between financial education and specific outcomes, and more clearly document program features that are likely to influence program effectiveness.

Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or the Eurosystem.

Abstract

This article presents a thematic review of the financial literacy evaluation landscape in OECD countries from 2010 to 2024, analyzing 68 (quasi-)experimental and peer-reviewed studies. We identify key patterns across study contexts, intervention types, outcome measures, results and methodological approaches. Our findings indicate that financial education interventions consistently improve financial knowledge across diverse contexts and target populations. However, evidence on their impact on financial attitudes and behaviors remains mixed and appears to be largely contingent on the intervention and study design. Given the considerable heterogeneity across studies, we propose methodological guidelines to enhance comparability and facilitate more robust conclusions on intervention effectiveness. To better understand the relation between financial education interventions and intended impacts, we recommend that future studies place a stronger focus on the underlying causal mechanisms and devote greater efforts toward assessing these effects in study designs.

Introduction

The rise of financial literacy and financial education as a policy and research topic can be understood as a reaction to developments of the financial landscape in the late 20th and early 21st century: Increased globalization, digitalization, the proliferation of complex financial products and increased economic and financial uncertainty (including various global crises) have created a financial environment that is increasingly difficult to navigate.

Indeed, consumers' financial literacy appears to be linked to financial stability and well-being on a global scale; the 2008 financial crisis has been attributed, in part, to consumers' lack of financial literacy (see e.g. Kovács and Terták, 2019; Shiller, 2008). This may also explain the sharp increase in policy focus and the exponential growth of research output on financial literacy starting after 2009 (see Goyal and Kumar, 2021).

However, knowledge and skills concerning the management of personal financial resources were certainly relevant before and topics and themes of financial skills do not appear to have changed much in the past century. In 1926, Clason already wrote about topics such as controlling expenditures, saving, compound interest, planning for the future, the risk of investments and home ownership (Clason, 1926). While more complex financial topics are the focus of specialized fields of financial education and financial literacy (for example digital financial literacy, see e.g. Lyons and Kass-Hanna, 2022), the majority of financial education interventions appear to focus on basic issues of personal finance.

Nevertheless, the scientific research field on financial literacy is still very young. The field is not only characterized by a lack of conclusive empirical evidence but also by substantial heterogeneity in definitions and theoretical assumptions. Definitions of financial literacy can vary considerably in terms of the assumed goal dimensions, traits, behaviors and content areas.¹ The prevalent heterogeneity in the field can also be observed in financial education interventions themselves, in target populations, the educational environment, desired outcomes of interventions and study designs.

Evidence from correlational studies indicates that financial literacy (in terms of financial knowledge) is strongly linked to financial behaviors. Several meta-analyses have been conducted to assess the effectiveness of financial education interventions on financial knowledge and behaviors (the most recent being Kaiser et al., 2022). However, meta-analyses showcase how drawing universal conclusions is severely

¹ Zieser et al. (2024) explore the concept of financial literacy in more detail in a previous issue of the OeNB Financial Literacy Evaluation Series.

limited by heterogeneity in the design and context of interventions and by insufficient reporting on intervention details. Existing meta-analyses provide little information on underlying causal mechanisms as they rely on a small set of broad metrics that are applicable to the whole study pool.

In contrast to meta-analyses, this paper employs a different approach by thematically reviewing the diverse landscape of financial education studies. First, we review studies to identify patterns across study contexts, intervention types, outcome measures, results and methodological aspects. Where possible, we aim to offer guidance on program characteristics that show promising effects on financial literacy. Second, building on the observations from the literature review, we offer methodological recommendations. These recommendations aim to enhance the quality and comparability of research on financial education interventions and to facilitate more robust meta-analyses and systematic reviews in the future.

For the review we adopted the following methodical approach: We conducted a search² for peer-reviewed journal articles that report on the effects of financial education interventions on financial literacy (including knowledge, attitudes and behaviors) or financial well-being. The publication period we reviewed was January 2010 to April 2024. We limited our scope to studies conducted in OECD member countries to reduce the overall complexity and heterogeneity stemming from countries' economic conditions and education systems. We further limited our study pool according to the study design, only including (quasi-)experimental studies that (1) compared at least two treatment groups or included a control group and that (2) either used randomized group assignment or a quasi-experimental design with a clear identification strategy. The latter category predominantly used pre- and post-test designs and difference-in-difference estimation.

Our search and selection resulted in 68 studies, which we categorized based on the target population: 29 interventions focused on children and adolescents and 39 on adults. Given the substantial heterogeneity in interventions for adults, we further subdivided them into four groups: (1) interventions targeting vulnerable populations, (2) interventions focusing on retirement savings, (3) interventions applicable to the general adult population and (4) interventions with college or university students.

This article was written for financial education program designers and educators interested in evidence-based financial education results. It also serves researchers and policymakers by providing an overview of the current landscape of financial literacy program evaluations and offering methodological recommendations for advancing this field of research. Additionally, this article is a key component of the OeNB Financial Literacy Evaluation Series³, which links the exploration of the concept of financial literacy in research and policymaking (Zieser et al., 2024) and several practice-oriented issues on evaluation methods (see e.g. Felbermayr, 2024; Lorenz, 2024).

The remainder of this article is organized as follows. In section 1, we introduce the concept of financial education as it is used in empirical research, specifically in relation to financial literacy. Section 2 provides an overview of prior empirical evidence, drawing on insights from meta-analyses. In section 3, we summarize the key characteristics of financial education evaluations for children and adolescents. Section 4 presents our findings for adults, with subsections dedicated to the four adult subgroups discussed earlier. In section 5, we synthesize the findings from the sections on both children and adults to draw conclusions about which types of financial education interventions are effective for different groups. Finally, section 6 offers methodological recommendations for addressing the limitations of existing evidence, providing guidance for future financial education evaluations.

² We conducted a search on the Scopus database and Google Scholar and included all studies from recent meta-analyses that fulfilled our criteria (in particular Kaiser and Menkhoff, 2017, 2020, 2022).

³ All issues of the OeNB Financial Literacy Evaluation Series can be found under <https://www.oenb.at/en/Publications/financial-literacy/financial-literacy-evaluation-series.html>.

1 Financial education in empirical research on financial literacy

In the international literature surrounding the concept of financial literacy, financial education is generally considered a *determinant* of financial literacy and the primary way to foster financial literacy through active intervention and, by extension, to promote beneficial financial behaviors and financial well-being. The World Bank, for example, follows the understanding that “*financial education is a tool for increasing consumer financial literacy,*” and financial education programs are “*tools for increasing consumers’ financial literacy and capability*” (World Bank, 2014, p. 1).

Financial education can also be considered either the input or the process that leads to financial literacy. The OECD considers it “*the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being.*” (OECD, 2021, p. 21). This definition puts the focus on the active *process* by which people acquire knowledge, skills and confidence. Conversely, financial education could also be defined as the “*input intended to increase a person’s human capital, specifically financial knowledge and/or application (i.e., financial literacy)*” (Huston, 2010, p. 308). Such a definition emphasizes the *input*, i.e. the role of the education intervention.

Depending on the definition of financial literacy, any intervention that addresses financial literacy could thus be considered to be a financial education intervention. In case of the OECD’s definition of financial literacy (OECD, 2020), this could be any intervention addressing any or all of the components “financial knowledge,” “financial attitudes” and “financial behaviors,” with the ultimate goal to improve financial well-being. This appears to be in line with the empirical literature, where approaches that address e.g. saving attitudes or behavior directly, without aiming to improve knowledge, are regularly subsumed under the financial education umbrella. We thus apply this prevalent understanding of financial education for the selection of studies for this review article.

There is debate over whether financial education should focus on economic knowledge applied to decision-making or directly foster prudent financial behaviors (Bartholomae and Fox, 2022). Additionally, some argue that financial education should go beyond personal finance, viewing it as a subset of economic education (Retzmann and Seeber, 2016), while others criticize a narrow “consumer training” approach and advocate for developing critical, reflective decision-making skills (Baumann and Hall, 2012). For the purpose of this review, however, we follow what has been considered financial education in the empirical literature on financial literacy. In subsection 6.1, we discuss causal channels that future research could explore.

The main causal pathway assumed for the majority of financial education interventions appears to be via knowledge, where an intervention improves knowledge, which in turn enables desired behaviors, financial well-being or other desirable outcomes. However, the theoretical underpinnings of this assumed causal chain is rarely clearly stated, let alone explicitly formalized or analyzed.

Nevertheless, empirical research on the isolated link between financial knowledge and financial behavior appears to be abundant. Financial knowledge has been associated with positive financial outcomes (see Gomes et al., 2021), such as financial planning (e.g. Lusardi and Mitchell, 2011a), savings (e.g. Jappelli and Padula, 2013), more sophisticated investment behavior (Gaudecker, 2015; Rooij et al., 2011) or less risky mortgages as an important mechanism in preventing financial crises (e.g. Gerardi et al., 2010; Klapper et al., 2012; Zahirovic-Herbert et al., 2016). Moreover, financial knowledge appears to have a significant relationship with financial well-being that is mediated via financial behaviors (ANZ Bank New Zealand Limited, 2021; Hwang and Park, 2023). However, these results are exclusively based on correlational studies.

Evidence on the causal effects of financial education interventions is less clear. Kaiser and Lusardi (2024) highlight the growing evidence from meta-analyses, from recent natural experiments, particularly those on mandatory financial education in high schools and from a relatively new wave of experimental

literature on what the authors label “innovative” financial education measures for adults. They emphasize that factors such as relevance to the situations of participants, accessibility and entertainment value, as well as scalability seem to be important factors for the effectiveness of these initiatives. However, they also conclude that the causal mechanisms driving the effects of financial education remain largely unclear.

The heterogeneity of financial education interventions and related research can be attributed to the concept of financial literacy. Positioned at the center of the assumed causal chain between financial education and financial behavior or financial well-being, financial literacy itself lacks a coherent, accepted definition in the existing literature. Definitions of financial literacy differ, for example, in terms of envisioned content areas and situations in which it is applicable, but also with regard to its specific goal dimensions and the extent to which behavior is included as a component of financial literacy (see Zieser et al., 2024 for an overview). Of course, the same heterogeneity can also be expected in concepts of financial education as the primary form of intervention addressing financial literacy and in financial behaviors and financial well-being as the central downstream outcomes.

Heterogeneity of the financial education literature also stems from empirical studies on interventions. This becomes especially apparent in meta-analyses. Fernandes et al. (2014), for example, provide little information on the specific design of interventions considered. Instead, they state: “*It is striking how many papers do not give enough details about their financial education interventions to be able to code for variables that might plausibly affect their effect sizes.*” (p. 29). They thus recommend that authors report key aspects of the intervention. Similarly, Kaiser et al. (2022) cluster studies by outcome variables and by intervention format (e.g. classroom- or online-based), but do not provide any classification based on intervention content, curriculum or didactic aspects. Moreover, Fernandes et al. (2014) observe a distinct disconnect between theoretical concepts addressed in the studies and how they are measured. They find that financial literacy appears to be frequently defined as a skill or form of expertise. In empirical studies, however, the concept is typically measured merely through a small number of knowledge questions on financial topics.

As opposed to trials testing the effectiveness of clearly defined interventions and outcomes (e.g. drug trials), research on financial education interventions may thus be considered too heterogeneous to draw clear conclusions (see Willis, 2022, for a critical discussion of this heterogeneity). Despite increasingly large study pools analyzed in meta-analyses, it remains unclear what the “active ingredients” of financial education are and by which causal mechanisms they improve which desired outcomes. Nevertheless, there is mounting evidence from meta-analyses that interventions *typically classified* as financial education exert, on average, a positive influence on financial knowledge and, to a lesser degree, on financial behaviors. The following section summarizes such causal evidence from the most prominent meta-analyses.

2 Prior evidence from meta-analyses

Several meta-analyses on the effects of financial education have been conducted in the past decade. Due to a rapidly growing number of empirical studies over the past two decades, meta-analyses were able to use increasingly strict inclusion criteria with regard to the study design. Overall, conclusions from meta-analyses are fairly consistent: On average, financial education interventions increase financial knowledge. Effects on financial behaviors also appear to be positive, but evidence is considerably weaker.

In one of the first meta-analyses, Fernandes et al. (2014) incorporated both econometric and (quasi-) experimental studies reported in 168 papers in which financial literacy was either measured or manipulated through education interventions. Similarly, Miller et al. (2015) analyzed 188 studies with results from studies on “financial literacy and capability interventions.” Kaiser and Menkhoff (2017) narrowed the methodical scope of studies and included 126 (quasi)experimental studies. Kaiser and Menkhoff (2020) analyzed 37 (quasi-)experimental studies conducted in schools. Lastly, Kaiser et al. (2022) focused exclusively on 76 randomized experiments.

In meta-analyses, authors typically code studies according to intervention and study characteristics to create variables which are tested for effects on the overall impact of financial education. Fernandes et al. (2014), for example, coded studies according to the intensity of the intervention, the type of intervention (high school, counseling, seminar or workshop, multiple sources, information exposure), the type of behavioral outcome assessed (saving, planning for retirement, absence of debt, stock ownership and investment decisions, cash flow management, activity in retirement plans, financial inertia), the delay in months between intervention and measured behavior and other study and population characteristics. Other meta-studies used similar approaches. It is important to note that none attempt to cluster the thematic focus or hypothesized causal mechanisms of interventions themselves.

Fernandes et al. (2014) find that correlations between measured financial literacy and behavior exceed the comparatively small effects on behavior found in studies where financial literacy was influenced, which suggests that correlations between financial literacy and behaviors cannot serve as suitable indicators for the effectiveness of financial education. While they report stronger overall effects for high-intensity education interventions, they also find a rapid decay of the effects. They also find that seminars or workshops, counseling and financial education in high schools show the strongest effects, mere exposure to information about financial education the weakest. Using an extended study pool of studies assessing financial education interventions, Miller et al. (2015) use a detailed classification of outcome variables, combining results for the following binary outcomes: “savings reported in past period,” “contributes to retirement savings,” “defaulted on a loan” and “keeps financial records/budgets” (p. 234). Overall, their analysis suggests that saving and recordkeeping behavior are impacted most by financial education interventions.

Only considering (quasi-)experimental studies, Kaiser and Menkhoff (2017) find that financial education strongly affects financial literacy and that it has a small but measurable effect on financial behavior. Some outcomes, such as borrowing behavior, appear more difficult to affect than others, such as budgeting or saving. Concerning the interventions themselves, they find that higher-intensity financial education generally shows stronger effects and that the type of intervention determines effect sizes. Mandatory education, in particular, exhibits weaker effects than voluntary education interventions. Education at a “teachable moment” or “just in time” for relevant decisions provides stronger effects, but no differences are reported with regard to intervention channel and format. Focusing on the school context only, Kaiser and Menkhoff (2020) find results similar to those found in the general population, namely that there are clear and pronounced effects on financial knowledge and less certain effects on financial behavior. More intense treatments produce stronger effects and there appears some decay of the effect on knowledge over time. As school-specific results, the authors find that smaller class sizes appear to be associated with stronger treatment effects.

In the most recent meta-analysis that attempts to identify a generalizable effect of financial education, Kaiser et al. (2022) only consider randomized experiments. In their analysis, they find statistically robust effects of financial education on both financial knowledge and financial behaviors. In contrast to Fernandes et al. (2014), the authors do not find evidence of rapid decay of the effects over time. A small number of studies covering time spans longer than 18 months, however, limit the conclusiveness of this result. Concerning the types of interventions, Kaiser et al. (2022) conclude that, on average, classroom financial education appears to be effective, while less costly and less intensive interventions (such as information “nudges”) are less effective. More costly personalized interventions (such as counseling) appear most effective. In line with previous meta-analyses, the authors find stronger effects on certain outcomes, in particular financial knowledge, budgeting and saving, and smaller effects on credit, insurance and remittance (money transfer) behavior. The authors tie these differences in outcomes to a predominant focus of

studies on saving and budgeting behavior and to different causal mechanisms by which financial education can affect different types of behavior.

3 Financial education for school children

Financial education interventions are frequently targeted at children and adolescents (e.g. Mauser et al., 2024). Consequently, it is valuable that many impact evaluations analyze interventions aimed at this group of people. In fact, 43 % of studies in our study pool examine interventions for children and adolescents. Except for one study (Migheli and Coda Moscarola, 2017), all of them take place within formal schooling settings. Therefore, we frequently refer to interventions in this section as “school-based.”

Although financial education programs for children vary in implementation details and pedagogical approaches, they tend to be more homogeneous compared to those targeting adults. This greater consistency is especially apparent in the specific target population (programs designed for specific age groups), the setting (typically school-based), limited variations in program intensity and less diverse contents covered. Additionally, the large share of rigorous school-based evaluation studies contributes to a more reliable assessment of their effectiveness.

Given this comparatively higher consistency, this section first aims to provide an overall summary of the key characteristics of financial literacy evaluations for children and adolescents. The remainder of this section highlights emerging patterns found in interventions’ content and conceptual focus, explores differences between well-established education initiatives with pilot programs, and addresses variations of program development and implementation, outcome measures and effects, as well as teacher training and parental involvement. To better contextualize results and guide their interpretation, we additionally expand on existing literature beyond our study pool.

3.1 Main study characteristics

School-based interventions are typically designed to align with specific educational levels and target students, rather than other influential stakeholders within the school system, such as teachers or parents. We will discuss their role in sections 3.7 and 3.8. Financial education evaluations begin at grade four in primary school, corresponding to children aged approximately 8–11 years in most countries. Research suggests that children make significant advancements in their financial and economic understanding between the ages of six and twelve. This development is largely attributed to cognitive growth, socialization and early personal financial experiences. Even below that age, important cognitive abilities, such as executive functioning, basic numeracy and financial attitudes start to form (see for example Consumer Financial Protection Bureau, 2016b; Van Campenhout, 2015; Webley, 2005). However, our study pool does not include interventions targeting students below the age of eight, likely because financial education programs and their impact evaluations are less common at very young ages (Holden et al., 2009).

Studies of secondary school interventions predominantly focus on grades eight and nine with students approximately aged 13–14, whereas interventions aimed at primary school students are less frequently available. Though less common, some research also explores interventions tailored to specific tracks, such as students in vocational education tracks (see e.g. Amagir et al., 2022), or schools with a high proportion of socioeconomically disadvantaged students (see Gill and Bhattacharya, 2015; Lührmann et al., 2015, 2018).

For the interventions studied, financial literacy is to a large extent not part of the standard curriculum. Nevertheless, school-based financial education interventions are typically taught during regular school hours, either (1) as part of a specific subject, (2) integrated across multiple subjects, or (3) as an extracurricular activity within standard schooling hours. Importantly, all approaches imply that programs are usually mandatory for students. At the primary school level, integration across subjects and extracurricular

activities are the most common formats in our sample. In secondary schools, all three formats exist. For detailed information on program intensity for each study see table 1 in the annex. The following programs illustrate the three different implementation approaches:

Amagir et al. (2022) examined a subject-specific financial education program for adolescents with eight weekly lessons focusing on financial decision-making. The program was implemented in either economics or social studies classes and taught by economics teachers. Students in the control group followed the standard economics curriculum, which gave minimal attention to the topics covered in the treatment group. They found positive effects on financial knowledge and financial behaviors but no effect on financial attitudes.

Batty et al. (2020) tested the effect of an experimental non-lecture-based program. Instead of lectures, activities were integrated across the school day in a simulated classroom economy with students receiving artificial money in exchange for individual responsibilities in class (i.e. a “classroom job”) which they could use for rent and other expenses, save or spend on rewards. They report positive effects for financial knowledge, but they did not investigate other financial outcomes.

Moscarola and Kalwij (2021) analyzed the impact of an extracurricular visit to the “museum of savings” in Turin, where primary school students watched videos and played games related to economic and financial topics. They showed increasing financial knowledge for topics that were explicitly taught during the visit.

Given that financial literacy is not widely embedded in curricula, most interventions are short in duration, often spanning only a few hours or lessons over several weeks, with limited variation in program length across studies. Due to the limited variation, we are unable to find patterns in the role of program intensity in determining effectiveness. Kaiser and Menkhoff (2020) found that smaller class sizes enhance program effectiveness; however, this information was not available for the studies we considered.

Given that disadvantaged children may benefit most from financial education (see OECD, 2024), one key advantage of school-based interventions embedded within regular school hours is that all students participate, given that schools, headmasters or teachers sign up for the program. In contrast, programs with voluntary participation for children offered outside of school hours may be subject to major selection biases, particularly due to parents’ and students’ self-selection (see subsection 6.9). Among the studies we reviewed, the only intervention conducted outside of school hours was investigated by Bhattacharya, Gill and Stanley (2016), who examined a one-week financial literacy summer camp. Their findings suggest that parents with present bias – those who undervalue the long-term benefits of the program – are less likely to enroll their children.

3.2 Content and conceptual focus

Financial education programs for children and adolescents aim to equip students with essential personal finance skills. These programs typically cover topics that can be categorized as *basic money management*, *saving and investing*, *credit and borrowing*, *banking and financial services*, *economic literacy and financial risk management*. For details on the content focus of each study, see table 1 in the annex.

Many interventions primarily focus on building *basic money management skills*, such as distinguishing between needs and wants, tracking income and expenses (budgeting), setting spending limits and financial goals. These fundamentals are often taught alongside *saving and investing*, where students learn the benefits of regular saving, the role of interest in wealth accumulation, and various saving options, including bank accounts and investment products. Overall, saving and investing is the most commonly taught topic.

Beyond basic money management and saving, approximately one-third of programs introduce students to the topic *credit and borrowing*. These lessons help students understand how loans and credit cards function, including interest rates and repayment terms. They may also explore the potential consequences of accumulating debt and strategies to avoid excessive borrowing. Similarly, about one-third of programs

cover the role of *banks and financial institutions*, teaching students about different types of accounts, payment methods, and how financial institutions facilitate saving and borrowing. Some programs cover *financial risk management*, where students learn about insurance as a safeguard against financial loss and how to identify and mitigate financial risks, including fraud and identity theft.

Only a limited number of programs extend beyond personal finance to incorporate economic literacy, some introducing students to fundamental economic concepts relevant for personal money management such as scarcity, trade-offs and market forces, along with supply and demand (Bhattacharya and Gill, 2020; Bhattacharya, Gill and Stanley, 2016). Others provide an introduction into more general economic topics like inflation or the origins of money (Kalwij et al., 2019; Moscarola and Kalwij, 2021; Sconti, 2022). A few studies explore business or entrepreneurship education, providing students with insights into starting and managing businesses (Kalmi and Rahko, 2022; Kalwij et al., 2019). Few studies also incorporate topics such as earning an income (Kalwij et al., 2019; Walstad et al., 2010).

The primary conceptual focus of the reviewed programs is often on teaching financial knowledge rather than fostering positive attitudes or changing financial behaviors, though this is not always explicitly stated. As we will demonstrate in more detail below, school-based financial education programs generally show positive effects on financial knowledge, but their impact on financial behaviors and attitudes is mixed. Given that most studies primarily emphasize financial knowledge, these findings are not particularly surprising. Studies that *explicitly* focus on financial behaviors or attitudes – particularly those addressing children’s everyday financial experiences – tend to yield more favorable results in these areas (see subsection 6.1 for a discussion on classifying studies by causal mechanisms). Below, we present three studies illustrating this.

For instance, Amagir et al. (2022) integrated personal and group goal setting into the curriculum, encouraging students to establish and work toward their savings objectives. This goal served as a practical framework to apply financial literacy concepts, such as tracking their spending and developing practical saving strategies. It also fostered discussions on financial matters with peers and family through home assignments and promoted reflection on money habits and comparisons using research data. Additionally, students received practical rule-of-thumb advice, such as how small amounts can contribute to achieving savings goals. Amagir et al. (2022) found positive effects on financial behaviors (saving behavior and engagement in financial activities such as budgeting and making ends meet), at least in the short run. Maldonado and De Witte (2021) evaluated a computer game designed to teach students about payment methods and financial security. Their findings indicated that 13–14-year-old students who played the game made better decisions in simulated scenarios involving online fraud, payment safety and digital advertising.

While financial behaviors may be built when children themselves start to act in financial situations, the development of financial attitudes has been demonstrated to already start at the age of primary school education (see Consumer Financial Protection Bureau, 2016b; Van Campenhout, 2015). Regarding attitudes, Migheli and Coda Moscarola (2017) conducted a laboratory experiment with primary school children, where they were asked to draw an item they wished to save for and then discussed with instructors how much money they would need to purchase it. To measure the program’s effect on patience, the researchers conducted a patience exercise both before and after the drawing exercise. While the direct impact of the program on reducing impatience was weak, the combination of the intervention and repeated exposure to patience exercises significantly improved children’s ability to delay gratification.

The relationship between conceptual focus and program outcomes is not always straightforward. Some studies that primarily target financial knowledge still report positive effects on attitudes and behaviors, while others that focus on behavior and attitudes show mixed results. Another challenge in drawing

clear conclusions is that while many studies specify the topics they teach, it remains difficult to determine whether they approach these topics through a knowledge-based, attitudinal or behavioral lens.

Another important consideration is the type of financial knowledge being taught. Many of the reviewed studies do not specify whether their programs focus on static, conceptual knowledge – such as factual information about financial concepts – or on equipping students with adaptable skills (procedural knowledge) that prepare them for diverse financial challenges. The limited scope of topics covered and the limited focus on attitudes, behaviors and adaptable skills may be due to the short duration of most programs, which typically last only a few hours.

To sum up, existing financial literacy studies primarily focus on teaching knowledge of personal finance topics, while less emphasis is placed on fostering financial attitudes, behaviors and adaptable skills. Interventions that establish a connection with children’s everyday financial experiences tend to be more likely to have an impact on students’ financial attitudes and behaviors. However, further research and more transparent reporting are necessary to confirm these findings.

3.3 Well-known programs vs. piloting programs

Some studies evaluate the effectiveness of well-established and widely used financial education programs, while others either develop a new program for the underlying study or investigate the impact of a pilot or lesser-known initiative. The widely used programs are typically characterized by distinct branding including a website with information about the program and materials and lesson plans that can be freely downloaded or are available upon registration. The following programs fall into this category:

- Financial Fitness for Life⁴ (FFFL), a program that reaches over 15 million US students each year and has been evaluated by Batty et al. (2015), Bhattacharya, Gill and Stanley (2016) and Gill and Bhattacharya (2015) in the study pool we considered. The program was developed by the Council for Economic Education and teaches broad financial literacy including most of the topics mentioned at the beginning of this section through instructional materials from kindergarten to grade 12.
- FutureSmart⁵, a program developed by the MassMutual Foundation that reached almost 6 million students and was evaluated by Johnson et al. (2021). Through a story-driven narrative and interactive activities, students take on the role of the mayor of a town, where they must navigate real-life financial decisions. They learn skills like saving, budgeting, education and career planning to achieve important financial goals.
- Hands on Banking⁶ (HOB) was part of the program evaluated by Bhattacharya, Gill and Stanley (2016) and is a real-world money management simulation, where young people learn financial skills like budgeting, comparison shopping and evaluating needs, wants and trade-offs. The program was developed by Wells Fargo Bank.
- My classroom economy⁷ (MCE) evaluated by Batty et al. (2020), a program where students earn salaries for completing classroom tasks, manage expenses such as paying rent for their desks, receive bonuses or fines based on behavior and performance and make spending decisions at in-class auctions or stores. The program was designed to integrate into the school day without requiring significant instructional time or specialized teacher training.
- My Finance Coach (discontinued) evaluated by Lührmann et al. (2015, 2018). The My Finance Coach Foundation GmbH provided interested schools and teachers with free educational materials on

⁴ Council for Economic Education (2025).

⁵ MassMutual Foundation (2025).

⁶ Wells Fargo (2025).

⁷ Vanguard (2025).

financial topics. Teachers would receive the materials, including all necessary worksheets in class sets, after they had participated in online teacher training sessions. Main topics include buying, planning, saving, risk management.

- Stock Market Game⁸ (SMG) evaluated by Bhattacharya, Gill and Stanley (2016), Gill and Bhattacharya (2015), Harter and Harter (2010) and developed by the SIFMA Foundation. In the program, students manage a virtual portfolio of 100,000 dollars and invest under real-time stock market conditions. They research, buy, sell and monitor their virtual investments, adjusting their portfolio based on real-world market data. The game concludes after a set period, after which students analyze their performance and reflect on their strategies.

All listed programs, except My Finance Coach, originated in the USA. Overall, most well-known programs show positive effects on financial knowledge. However, studies investigating financial behavior found no significant impact on behavior (Batty et al., 2015; Johnson et al., 2021; Lührmann et al., 2015). Findings on financial attitudes are mixed: While Lührmann et al. (2015) and Lührmann et al. (2018) reported positive effects for My Finance Coach, no significant effects were found for the adapted FFFL program (Batty et al., 2015) or FutureSmart (Johnson et al., 2021).

Some interventions combine multiple programs. For example, Harter and Harter (2010) combined SMG with a complementary stock market learning curriculum. Similarly, Gill and Bhattacharya (2015) integrated SMG with their broader stock market learning curriculum and tested it against the FFFL program. In both interventions also elements of HOB were used. Bhattacharya, Gill and Stanley (2016), on the other hand, combined FFFL and elements of a stock market curriculum including SMG in their intervention. Gill and Bhattacharya (2015) found that the broader financial literacy program outperformed the curriculum with special focus on the stock market and investing in financial knowledge. They argue that deeper engagement with learning and applying economic principles creates spillover effects in financial knowledge, ultimately enhancing performance on questions assessing overall financial literacy. Effects on financial attitudes and behaviors were not investigated.

Comparisons of well-known programs and pilot programs reveal no significant patterns in reported effects. Moreover, well-known programs are typically evaluated on a similar scale as pilot initiatives, with most evaluations including 600–2,000⁹ student observations, while only a few interventions rely on notably smaller samples of fewer than 200 students (Bhattacharya, Gill and Stanley, 2016; Gill and Bhattacharya, 2015; Migheli and Moscarola, 2017; Özdemir and Kaya Uyanik, 2021). Sample attrition is a major issue in many interventions (see subsection 6.8 for a discussion of sample attrition and possible mitigation strategies).

3.4 Didactic aspects – experimental, active individualized learning

Most of the studies considered involved teaching methods with experiential or active learning elements. According to Burch et al. (2019), experiential learning occurs when “*students actively process an experience that leads to new knowledge, skills, or insight*” (p. 242). This approach provides students with regular opportunities to integrate conceptual, procedural and factual knowledge, supporting deeper understanding and advanced learning (Burch et al., 2019). Examples of experiential financial education include simulated financial scenarios (e.g. stock market games, business management simulations) and real-world financial experiences (e.g. opening and managing a savings account). Active learning, in contrast, prioritizes student engagement, participation and critical thinking over passive information absorption. This approach employs instructional methods such as discussions, problem-solving, case studies, hands-on experiments and group work, requiring students to actively engage in the learning process.

⁸ SIFMA Foundation (2025).

⁹ The studies with the highest numbers of observations are Dare et al. (2020), De Witte et al. (2020), Iterbeke et al. (2020) and Sule and Seda (2018) with more than 2,000 observations each.

Experiential learning has demonstrated positive effects on students' overall learning outcomes (Burch et al., 2019). Research further suggests that experiential learning may be particularly effective in enhancing financial literacy compared to traditional teaching approaches (Amagir et al., 2018). Experiential learning may be especially well-suited for improving financial literacy, as it "(...) *has the potential to engage students in topics of interest to them, and it provides opportunities to explore how financial concepts can be applied to real-world situations.*" (Amagir et al., 2018, p. 75). However, the evidence supporting the impact of active learning on financial literacy is limited and its effect has not been directly addressed in our study pool.

Identification of the causal role of experiential versus active learning is often not possible due to inconclusive descriptions of instructional approaches used. Only some recent studies explicitly integrated experiential learning as a core didactic element (see e.g. Amagir et al., 2022; Batty et al., 2020; Kalmi and Rahko, 2022). Among these studies, only Kalmi and Rahko (2022) directly compared experiential learning to traditional methods, reporting that experiential approaches yielded the highest positive impact. However, the study had some major limitations, including non-random program assignment, an imprecise intervention design and significant sample attrition, with a substantial drop in observations between pre-test and post-test. Several noncomparative studies also indicate that experiential learning enhances financial knowledge, though its effects on financial behavior and attitudes remain mixed.

As mentioned in subsection 3.2, Amagir et al. (2022) studied the effect of a program that incorporates several experiential learning principles (like setting personal saving goals) throughout the program as a framework to apply financial literacy concepts. The program was supplemented with animated videos and students were encouraged to discuss financial matters with peers and family using take-home assignments. The program demonstrated an immediate positive impact on financial knowledge and financial behavior but no effect on financial attitudes. However, nine months after the program, the effects vanished.

Similarly, Johnson et al. (2021) assessed a program incorporating both experiential and active learning elements. Secondary students assumed the role of a town mayor helping citizens make financial decisions. In one module, students advised a local resident on redecorating within a limited budget; in another, they assisted a character in saving for a trip while managing daily expenses. The study indicates positive effects of the assessed program on financial knowledge but no measurable impact on financial behavior or attitudes.

Next to experimental and active learning, a significant share of studies focused on individual student learning approaches, where students progressed through online learning paths at their own pace. Research suggests that tailored financial education programs are more effective (see Van Campenhout, 2015, for a review), and individualized student learning through adaptive learning paths may be an effective way to enhance financial literacy. For example, Compen, De Witte and Schelfhout (2020) assigned students to different learning paths based on their initial financial knowledge scores. De Beckker et al. (2021) examined a structured learning path featuring exercises, summaries and formative assessments. These exercises integrated videos, interactive learning games and case studies tailored to real-life financial experiences.

In summary, the inclusion of active and experiential learning approaches as well as self-paced and individualized learning programs seems to improve financial knowledge. However, they are not a universal solution for enhancing financial attitudes and behaviors. Further research is needed to determine which types of financial education are most effective in fostering positive financial attitudes and behaviors. For doing so, we suggest that researcher provide more information about the didactic focus of the program evaluated, as this aspect has often received limited attention in existing studies (for details see subsection 6.2).

3.5 Program development and implementation

Financial education programs in schools are often provided by external suppliers that implement curricula developed by universities, financial sector firms (such as investment firms and banks), government minis-

tries or non-profit organizations. As shown in subsection 3.3, many well-known programs originate from for-profit companies, but also piloting initiatives are frequently developed by for-profit firms.

Against the background of potential conflicts of interest, it is crucial to critically assess the motivations of these for-profit providers, particularly in the context of children's education. Without careful scrutiny, financial education could inadvertently serve as a tool for corporate influence rather than a neutral, skills-based approach to economic empowerment. For an overview of (private) stakeholders involved in financial education and their influence on the financial literacy landscape see Zieser et al. (2024).

In some cases, financial education programs are not only developed but also delivered by external instructors such as university professors or volunteer employees from firms involved in program design. These instructors typically teach during regular school hours and their involvement is also intended to increase standardized implementation of the program. However, most programs rely on students' regular teachers for implementation. For both teacher- and externally led programs, participation for schools is typically voluntary. Teachers and other school personnel either apply for the program themselves or are recruited by researchers or program developers. Consequently, students' access to financial education programs largely depends on teachers and school administrations, who serve as key gatekeepers.

Moreover, when teachers implement the program, they additionally determine both the content (e.g. which materials they use) and the teaching methods (e.g. instructional approaches), meaning that students experience the intervention indirectly through their teachers' mediation. To minimize the variability introduced by instructors, studies explore ways to standardize financial literacy instruction. Common strategies include: (1) providing standardized teaching materials to ensure consistency, (2) offering teacher training and additional instructional resources to improve delivery, (3) implementing self-directed learning models, where teachers assume the role of a coach or facilitator rather than a direct instructor. Under this approach, students primarily navigate digital materials at their own pace, consulting the teacher only when necessary. For more details on format and delivery channel of each intervention see table 1 in the annex.

As a result, some interventions are more standardized than others, offering predefined lesson plans and materials to ensure uniformity in delivery. Conversely, other programs provide minimal guidance and grant teachers flexibility in how they adapt and implement the content. This variability may lead to differences in program outcomes depending on teachers' approach and expertise. Since teachers – and in particular professional teacher training – play a central role in shaping students' learning experiences, we examine their influence in more detail in subsection 3.7.

3.6 Outcome measures and effects

As shown above, the conceptual focus of most school interventions lies on financial knowledge delivery. The evaluations also primarily assess the impact on financial knowledge. Approximately half of the school studies in our pool additionally also examine self-assessed (hypothetical) financial behaviors. Financial attitudes are studied either alongside with financial knowledge and/or financial behaviors or as the primary focus when the intervention specifically targets attitude. None of the considered studies investigated long-term impacts like financial well-being. In the context of school children, this appears appropriate because financial well-being as defined in the context of financial literacy cannot be considered a concept relevant for the population of children. However, financial well-being may be a relevant outcome measure for future long-term studies that follow children into adulthood.

For financial knowledge, a large proportion of studies report positive effects. In contrast, only a minority of studies find positive impacts on (self-reported or hypothetical) financial behaviors. This aligns with recent findings from a meta-study on the effectiveness of financial literacy in schools by Kaiser and Menkhoff (2020), who report the lowest effect sizes for financial education on financial behaviors for children. They note that measuring financial behavior is particularly challenging, as young people at this

stage have limited engagement in financial activities. In contrast to financial behavior, research indicates that financial attitudes begin to form as early as in primary school. However, the evidence on the effects of financial education on attitudes is mixed, with some studies reporting positive effects while others find no impact.

Only a handful of studies have conducted follow-up investigations, reassessing participants some time after the intervention. These studies generally find that effects persist for several months (Batty et al., 2015; Compen, De Witte and Schelfhout, 2020; Iterbeke et al., 2020). The only study examining long-term effects is Sule and Seda (2018), which assessed children's patience through an intertemporal choice task. Almost three years after the intervention, the effect of the educational program on patience was still present but slightly smaller than in the earlier assessments.

Although we find overall positive effects on financial knowledge and mixed effects on financial attitudes and behaviors, caution is required when interpreting these findings due to the varying definitions of these concepts. As discussed in Zieser et al. (2024), financial literacy and related concepts are defined and operationalized in diverse ways, varying in fundamental aspects of their understanding. This inconsistency poses challenges for impact evaluations, as different researchers may apply varying conceptual frameworks, making comparisons across studies difficult. Therefore, it is insufficient to rely solely on authors' claims that they measured financial knowledge (or any other outcome) – one must consider the individual measurement instruments used to determine what was actually measured.

For example, studies differ in their level of abstraction when measuring financial knowledge. Some apply widely used items such as Lusardi and Mitchell's "Big Three" to try to measure general financial knowledge (see e.g. Lührmann et al., 2018; Sconti, 2022) – while others focus on short-term learning gains with items closely linked to the intervention content (see e.g. Iterbeke et al., 2020). While neither approach is inherently superior, this variability introduces another source of heterogeneity that complicates comparisons across studies. A major limitation to the robustness of studies is that only very few use rigorously validated instruments (see subsection 6.4 for a discussion on validating outcome measures).

Studies measuring short-term financial knowledge gains do not always report positive effects, and the extent to which content-specific knowledge translates into broader financial understanding remains unclear. For example, Moscarola and Kalwij (2021) found that students' scores improved only for topics explicitly covered in their program, with smaller or no effects observed for other topics. Similarly, Bhattacharya, Gill and Stanley (2016) examined the impact of an additional 90-minute financial education session within an existing program and found no statistically significant effects, even for items directly related to the additional instructional content.

Similar challenges arise in defining and measuring financial behavior. Researchers do not use a single, standardized scale to assess financial behavior. Instead, they rely on diverse conceptual frameworks. Some studies measure hypothetical behaviors, such as savings intentions, consumer choices, decisions in fictional financial scenarios (e.g. payment safety, online fraud, advertising) and responses to hypothetical situations (e.g. receiving a suspicious email from a bank). Others assess self-reported, real-life financial behaviors, including actual savings, engagement with financial products, carefulness with different payment methods, financial planning, impulse shopping and making ends meet. As these examples illustrate, financial behavior measures vary widely – not only in distinguishing between hypothetical and real-life behaviors but also in the specific financial topics they cover. This heterogeneity further complicates cross-study comparisons.

Overall, financial education effectively enhances financial knowledge, but its impact on attitudes and behaviors remains mixed. Measurement inconsistencies and varying definitions complicate comparisons across studies, highlighting the need for standardized assessment methods. Long-term effects remain largely unexplored, and more research is needed, particularly for young children, as effects on behavior

and attitudes have not been examined at the primary school level, although findings on financial knowledge appear consistent across grade levels.

3.7 Professional teacher training

As discussed in section 3.5, students' teachers are frequently responsible for the implementation of the financial literacy program for children. Training them prior to their teaching in financial education programs is used in several interventions, though the extent and structure of teacher trainings vary. For most studies applying teacher training, the sessions typically last only a few hours.

Teacher training appears to be a critical factor influencing the effectiveness of financial education programs for two main reasons: The literature suggests that many teachers lack confidence in teaching financial topics, or in other words they lack what has been labeled "teacher self-efficacy". Additionally, they often do not possess sufficient financial knowledge to deliver financial education effectively (see e.g. Compen, De Witte and Schelfhout, 2019; Eisenhart, 2024; Sawatzki and Sullivan, 2017). Providing teacher training addresses these issues by familiarizing teachers with program materials, core topics and didactic approaches. Furthermore, if the training is specifically tailored to the materials and teaching methods of the program it is more likely that teachers implement the program as intended (Compen, De Witte and Schelfhout, 2019).

However, based on the training sessions used in the studies we considered, it is hard to draw definite conclusions about their impact on children's outcomes for the following reasons. First, studies provide limited details about the nature of teacher training and its actual implementation. Some report information about the teaching intensity, others only state that teachers have received training (see table 1 in the annex). Second, the training sessions are rarely evaluated. Instead, the relevance of teacher training is often inferred from student performance evaluations. For instance, Batty et al. (2015), Harter and Harter (2010) and Sconti (2022) collect teacher-level data alongside student data, but teacher data are mainly used as a control variables rather than being analyzed in depth. Most studies do not collect teacher-level variables at all. As a result, our understanding of the role of teacher characteristics, particularly their training experience, topical knowledge and self-efficacy, remains limited. This gap is also highlighted by Compen, De Witte and Schelfhout (2019) in a review of the impact of teacher professional development on financial literacy education. Key unresolved questions include whether the length of training, the level of program standardization, or the competencies and self-efficacy gained by teachers are most relevant for program effectiveness.

Still, a small number of recently conducted studies provide initial evidence on the role of teacher training. Two studies conducted in the Flemish region of Belgium between 2017 and 2021 as part of a larger research project examined teacher training alongside financial literacy program evaluations (Compen et al., 2023; Compen et al., 2020). In addition to an investigation of financial education interventions for secondary school students (De Witte et al., 2020), Compen, De Witte and Schelfhout (2020) assessed the effects of a three-hour webinar designed to enhance teachers' financial knowledge and pedagogical skills. The training included instruction on financial concepts (such as saving and investing), program materials and the didactic approach of self-regulated learning – an approach that that was used as part of the student intervention. Teachers participated in discussions, collaborative assignments and feedback sessions to refine their teaching methods. The study measured teachers' self-efficacy (confidence in teaching financial literacy) and teaching behavior before and after the student intervention. For teachers who attended the webinar they find an increase in self-efficacy between students' pre- and post-test, whereas those who did not participate experienced a decline. However, a key limitation of this study is that teachers' self-efficacy was only measured after the webinar, meaning the student intervention itself may have influenced the observed effects, particularly since teachers self-selected into the training.

Several years later, Compen et al. (2023) evaluated a more scalable teacher training approach, where teachers accessed a training module before implementing the financial literacy program. This module included videos, quizzes, discussion forums and other interactive elements, allowing teachers to decide how and to what extent they engaged with the training. While the training did not improve students' financial knowledge, it had a positive impact on their financial behavior. Classroom observations indicated that trained teachers spent more time introducing the program, which may have contributed to these improvements. Consistent with the earlier study, teachers who completed the training experienced increased self-efficacy, whereas those who did not participate showed a decline. Notably, teachers' own financial knowledge did not significantly improve, suggesting that enhanced self-efficacy and instructional modifications were the primary drivers of student improvements.

Another study by Urban et al. (2020) examined the effects of financial education graduation mandates on young people's credit outcomes in the United States using a quasi-experimental synthetic control design. The study compared states with different financial education mandates before 2011, focusing on Texas and Georgia. While both states required financial education courses for high school graduation, Georgia invested more in teacher training and certification, leading to stronger improvements for participants' credit scores and reductions in delinquency. Georgia implemented three key measures: (1) funding expert-led teacher training with ongoing support via webinars and local organizations, (2) linking school funding to teacher certification in economics or social studies to ensure qualified instructors and (3) incorporating personal finance topics into standardized student assessments with structured materials. By contrast, Texas had no formal teacher training requirements, and its curriculum was less structured and loosely enforced. A major limitation of this study is that state-level variation makes it difficult to establish causality, as other policy differences may have contributed to the observed effects.

While these empirical studies suggest that teacher training may positively influence students' financial knowledge and behavior, the mechanisms behind these effects remain unclear. Additionally, the studies have methodological limitations. Compen et al. (2020) only measured teachers after training, raising questions about causality. Compen et al. (2023) had a small sample of teachers, limiting generalization. Urban et al. (2020) relied on state-level comparisons, which introduced uncontrolled variability. To address these gaps, further research on teacher training and its impact on financial literacy education is necessary.

While research on financial education lacks definitive recommendations, reviews of professional financial literacy teacher training – drawing from broader educational disciplines and financial literacy – offer valuable guidance: Compen et al. (2019) and Louis et al. (2024) highlight that effective professional development should strengthen both teachers' subject matter knowledge and pedagogical skills. Training should have significant intensity and is recommended to be supplemented with ongoing support, including follow-up activities, coaching and peer collaboration, such as participation in professional learning communities. Giving teachers a voice in selecting content and structuring training programs enhances engagement and addresses individual knowledge gaps. Additionally, successful programs boost teachers' confidence in teaching financial concepts.

3.8 Parental involvement

Parents play a crucial role in their children's financial socialization – particularly in their early years – which Van Campenhout (2015) summarizes as follows: *“In sum, parents' financial behavior, norms, and attitudes will be passed down in the financial attitudes and behavior of their children”* (p. 200). Despite parents' significant impact, the role of parental involvement in school-based financial education interventions has been largely understudied. This gap may stem from the common perception that financial education at school and at home are separate and disconnected efforts (Van Campenhout, 2015).

In our review, we identified only two recent studies that examined parental involvement in school-based financial education programs, both conducted in Flanders, Belgium. Maldonado, De Witte and Declercq (2022) investigated the impact of parental involvement in homework assignments by comparing two groups. In one group, students received homework tasks explicitly encouraging parental participation. In the other, homework did not require parental input. While the classroom-based intervention significantly improved students' financial literacy, additional parental involvement in homework did not lead to a statistically significant improvement in financial knowledge. However, for students from low socioeconomic backgrounds and those with initially low family communication, parental involvement in homework had a positive effect on behavioral aspects of financial literacy, such as saving habits.

Similarly, Maldonado and De Witte (2021) examined the effects of providing parents with subject-specific information about financial literacy, delivered through an informational brochure. This intervention aimed to increase parental awareness and engagement by highlighting the importance of financial education and offering practical tips for discussions with their children. Although the study found no significant improvement in students' overall financial literacy or financial knowledge, there was a notable positive effect on students' financial skills, particularly in practical financial decision-making.

These findings provide initial evidence that while parental involvement in financial education may not always enhance knowledge outcomes, raising parents' awareness of the importance of financial education can positively influence financial behaviors. Existing meta-analyses on the general effects of parental involvement suggest that different types of parental involvement can lead to varied student outcomes. For example, parental assistance with homework had either no effect or, in some cases, negative effects, though the underlying reasons remain unclear. In contrast, parental expectations regarding their children's schooling – such as their beliefs and attitudes toward education, teachers and academic subjects – were strongly linked to higher academic achievement. Whether these findings apply universally or only to specific outcomes remains uncertain (see Wilder, 2023, for a synthesis of meta-analyses results).

Assuming that the results of meta-analyses on overall academic achievement are also applicable to financial literacy, the greater effectiveness of interventions aimed at raising parental awareness – compared to homework-based involvement – aligns with this pattern. However, further research is needed to determine which forms of parental involvement are most effective in improving financial literacy. Additionally, the finding that parental involvement influences financial behaviors rather than financial knowledge is consistent with existing literature. Research suggests that while parents predominantly shape their children's financial *behaviors*, schools are more effective at imparting financial *knowledge* (Van Campenhout, 2015). To enhance parental participation, Van Campenhout (2015) recommend that schools and policymakers implement strategies such as raising awareness of parents' critical role, offering financial literacy workshops tailored to parents and addressing practical barriers to engagement.

4 Financial education for adults

Adults face a wide range of financial decisions throughout their lives, from managing day-to-day expenses to planning for long-term financial security, all of which impact their financial well-being and economic mobility. This section examines the effectiveness of financial education interventions across different adult populations.

First, we analyze financial education initiatives designed for vulnerable groups, including low-income individuals and welfare recipients, migrants, people with disabilities and victims of domestic violence. These programs often involve tailored, in-person approaches and aim to enhance financial stability and resilience. Second, we explore financial education interventions targeting retirement planning, which range from employer-based programs and pension fund initiatives to digital tools designed to improve long-term saving behavior. Third, we review financial education interventions addressing general financial

topics for the broader adult population, examining various delivery formats such as digital platforms, printed materials and in-person education. Lastly, we examine a specific study population, popular in various research areas, namely university and college students.

For interventions targeted at adults a different review approach was necessary than for children due to the heterogeneity of the population, the limited number of studies sharing a common intervention structure and a larger proportion of studies with major methodological limitations. Consequently, for each population group, we focus on analyzing the studies and identifying underlying patterns. Recommendations on what works are, however, only possible to a very limited extent. Across the four categories, we assess the effectiveness of different educational methods, considering factors such as financial knowledge improvements, behavioral changes and long-term financial outcomes. By comparing intervention designs, target audiences and measured impacts, this section provides insights into practices and the challenges associated with financial education for adults.

4.1 Financial education for vulnerable groups

This section examines financial education interventions for various vulnerable groups. Based on a review of the studies in our pool, we analyze the empirical evidence by categorizing it into three subgroups according to the target populations: (1) low-income individuals and clients of debt and welfare services, (2) migrants and very specific target groups, namely (3) people with disabilities or chronic illnesses and victims of domestic violence. Financial education for vulnerable groups is typically delivered in person and tailored to specific life situations. By analyzing the effectiveness of these targeted interventions, we seek to determine whether they can have a lasting impact on individuals' financial stability and economic mobility.

4.1.1 Low-income individuals and clients of debt and welfare services as target group

Three studies considering financial education for low-income individuals are from the US and involve in-person interventions (either one-on-one or classroom-based). One of these programs is mandatory and designed for clients of financial assistance programs, specifically recipients of housing vouchers (Collins, 2013). Prior research indicates that low levels of financial literacy are linked to poor financial decision-making, which potentially contributed to housing crises in the past – such as choosing high-cost mortgages and managing debt detrimentally (Gale et al., 2012). An interest in financially securing US households has potentially shifted the focus from stand-alone financial education interventions to educational interventions that are integrated with access to relevant financial products and institutions (Grinstein-Weiss et al., 2015). The other two programs rely on voluntary participation (Modestino et al., 2019; Reich and Berman, 2015). In the Netherlands, a voluntary in-person intervention was implemented for financially vulnerable individuals, primarily clients of debt and welfare services. The sample consisted of 64% of participants whose main income source was social benefits, with over two-thirds receiving professional financial assistance (Bruijn et al., 2022).

Program content generally covers financial planning, budgeting, money management (e.g. bill payment), credit management (e.g. credit reports), savings strategies and debt management. One program also includes counseling, such as personalized budgeting and credit action plans (Modestino et al., 2019). Bruijn et al. (2022) tested two treatment variations: a traditional financial education program focusing on financial knowledge (e.g. income types, expenditures, financial products) and skills (e.g. budgeting, applying for allowances, tracking expenses), and a version enhanced with behavioral insights (BI) designed to foster motivation and practice through a need-driven, adaptive approach. The BI program allowed participants to choose discussion topics (e.g. income, financial administration, short- or long-term budgeting), applied autonomy-supportive teaching and integrated behavioral exercises to encourage financial habit formation.

All interventions were delivered across multiple sessions (at least two, up to six), with the programs requiring between eight and 15 hours in total (Bruijn et al., 2022; Collins, 2013; Reich and Berman, 2015). As far as indicated, courses spanned one to two months. The programs' primary focus was behavioral change – applying financial knowledge to personal financial decisions.

In part, studies used administrative data as outcome measures, including bank balances and credit reports (credit scores and ratings) (Collins, 2013; Modestino et al., 2019). Other measures included financial knowledge tests (Modestino et al., 2019; Reich and Berman, 2015) and self-reported financial behaviors (e.g. saving, timely bill payments), financial attitudes such as self-efficacy (e.g. confidence in financial skills), and financial well-being indicators (e.g. negative life events, future planning, chronic and general financial stress) (Bruijn et al., 2022; Collins, 2013; Modestino et al., 2019; Reich and Berman, 2015). In Bruijn et al. (2022), knowledge was assessed via self-report while the financial behavior measure adapted items from Kempson et al. (2013). Additionally, financial psychological indicators included attitudes toward spending, financial self-assessment and motivation (drawing from Dijk et al., 2022; Lown, 2011; OECD, 2015).

Except for Reich and Berman (2015), who only applied short-term measures, effects were studied over periods ranging from 6–18 months. Reich and Berman (2015) observed short-term improvements in financial knowledge and behaviors, but only for participants who already exhibited positive behaviors before the intervention. No effects were found on self-reported negative life events. Modestino et al. (2019) found that their intervention increased access to credit six months post-intervention and improved credit scores 18 months later. It also positively impacted self-reported financial knowledge, self-efficacy and reduced reliance on alternative financial services. In contrast, Collins (2013) found no significant effects on savings or credit scores after 12 months, though self-reported financial planning behaviors improved. Bruijn et al. (2022) showed that the BI program significantly improved financial behavior – primarily through its positive impact on budgeting – and increased self-efficacy and motivation six months post-intervention. However, no effects were found on subjective financial well-being or the overall financial situation, which the authors attribute to the small sample size. Surprisingly, no significant differences emerged between the BI and traditional programs, possibly due to their similar content and duration.

A common limitation among studies on low-income populations is high attrition due to small sample sizes and participant dropout, leading to potential biases (e.g. hidden characteristics), reduced statistical power, and weakened internal validity and generalizability (as in e.g. Bruijn et al., 2022; Collins, 2013; Modestino et al., 2019; Reich and Berman, 2015). Additionally, selection biases (e.g. full randomization was not feasible in Bruijn et al. 2022) and the limitations of self-reported measures must be considered (e.g. financial attitude measure had low reliability, and the absence of administrative data limits objectivity in Bruijn et al., 2022). A general discussion of studies' limitations and methodological recommendations can be found in section 6.

4.1.2 Migrants as target group

Interventions targeting migrants are delivered either digitally – via websites providing financial information and assessments (Barcellos et al., 2016) or mobile applications (Blanco et al., 2023) – or in person, through training sessions held at churches, community centers and sports clubs (Gibson et al., 2014). Two interventions are conducted in the US (Barcellos et al., 2016; Blanco et al., 2023), while the third is in New Zealand and Australia (Gibson et al., 2014). All are voluntary, with incentives provided for study participation.

Gibson et al. (2014) implemented a financial education intervention that differs from traditional migrant-focused programs, which typically emphasize integration into the host country's financial system, banking services, budgeting and savings. Instead, their intervention focused on educating migrants about

remittance methods and associated costs.¹⁰ Participants included three distinct migrant groups (Pacific Islanders, East Asians and Sri Lankans), each varying in remittance frequency, education levels and financial literacy. The intervention was delivered separately for each group, consisting of a one-time, two-hour training session for groups of 30 participants. Originally designed for Pacific Islanders, the curriculum was later adapted for East Asian and Sri Lankan participants. Highly educated trainers were selected from the target populations, ensuring cultural and linguistic appropriateness. The program materials (and surveys) were available in English, Mandarin and Korean, covering remittance cost components, strategies for reducing costs, cost comparisons and new remittance products.

Barcellos et al. (2016) designed a one-time financial education intervention tailored to first- and second-generation immigrants. They tested the effects using the RAND American Life Panel (a nationally representative online panel), though details on participant incentives were not provided. The intervention by Barcellos et al. (2016) was tested in two versions: (1) general-purpose financial education on banking services, saving and investing, and (2) the same content plus an FAQ section with information relevant to immigrants (e.g. required documents to open a US bank account).

Blanco et al. (2023) implemented a community-based digital intervention among low- to moderate income Hispanics (aged 18+). Their six-month intervention combined weekly financial education materials with nudges (text and email reminders) encouraging digital engagement. Participants received monetary incentives. Blanco et al. (2023) structured their intervention around monthly topics: financial goal setting, financial product selection, bill payments, credit scores, debt and saving. Participants worked at their own pace, with an emphasis on both knowledge acquisition and behavioral change. Activities included income tracking and financial planning. The program was available in English and Spanish.

All three studies focused on financial knowledge and behavior as outcome measures. Barcellos et al. (2016) measured general and immigrant-specific knowledge, as well as hypothetical financial behavior changes (e.g. likelihood of enrolling in retirement plans). Blanco et al. (2023) assessed financial capability and self-efficacy through behavioral indicators and measured financial stress (e.g. budget planning, confidence in covering expenses, automatic savings deposits). Gibson et al. (2014) evaluated remittance-specific financial knowledge (three questions), broad financial knowledge (two questions similar to those used in Lusardi and Tufano 2015) and participants' behavior regarding remittance cost comparisons and choices.

Barcellos et al. (2016) found significant short-term knowledge increases, with greater gains for the intervention including immigrant-specific information. However, knowledge effects dissipated after six months, suggesting the need for repeated interventions to ensure retention. No significant behavioral changes were observed, even immediately after the intervention.

Blanco et al. (2023) combined financial education with digital nudges, and examined retention rates, comparing them to those of in-person financial coaching programs. Their program achieved retention rates exceeding 60%, compared to less than 40% in financial coaching programs such as Branches and Financial Clinic (Consumer Financial Protection Bureau, 2016a). However, the study did not isolate the effect of nudging. Regarding financial behavior, participants showed improvements in budgeting and emergency savings, and financial stress was reduced. The authors argue that mobile-based digital interventions can address barriers such as time constraints and inaccessible financial information.

Gibson et al. (2014) found that financial knowledge increased among participants with initially low levels of financial literacy (Pacific Islanders and East Asians). These groups were more likely to compare remittance costs across methods and products. While there were modest effects on avoiding expensive or non-transparent remittance channels, no significant changes were observed in remittance frequency or amount. Knowledge effects slightly declined after six months but remained statistically significant.

¹⁰ Remittances play a crucial role in reducing poverty in migrants' home countries. Yet, many migrants lack knowledge about cost-effective transfer methods.

Considering study limitations, Barcellos et al. (2016) faced attrition and small sample sizes, preventing subgroup analysis (e.g. differentiation between Hispanic immigrants and other groups, or between first- and second-generation immigrants). Additionally, the behavioral outcome measures relied on hypothetical scenarios rather than real-world actions. Blanco et al. (2023) faced external validity issues due to their small, non-representative sample of the US Hispanic population. The program targeted working age individuals, raising concerns about its applicability to older adults with lower digital literacy. Long-term behavioral persistence is unknown, as the study did not measure outcomes after participants stopped receiving nudges. The intervention also took place during the COVID-19 pandemic, a period of heightened digital engagement, and monetary incentives may have influenced retention rates. Gibson et al. (2014) encountered difficulties comparing the three migrant groups due to high attrition among Sri Lankan participants and irregular remittance patterns among East Asians. The most reliable findings pertain to Pacific Islanders, for whom the intervention was originally developed. Despite a six-month follow-up, the study lacks long-term analysis, particularly of behavioral changes beyond the Christmas remittance period.

4.1.3 People with disabilities and chronic illnesses or victims of domestic violence as target group

Four studies examine financial education interventions for two particularly vulnerable groups: individuals with disabilities or chronic illnesses and survivors of intimate partner violence (IPV). The first group includes US military veterans with psychiatric disabilities (Elbogen et al., 2016) and chronically ill rural women in the US (Haynes et al., 2011). The second group comprises female IPV survivors in the US and Puerto Rico (Hetling et al., 2016; Postmus et al., 2011). Notably, the two IPV studies evaluate the same intervention with the same sample.¹¹

All interventions were voluntary, with financial incentives provided in two studies (Elbogen et al., 2016; Hetling et al., 2016; Postmus et al., 2011). Data collection involved interviews, conducted in person for veterans (Elbogen et al., 2016) and via phone or face-to-face for IPV survivors (Hetling et al., 2016; Postmus et al., 2011). The interventions differed in format, duration and delivery mode. Two were in-person programs (Elbogen et al., 2016; Hetling et al., 2016; Postmus et al., 2011), while one was an online course (Haynes et al., 2011).

Elbogen et al. (2016) implemented a one-time, one-on-one session (lasting 1–3 hours) designed to help veterans with psychiatric disabilities manage their finances. The curriculum covered budgeting, saving, distinguishing needs from wants, financial fraud and avoiding financial exploitation. It also included information on disability benefits, employment income limits and veteran discounts.

The IPV intervention, examined in Postmus et al. (2011) and Hetling et al. (2016), combined four to eight weekly group workshops (1–2 hours each) with at least one individual financial counseling session (30–60 minutes). The program, available in English and Spanish, focused on financial independence and address disentangling joint financial relationships, repairing credit damaged by abusers, economic safety planning and protecting against financial abuse.

Haynes et al. (2011) studied an online financial education program for chronically ill rural women in the US, integrated into a broader university-led health education project. The intervention was tested in two formats: one with online lessons supplemented by expert-led roundtables and a social support discussion forum, and one with online lessons only, without interactive components. The program lasted 22 weeks, with weekly lessons consisting of a short instructional guide followed by related financial activities. Topics

¹¹ Hetling et al. (2016) and Postmus et al. (2011) analyze a program implemented in 14 agencies across seven US states and Puerto Rico, with 457 participants at baseline. While Hetling et al. (2016) report short-term effects immediately after the intervention, Postmus et al. (2011) extend the evaluation to 6 and 12 months.

included income tracking, assessing net worth and navigating government assistance programs. Participants were provided with computers and internet access, along with technical support if needed.

Studies measured financial knowledge and behavior. Elbogen et al. (2016) assessed financial knowledge using true/false questions on saving, borrowing and disability benefits, and measured financial behavior with an impulsive-spending scale. Additional self-reported measures included savings, debt, annual income, employment and homelessness status. No significant main effects were found 6 months after the intervention comparing the treatment and control group. Only secondary post-hoc analysis found that participants who reported using learned skills after the intervention increased financial knowledge, improved responsible spending and reduced impulsive spending. The authors suggest that the broad coverage and one-time format may have limited effectiveness, recommending a more targeted, skills-based approach.

Hetling et al. (2016) assessed perceived financial knowledge, self-reported financial behavior, financial attitudes (e.g. views on saving, planning, and recordkeeping) and external factors such as depressive symptoms and IPV experiences with data from 300 participants. Immediately after the intervention, financial knowledge and behavior improved, with positive correlations between financial attitudes and outcomes. Using data from the same study, Postmus et al. (2011) analyzed a longer time frame of 6 and 12 months with data from 195 participants, finding sustained intervention effects. However, both studies report improvements in the control group, possibly due to financial and support services provided by domestic violence agencies.

Haynes et al. (2011) used five multiple-choice questions from a validated personal finance textbook to measure knowledge on wealth, income, money management, saving and assets. While financial knowledge improved overall, only savings knowledge showed a significant increase compared to the control group. There were no significant differences between the two intervention formats, suggesting that the social networking component did not enhance financial learning. However, participant engagement in discussion forums suggests potential benefits for motivation and retention.

Study limitations include reliance on self-reported measures, which may be biased by overestimation or social desirability effects (Hetling et al., 2016; Postmus et al., 2011). The financial attitude scale in Hetling et al. (2016) was not validated beforehand. The IPV intervention's generalizability is limited due to a non-random sample with a higher proportion of Latina participants. Additionally, control group improvements may reflect external services received from domestic violence organizations. Haynes et al. (2011) faced small sample sizes and recruitment difficulties, which limited statistical power. The unexpectedly high baseline financial knowledge suggests that more advanced materials and a more sophisticated knowledge assessment may have been appropriate. The study did not isolate the effects of discussion forums or expert roundtables, as these components were not tested separately. In Elbogen et al. (2016), intervention effects were detected only through post-hoc analysis, which reduced explanatory power. The single-session format likely limited long-term impact, suggesting the need for more sustained interventions.

4.1.4 Conclusions on financial education for vulnerable groups

Financial education interventions for vulnerable groups are largely delivered in person, unlike those for the general population, which often rely on digital formats (see section 4.3). Many programs are also timed to specific life situations, such as receiving financial assistance, experiencing debt or recovering from financial hardship, ensuring that participants are directly confronted with relevant financial decisions. This context-specific approach may enhance engagement; however, it is important to consider that findings on participants' financial behaviors may be influenced by immediate external pressures.

Findings across the studies show short-term improvements in financial knowledge, financial attitudes (such as self-efficacy) and certain financial behaviors, though long-term impacts on financial stability

(i.e. being able to meet financial obligations, manage financial shocks and maintain a sustainable financial position over time) and economic mobility (e.g. income growth, wealth accumulation and movement out of poverty) remain unclear. While some interventions, particularly mandatory ones linked to financial assistance programs, show positive effects on savings and credit outcomes, others fail to translate knowledge gains into lasting behavioral changes. Digital interventions, particularly for migrants and welfare clients, improve engagement and retention, yet their effect on real financial behavior remains uncertain.

Outcome measures vary widely, with some studies relying on self-constructed financial literacy scales and others using a mixture of established measures with additional tailored questions. Objective, administrative financial data, such as bank balances and credit reports, provide more reliable insights but are mostly used in interventions targeting low-income individuals. Self-reported measures dominate but introduce risks of bias, overestimation and social desirability effects, making it difficult to assess actual financial improvements.

A major limitation across studies is low external validity, as interventions often target highly specific populations, such as IPV survivors, individuals with psychiatric disabilities or recipients of social benefits. Small sample sizes, high attrition rates and selection biases further restrict the ability to generalize findings. Additionally, financial incentives for participation, especially in studies involving marginalized groups, may have influenced retention and engagement.

Overall, while financial education for vulnerable groups can enhance financial knowledge and immediate decision-making, evidence on long-term financial security and behavioral change remains mixed. Future research might want to prioritize longitudinal designs, stronger evaluation methods (e.g. randomized controlled trials) and greater use of objective financial data to better assess the real impact of these interventions. Integrating financial education with practical financial tools and institutional support may further enhance effectiveness, ensuring that knowledge gains lead to sustainable financial behaviors.

4.2 Financial education for retirement planning

This section examines financial education interventions aimed at improving retirement planning. Based on a structured review of studies, we categorize the interventions into three subgroups based on their target populations: (1) members of retirement saving funds, (2) employees and (3) the general adult population. The interventions employ various strategies, including direct financial education, behavioral nudges and decision simplification techniques. By analyzing their effectiveness, we aim to understand how these interventions impact financial knowledge, retirement saving behavior and long-term financial decision-making.

4.2.1 Members of retirement saving funds as target group

One way to engage individuals in financial education for long-term financial planning and retirement preparation is through interventions offered to members of retirement savings funds (Billari et al., 2023; Foster et al., 2015; Ghafoori et al., 2021). These programs are often provided by pension funds themselves (Billari et al., 2023; Ghafoori et al., 2021), raising concerns about economic interests but also leveraging institutional expertise and shared interests with pre-retirees (Ghafoori et al., 2021).

The interventions examined in Italy (Billari et al., 2023) and Australia (Foster et al., 2015; Ghafoori et al., 2021) were all voluntary and one-time, though they varied in delivery. Billari et al. (2023) studied a 25-minute online video using a nudging approach to increase awareness and engagement with pension fund resources, while Foster et al. (2015) tested how modifying the salience of retirement fund information influenced the ability to evaluate fund performance. In contrast, Ghafoori et al. (2021) evaluated a 90-minute, in-person seminar.

Program content typically covered expected lifespan and pensions, retirement savings needs, tracking pension entitlements, investment choices, tax benefits of additional contributions, inflation effects and portfolio diversification (Billari et al., 2023; Ghafoori et al., 2021). Billari et al. (2023) focused on demographic survival literacy¹², financial knowledge (measured using questions on compound interest, inflation, risk and diversification adapted from Lusardi and Mitchell, 2007b), self-reported behavior and administrative pension fund data. The intervention significantly and persistently improved both demographic and financial knowledge over an approximately nine-month period, with younger participants shifting toward higher-risk, higher-return investments within three months.

While both digital interventions relied on behavioral design, the study by Ghafoori et al. (2021) focused on long-term behavioral changes. Using administrative data over 20 months, the study found a significant increase in voluntary contributions within three months of the seminar, with effects persisting nearly two years later. Participants also improved their portfolio allocation strategies, reducing risk as they neared retirement. Similarly, Foster et al. (2015) found that making key financial information more accessible and assessable generally lead to a higher ability to evaluate fund performance and improved financial knowledge¹³ among participants with lower financial literacy but not for those highly literate.

A common limitation among these studies is self-selection bias, as all programs were voluntary, limiting generalizability (Billari et al., 2023; Ghafoori et al., 2021). Additionally, Foster et al. (2015) recruited participants from an online panel rather than a broad cross-section of fund members, further restricting applicability to the general population.

4.2.2 Employees as target group

Another approach to providing financial education for retirement planning is to target employees directly, aiming to influence their contributions to employer-sponsored retirement plans. The three interventions analyzed here originate from the US and utilize digital formats, either for direct financial education (Collins and Urban, 2016), behavioral nudging (Clark et al., 2014) or decision simplification strategies using projections and anchoring (Goda et al., 2014).

Intervention designs varied in complexity and participant engagement. In a field experiment at a large financial institution, Clark et al. (2014) tested a low-effort intervention with a subset of newly hired employees – a simple informational flyer distributed primarily via email – highlighting employer matching contributions and the benefits of compound savings (i.e. information nudges). By contrast, Collins and Urban (2016) implemented a more comprehensive approach, offering a ten-module, self-paced online financial education course, which employees at 45 credit unions could complete during work hours. On average, participants spent 8.75 hours completing the program, covering financial planning, investing and retirement saving strategies. Meanwhile, Goda et al. (2014) tested three versions of a four-page mailed brochure that provided varying levels of personalization and income projections, aiming to assess how these features influenced voluntary retirement contributions.

Outcome measures relied on employer administrative data and participant self-assessments. While Clark et al. (2014) found that younger employees were more likely to enroll in a 401(k) workplace retirement plan after receiving the flyer (2 months later), the effect was negative for older employees.¹⁴ Survey

¹² Defined as the awareness of the need to plan for the long term given life expectancy (Billari et al., 2023).

¹³ The knowledge test used questions adapted to Australian terminology from Lusardi and Mitchell (2011a) and Rooij et al. (2011).

¹⁴ In a footnote, Clark et al. (2014) mention that they actually split the treatment group in two, where one group received the flyer with additional information on the saving behavior of all company employees. This alternate version was supposed to introduce a peer effect. However, no differences between the two treatment groups were observed.

responses also suggested that the flyer alone was not enough to influence behavior. In contrast, the more immersive program tested by Collins and Urban (2016) led to a 40 % increase in employer contributions to retirement savings, with no negative impact on other financial priorities such as education savings or bill payments.

Goda et al. (2014) found that employees exposed to any version of the retirement projection intervention increased their annual voluntary contributions by 3.6% on average. However, differences between the versions were too small to determine which features were most effective. The study also revealed that randomly assigned assumptions about retirement age, investment returns and hypothetical contributions significantly impacted behavior, likely due to anchoring effects.

The studies highlight both the potential and the limitations of workplace financial education. The flyer intervention was cost-effective but had minimal impact (Clark et al., 2014), while the education program successfully improved saving behavior (Collins and Urban, 2016). The projection-based intervention demonstrated modest effects, but the strong anchoring influence suggests a need for a careful framing of financial information (Goda et al., 2014). In general, the target populations in the reviewed studies have higher financial literacy levels and engage in above-average retirement savings compared to the general US population (Collins and Urban, 2016; Goda et al., 2014).

4.2.3 General adult population as target group

Beyond workplace settings, online financial education interventions on retirement savings have been studied in Australia, the US and Canada (Boyer et al., 2022; Heinberg et al., 2014; Isler et al., 2022).¹⁵ These studies incorporated behavioral insights (Heinberg et al., 2014), educational nudges (Isler et al., 2022) and financial education videos on tax-preferred savings vehicles (Boyer et al., 2022).

Interventions differed in their design and teaching approach. Heinberg et al. (2014) developed a low-cost, replicable financial education program covering five key concepts – compound interest, inflation, risk diversification, tax treatment of retirement savings, and employer matching – delivered via short videos (3 minutes) or written narratives.¹⁶ Isler et al. (2022) tested educative versus default nudges, where participants completed a financial knowledge test before allocating monetary endowments among savings accounts with varying risk and return rates. The educative nudge provided feedback on incorrect answers to improve financial knowledge.¹⁷ The default nudge pre-allocated savings according to financial service recommendations. Boyer et al. (2022) studied the effect of educational videos (the longest lasting only 101 seconds) on Canadians' understanding of tax-advantaged retirement savings vehicles, testing one video on tax features and the same video in combination with one on government benefit clawbacks.

Outcome measures included financial knowledge tests and behavioral indicators. Heinberg et al. (2014) found that both video and narrative formats increased financial knowledge, particularly in areas where prior knowledge was low. Video-based learning tended to enhance self-efficacy more than narratives, but neither format consistently outperformed the other. Focus group insights suggested that written narratives may aid knowledge retention, while videos might be more effective in motivating behavioral change.

¹⁵ Isler et al. (2022) used a university-based experimental sample recruited via an online platform for survey participants. Heinberg et al. (2014) employed a probability-based sample of US households from the RAND American Life Panel and Boyer et al. (2022) recruited Canadians aged 35–55, again from an online panel.

¹⁶ Heinberg et al. (2014) applied principles from psychology and marketing, e.g. minimizing complex jargon to reduce cognitive load and ensuring that content was practical and directly applicable to participants' financial lives. The intervention also emphasized short-term benefits – both tangible and intangible (e.g. peace of mind) – to make the content more immediately relevant. The videos aimed to boost self-efficacy through direct visual experience, promoting observational learning.

¹⁷ The test incorporated and modified questions from various existing questionnaires, including the “Big Three” financial literacy test put forth by Lusardi and Mitchell (2011b), the OECD/INFE survey and PISA (OECD, 2018).

Knowledge gains diminished after eight months, highlighting the need for reinforcement. Isler et al. (2022) found that default nudges significantly increased savings and reduced financial errors, while educative nudges had no measurable impact. Moreover, individuals with higher cognitive reflection and stronger financial knowledge – particularly in understanding compound interest – managed their retirement accounts more effectively. Boyer et al. (2022) found that participants in the intervention groups scored significantly higher on tax-related knowledge questions and made more tax-efficient savings decisions. However, while the effect was significant for both videos combined, the single-video intervention was only effective for participants with limited prior knowledge.

Common limitations include self-selection biases, restricting generalizability (Boyer et al., 2022; Heinberg et al., 2014; Isler et al., 2022). Additionally, Heinberg et al. (2014) only measured knowledge and self-efficacy, despite the intervention's goal of influencing behavior. Isler et al. (2022) suggested that the educative nudge may have been too brief to drive behavioral changes. Boyer et al. (2022) relied on hypothetical investment choices, leaving real-world applicability uncertain. All three studies lacked long-term follow-ups, limiting conclusions on the persistence of effects.

4.2.4 Conclusions on financial education for retirement planning

Financial education interventions targeted at retirement planning primarily aim to optimize financial behavior, particularly in preparing for retirement. Unlike other financial education initiatives, these programs frequently integrate alternative methods, such as nudging, alongside traditional education. Online formats are also more prevalent in this domain compared to in-person interventions.

Effectiveness varies by target population and intervention design. Programs for retirement saving fund members show that short educational videos and in-person seminars can improve financial knowledge and influence investment choices. However, self-selection bias and potential conflicts of interest arise when pension funds provide the education. For employees, simplified information and nudges – such as informational flyers or personalized retirement projections – can increase savings participation, particularly among younger employees and those with lower financial literacy. Workplace integration appears to enhance engagement, particularly when employees can complete training during work hours, but overall effects remain modest. Findings on interventions targeting the general adult population suggest that default nudges, which passively guide individuals toward certain financial behaviors, tend to be more effective in influencing savings decisions than educative nudges, which actively provide financial knowledge. Short educational videos have been shown to improve financial knowledge in the short term, but their impact on long-term knowledge retention and behavioral change remains uncertain.

Across all subgroups, outcome measures commonly include financial knowledge tests, self-reported behavior, administrative data on retirement contributions, and experimental decision-making tasks. Many studies report positive short-term effects, but self-selection bias, short observation periods and a lack of long-term follow-ups limit the generalizability of findings. Moreover, while personalized interventions, such as retirement income projections, can enhance engagement, their impact on actual saving behavior remains limited.

Overall, the findings suggest that nudging is more frequently combined with traditional education in retirement planning than in other financial education initiatives. At the same time, online interventions dominate, while in-person education is less common. While financial education interventions can support retirement planning, their effectiveness ultimately depends on delivery format, behavioral strategies and accessibility. Future research might want to prioritize longitudinal designs, stronger evaluation methods and a greater focus on sustained behavioral change to better assess the long-term impact of these interventions.

4.3 Financial education for a more general adult population on general financial topics

In addition to financial education interventions aimed at vulnerable groups and those focused specifically on retirement planning, we also identified several studies targeting a broader population and covering general personal finance topics. Given the diverse nature of these interventions, we take a different approach to our analysis. Rather than categorizing them by target group, as done previously, we examine them based on their delivery format – digital tools, analog materials and in-person education. By doing so, we seek to identify which approaches are most effective in improving financial literacy and decision-making for a general audience.

4.3.1 Digital and analog interventions

There are various interventions that employ both digital and analog formats to improve adults' financial literacy and decision-making. While digital approaches leverage tools such as smartphone applications, web-based exercises, interactive platforms, educational videos, and narrative formats, analog interventions use printed materials. Despite addressing similar financial topics – including budgeting, saving, debt management, risk diversification and investment decision-making – the studies differ in their delivery design, duration, engagement strategies, outcome measures and target populations.

Digital interventions vary considerably in format and structure. Some studies focus on mobile tools and bundled app interventions. For instance, Angel (2018) evaluated three digital tools among Austrian adolescents and young adults (16–22 years): a 75-minute documentary on over-indebtedness, a mobile budgeting app for tracking income and expenses and an online research exercise. Outcome measures included objective financial knowledge, financial attitudes (e.g. interest in personal finance, saving affinity) and self-reported behavior (e.g. information-seeking, saving habits). Although all tools addressed budgeting, saving and debt management, only the mobile budgeting app led to a statistically significant increase in bank account monitoring; no other significant effects were detected.

In a similar vein, French et al. (2020) tested a bundled intervention over six months among working age adults (16–65 years) in Northern Ireland that were recruited via a credit union. This intervention combined four smartphone applications (covering loan interest comparison, expenditure tracking, a cash calendar and debt management) with additional engagement strategies such as push notifications, a mid-intervention money management workshop and a two-week money skills competition. This multifaceted approach resulted in short-term improvements in financial knowledge, loan confidence and self-reported behaviors like income tracking, although overall digital literacy and financial well-being remained unaffected and engagement diminished over time.¹⁸ Since all four apps were bundled into a single intervention, their individual levels of effectiveness could not be compared.

Other studies have examined how content presentation influences learning outcomes. Kothakota and Kiss (2020) compared a brief (10–15 minute) financial education module – with integrated visual elements – to a text-only format among adults (18–65 years). Administered via SurveyMonkey and including a five-question multiple-choice test on topics such as interest rates and compound interest, the intervention found that visual enhancements significantly improved knowledge retention. Complementing this perspective, Lusardi et al. (2017) recruited US adults from the RAND American Life Panel to test four digital formats focused on risk diversification and investment decision-making: (1) an information brochure (also suitable for print distribution), (2) an interactive visual tool allowing “what-if” analyses, (3) a written narrative and (4) a video narrative. While (1) and (2) emphasized data exploration, (3) and (4) employed

¹⁸ 32% of participants used the apps infrequently, and 23% did not download them at all. The most common reason for low engagement was forgetting about the app, while 35% of participants indicated they would be more likely to use the apps if the information provided was more relevant to their personal financial situations (French et al., 2020).

storytelling techniques. All formats boosted self-efficacy and confidence in applying financial concepts, with the strongest effects in the video group. Additionally, the video narrative outperformed the written narrative in improving objective financial knowledge. The brochure and interactive tool showed no significant differences. Technical issues (no further explanation is provided by the authors) and comparatively lower knowledge gains among women and minority participants highlight potential limitations.

A different digital approach was adopted by Fürstenau and Hommel (2019), who examined an online mortgage loan calculator as an informal learning tool among a small sample of German university students ($n = 45$).¹⁹ Designed to enhance both objective and subjective financial competencies related to mortgage decisions, this self-directed tool did not yield significant differences between experimental and control groups. The findings suggest that without structured guidance – or without participants possessing sufficient prior financial knowledge – such digital tools may have limited effectiveness, measured immediately and two weeks after the intervention. Given that participants were final-year economics and business students, this raises questions about the level of required prior knowledge.

Addressing a specific life event, Moulton et al. (2015) implemented a hybrid digital intervention for first-time, low-to-moderate-income homebuyers in the US.²⁰ Participants who were engaged in a subsidized homeownership program and had completed a mandatory preparatory course (comprising an online book, a one-hour financial counseling call and an online assessment) were invited to use an interactive online platform for goal setting and action planning, supplemented by quarterly telephone coaching sessions. Outcome measures focused on mortgage delinquency rates (30-, 60- and 90-day), along with self-reported financial behaviors (budgeting, borrowing, saving and planning) and perceived financial well-being. The intervention notably reduced the likelihood of 90-day mortgage delinquency one year later, reinforced saving behavior, lowered revolving credit card balances and doubled the rate of automated mortgage payments, though it had no effect on shorter-term delinquency (30 or 60 days) and was limited by a 50% attrition rate and potential biases in self-reporting.

In contrast to these technology-driven approaches, analog interventions remain a viable alternative. Fan and Chatterjee (2018) investigated the effectiveness of a printed investment information sheet among undergraduate students at a large US public university. Covering topics such as stocks, bonds, interest rates, risk and tax advantages, the material was handed out to the participants with the experimental session lasting no longer than one hour. Participants were randomized into four groups: one received only the printed material, two received the material alongside situational stimuli (one simulating market volatility and the other introducing peer influence), and a control group received unrelated information. The situational stimuli aimed to examine whether external psychological pressures affect financial learning. A ten-question investor knowledge quiz (derived from an existing financial literacy assessment) served as the primary outcome measure. All treatment groups showed significant improvements in investment knowledge relative to the control, with the situational stimuli providing no additional benefit.

Several studies reported common limitations. Digital interventions often suffered from small sample sizes, low retention rates and self-selection biases (Angel, 2018; French et al., 2020; Kothakota and Kiss, 2020; Lusardi et al., 2017; Moulton et al., 2015). Additionally, the short duration of many interventions

¹⁹ In reference to Livingstone (2001) the authors understand informal learning as “any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria” (Fürstenau and Hommel, 2019, p.7).

²⁰ Buying a new home places significant financial constraints on households, making them vulnerable to unplanned consumption, which could lead to shifting income toward other expenditures instead of mortgage payments (Moulton et al., 2015). Rather than being an intervention specifically for vulnerable groups per se, we consider this intervention to be targeted at a specific life event – first-time home buying. Therefore, we did not analyze the study within the study pool of financial education interventions for vulnerable individuals but instead included it in this subsection.

and the reliance on hypothetical or immediate post-intervention testing raise questions about the long-term impact and real-world applicability of these programs. For analog approaches, constraints such as brief exposure, limited sample diversity and the absence of behavioral outcome measures suggest that while effective for short-term knowledge gains, printed materials may require further enhancement to influence sustained financial behavior (Fan and Chatterjee, 2018).

4.3.2 In-person interventions

There are various in-person interventions to improve adults' financial literacy by engaging participants in structured, face-to-face learning environments. While some interventions are offered on a voluntary basis in settings such as financial institutions and workplaces, others are mandatory. The studies differ in delivery methods (from one-time sessions to multi-week courses), duration, content focus and engagement strategies.

Two studies (Bruhn et al. 2014; Horwitz et al. 2021) implemented voluntary interventions in non-military settings, whereas others (Skimmyhorn 2016; Skimmyhorn et al. 2016) focused on mandatory interventions in military contexts. Bruhn et al. (2014) evaluated a large-scale program implemented by a major financial institution in Mexico City, where extensive recruitment efforts (including direct mail, social media ads and street-based surveys) yielded a low attendance rate of only 17.8%. In contrast, the workplace intervention by Horwitz et al. (2021) was implemented in two financial services companies, where employees self-selected into a ten-week program, with one company allowing flexible class timing and the other pre-scheduled sessions. Meanwhile, in the military setting, Skimmyhorn (2016) delivered a mandatory eight-hour personal financial management course, split into two sessions, to newly enlisted US Army soldiers during boot camp, ensuring high participation. Similarly, Skimmyhorn et al. (2016) conducted mandatory financial education at a US military academy, randomly assigning cadets to one of two teaching methods within a semester-long economics course.

The design and delivery formats vary substantially across the studies. Bruhn et al. (2014) describe a one-time, four-hour in-person course covering savings, retirement planning and credit management, developed by banking specialists in collaboration with an economic education organization. To address low take-up, their design included various treatment groups that experimented with monetary rewards, deferred payments, free transportation and promotional testimonials. However, while financial incentives modestly increased attendance, other incentives had little effect. In the workplace intervention, Horwitz et al. (2021) implemented a ten-week course with weekly one-hour sessions covering budgeting, saving, credit, homeownership and retirement planning. Participants paid an upfront fee – refunded upon course completion – as a commitment device. The non-participating comparison group received two financial education booklets covering similar topics, representing a less structured, passive intervention.

In the military boot camp, Skimmyhorn (2016) provided an eight-hour program, split into two sessions, that addressed spending plans, credit, debt management, insurance, consumer awareness, financial ethics and military retirement savings. In the military academy study, Skimmyhorn et al. (2016) compared two pedagogical approaches: (1) a principles-based approach focusing on traditional personal finance instruction and (2) a rules-of-thumb method simplifying decision-making through heuristics. This intervention, integrated into a semester-long economics course, consisted of four two-hour personal finance labs that covered budgeting, consumption, and the time value of money, and employed lectures, slides, videos, exercises and Q&A activities.

The studies employed a mix of objective and subjective measures to assess intervention impacts. Bruhn et al. (2014) used a financial knowledge test based on course content, self-assessments of financial knowledge, self-reported saving and borrowing behaviors, and administrative data on savings account and credit card balances for a subsample of financial institution clients. Horwitz et al. (2021) measured

outcomes with a ten-question financial knowledge test adapted from Lusardi and Mitchell (2007a), focusing on knowledge gains while not assessing behavioral changes. In the military boot camp, Skimmyhorn (2016) relied on administrative data to capture credit behavior (including delinquencies, debt balances, legal actions), retirement savings participation and military labor market outcomes such as promotions or involuntary discharge. Skimmyhorn et al. (2016) combined objective and subjective assessments along with self-reports to gauge financial behaviors, including self-efficacy, motivation to learn, likelihood of seeking financial advice, and risk and time preferences.

While all interventions generally improved financial knowledge in the short term, their effects on behavior varied by design and sample. Bruhn et al. (2014), measuring the intervention's impact six months later, found that the course significantly improved both objective and subjective financial knowledge and increased self-reported savings, though no significant effects were observed on borrowing behavior, credit card use or retirement savings; administrative data suggested that any savings effects were short-lived. In the workplace study, participation improved financial knowledge, yet perfect attendance did not outperform partial attendance (missing at least one class), and the study left open whether increased knowledge would translate into improved financial decision-making (Horwitz et al., 2021).

Among the military interventions, the mandatory program during boot camp reduced credit delinquencies and debt balances during the first year and significantly increased military retirement savings participation. The largest effects were recorded among participants with prior credit market activity – although only the retirement savings effect persisted over two years (Skimmyhorn, 2016). In the military academy study, both teaching methods significantly enhanced financial knowledge and self-confidence compared to a control group; however, the principles-based approach yielded greater self-efficacy, while the rules-of-thumb method appeared to reduce the willingness to seek financial advice, potentially fostering overconfidence. Notably, for female cadets, no significant differences emerged between the two methods (Skimmyhorn et al., 2016).

Several limitations affect the statistical power and generalizability of the reviewed studies. Low participation rates were a major challenge in Horwitz et al. (2021) and Bruhn et al. (2014), where voluntary enrollment led to minimal attendance despite incentive strategies, highlighting the difficulty of engaging participants in financial education programs. Short-term effects were common across all studies, with knowledge and behavioral improvements fading over time, suggesting that one-time interventions may not drive sustained financial changes. Self-selection biases were present in Horwitz et al. (2021), as participants voluntarily enrolled, and in Skimmyhorn et al. (2016), as students of military institutions show high professional motivation to learn, potentially skewing results. The findings suggest that while in-person financial education can improve knowledge in the short term, its long-term impact remains uncertain, particularly in voluntary settings.

4.3.3 Conclusions on financial education for a more general adult population and general financial topics

This section examined financial education interventions for the general adult population. Findings suggest that, while financial education can enhance financial literacy and decision-making, effectiveness varies significantly depending on the delivery format, engagement levels and the duration of the intervention's impact.

Digital interventions, including mobile apps, web-based tools, educational videos and interactive platforms, showed mixed results. While videos and visual elements improved financial knowledge retention, mobile budgeting apps encouraged income tracking, though engagement declined over time.

However, many digital tools failed to produce long-term behavioral changes, with studies highlighting low user retention and limited effectiveness in altering financial habits. Self-directed tools, such as mortgage

calculators, did not significantly enhance financial competencies, suggesting that structured guidance may be necessary to maximize their benefits.

The effectiveness of printed financial education materials was examined in a study on investment knowledge, which found significant short-term knowledge gains. This indicates that even brief and low-cost interventions can be useful for improving financial literacy. However, the study did not assess behavioral outcomes, making it unclear whether these knowledge improvements would persist over time or would translate into better financial decision-making.

In-person financial education interventions, particularly voluntary ones, improved financial knowledge but faced significant participation challenges. Large-scale programs struggled with low engagement, even when incentives were offered, as many individuals did not perceive the expected benefits as sufficient to justify participation. Workplace programs showed positive knowledge gains, but long-term behavioral effects remained uncertain. By contrast, mandatory financial education in military settings had stronger behavioral effects, particularly in improving saving behavior and reducing financial delinquencies. These findings suggest that linking education to immediate financial decisions, as seen in structured military programs, may enhance its impact.

A key limitation across all intervention types was their short-term nature, with many studies lacking long-term follow-ups to assess the persistence of knowledge and behavior changes. Voluntary participation also introduced self-selection biases, limiting generalizability. Overall, while financial education interventions can be beneficial, sustained engagement and reinforcement mechanisms are necessary to drive lasting financial improvements.

4.4 Financial education for university and college students

As in many other fields of research, university and college students represent a convenient study population due to their availability for recruitment. Universities and colleges could thus be considered one of the testing grounds for more widely applicable financial education interventions for (young) adults. However, university and college students may also be considered a population with specific financial education requirements due to their educational background and life period compared to the general population of (young) adults.

While most interventions considered in this subsection are described in their respective publications as being tailored specifically toward university or college students, only one study actually focused on financial education topics relevant only for university students, namely an intervention focused on financial issues of post-graduate education and on student debt: In a randomized experiment, Salas-Velasco (2022) finds that a short online course on the economic viability of a master's degree and on student loans increases knowledge of the respective issues and the perceived self-efficacy in making relevant decisions.

All other studies covered general personal finance topics that may also be relevant for a general population. The content of these interventions addressed basic personal finance topics (e.g. bank accounts, payment methods, interest rates, inflation, loans), topics related to expenditures (budgeting, responsible consumption, debt management), future-oriented topics (saving, retirement planning and insurance), and more specific investment-related topics (e.g. bonds, stocks, mutual funds, diversification and homeownership).

Gerrans and Heaney (2019) examine the impact of a high-intensity personal finance course conducted at an Australian university. The course consisted of 11 weeks of lectures and tutorials covering, among others, financial planning, loans, taxation, investments, housing and consumer law. In a difference-in-difference comparison, they find that the intervention had positive effects on financial knowledge, self-reported beneficial financial behaviors and behavioral intentions. Using a research design where the control group receives the treatment only after the post-test (waitlist design, see subsection 6.6), Torma et al. (2023) assess the effectiveness of four lectures at a university in Croatia, finding significant effects on

financial knowledge and interest, but no differences in a decision task. It is unclear from the publication, however, what topics were included in the lectures. Handy et al. (2021) examine the effect of a general personal finance program in a quasi-experimental setting, finding increased knowledge and increased confidence attributable to the intervention, particularly in minority women.

Concerning the longevity of effects of such personal finance courses, Gerrans (2021) reports results of one of the very few efforts to examine long-term effects through follow-up surveys with the treatment and control group. Analyzing survey responses from the original sample of Gerrans and Heaney (2019) over the subsequent three years after the intervention, the author finds that the intervention appeared to have a stable effect on financial knowledge and some behaviors even three years later.

A third type of studies focuses on the effectiveness of online or social media-based interventions. Agasisti et al. (2023) find that online video lectures have a similar effect on financial knowledge as on-campus lectures. However, the lack of a no-treatment control group and numerous differences in content, format and duration between the online and offline treatment make clear conclusions difficult. Anderson and Card (2015) find that both lectures and a social media-based intervention addressing consumption behavior and credit card use have similar effects on self-reported compulsive buying, despite the very low active participation in the social media group. The authors attribute this result to an awareness-raising effect of the social media-based intervention. In a randomized waitlist design with a fairly small sample at a US university, Choi et al. (2023) find no significant effect of weekly emails and text messages that encourage participating in an online financial education platform on financial self-efficacy or behaviors. Kuntze et al. (2019) tested the effects of a financial education video, finding significant effects on financial knowledge. However, it is not clearly reported whether the post-test-only design used random assignment to the treatment and control group.

Overall, outcome variables assessed in the studies are heterogeneous. This is true for the general type of concept, i.e. if knowledge, attitudes or behaviors are assessed, for the specific concepts addressed and for the specific questions used in questionnaires. Most studies presented here used some type of financial knowledge test as a main outcome variable. The tests used to assess knowledge vary widely: Some studies use published or otherwise independently created test items, in part to avoid an excessive overlap between the content of the intervention and the test questions. Others, conversely, employed specifically designed tests to better capture topics taught in the intervention. Only Handy et al. (2021) explicitly report using a published or validated knowledge test; others appear to use at least partly self-developed collections of knowledge questions without any validation efforts reported. Two studies do not measure financial knowledge as an outcome but employ published scales to capture attitudes and behaviors (see Anderson and Card, 2015; Choi et al., 2023).

Overall, due to the limited number and methodological rigor of studies, few conclusions can be drawn from the studies with college and university students. First, studies on conventional classroom-based interventions teaching personal finance topics show significant effects on knowledge, while their effects on self-reported behaviors or behavior intentions are less clear. Second, the only study on a student-specific topic (student loans and economic viability of a master's degree) exhibited significant effects on topic-specific knowledge and self-efficacy only, as actual behaviors were not assessed in the short experiment. Any other conclusions are not possible due to methodological limitations of the studies. This concerns the potential of online or social media-based interventions and interventions directly addressing behaviors. Potential study designs that may shed light on the effectiveness of intervention formats are discussed in subsection 6.7.

5 What works for whom

The effectiveness of financial education programs varies across different target groups, reflecting their diverse financial challenges and learning needs. The reviewed literature is highly heterogeneous in terms of study populations, intervention types, study designs and methodological rigor. Consequently, it is exceedingly difficult to determine which financial education interventions are most effective in specific contexts, let alone establish a universally valid impact. Nevertheless, many studies provide valuable insights into the effectiveness of financial education within their specific contexts. Moreover, a subset of studies on knowledge-focused interventions show a high degree of overlap in findings regarding improvements in financial knowledge and, to a lesser extent, financial attitudes and behaviors, allowing for limited general conclusions.

There is consensus that financial education aiming at children should be integrated into school curricula, rather than being left an optional choice, to ensure universal access for all children. These programs should always be tailored to children's cognitive development. Key cognitive developments occur in kindergarten and primary school, becoming more pronounced during secondary education. Yet, further research is needed to determine the most effective methods for teaching very young children. For a review and preliminary recommendations on this topic, see Consumer Financial Protection Bureau (2016b) and Jambunathan et al. (2024).

Evidence starting from secondary schooling level appears to be most robust due to a more homogeneous study pool compared to the adult population. Empirical evidence thus allows the fairly clear conclusion that school-based financial education improves financial knowledge. However, improving short-term knowledge alone is generally not considered the ultimate goal of financial education. The long-term retention of financial knowledge remains uncertain, as does the issue in how far financial knowledge translates into real-world skills and financial well-being, as there are no studies following students into adulthood.

Concerning the most effective teaching methods, research highlights that experiential, active and individualized learning approaches significantly enhance students' financial understanding, although there is no definitive evidence regarding which method is the most effective, partly because methods are often combined and serve different objectives. For example, individualized learning accommodates different learning speeds, whereas active and experiential learning strategies focus on engaging students through practical applications.

Evidence on the impact of financial education on financial behaviors of children is mixed, with most studies finding no significant positive effects. This aligns with previous meta-analyses that report the smallest effects on financial behaviors among children (Fernandes et al., 2014). Preliminary evidence suggests that financial behaviors disconnected from children's current experiences are difficult to influence. However, programs aligned with students' everyday financial experiences show greater promise. Consequently, financial behavior interventions should be gradually adapted to children's financial experiences and interests. If so desired, directly promoting sound financial behaviors among children may require interventions that explicitly emphasize behavioral aspects.

Parents and other influential figures in children's social environments also play a crucial role. Parental beliefs and attitudes toward education strongly correlate with student achievement. However, many parents remain skeptical of financial education programs. While the evidence regarding parental involvement is limited in our study pool and warrants further research, a review by Van Campenhout (2015) recommends strategies such as raising parental awareness, offering tailored financial literacy workshops for parents, and improving communication between schools and families.

Evidence on financial attitudes among children is also mixed, with some studies reporting positive effects and others not. However, research on attitudinal outcomes in children remains scarce, which is

unfortunate, given that financial attitudes and cognitive skills such as executive functioning begin forming as early as in kindergarten (see e.g. Consumer Financial Protection Bureau, 2016b; Van Campenhout, 2015; Webley, 2005). Unlike financial knowledge, financial attitudes appear to be directly linked to financial behaviors (Fernandes et al., 2014). This suggests that fostering positive financial attitudes early on can influence financial behaviors later in life.

Programs targeting children are typically implemented in schools. Teachers therefore play a key role in improving children's financial literacy. Regardless of the quality of provided materials, the effectiveness of interventions typically depends on teachers' confidence and willingness to use them. However, many teachers feel unprepared to teach financial topics and thus, professional teacher training is recommended. Reviews suggest that teacher training should enhance both subject matter knowledge and pedagogical skills and be an ongoing process rather than a single event. Strategies such as follow-up activities, best practice sharing among teachers and joint development of teaching materials can enhance training effectiveness.

Concerning adults, drawing conclusions about the effectiveness of financial education is even more challenging due to the heterogeneity of the studied populations and the limited number of evaluation studies for the various intervention types. Indeed, compared to the population of children, the study pool includes a great variety of intervention approaches that focus more on behaviors in various contexts rather than on general knowledge. Interpretations on what works must therefore be made with caution.

Financial education programs targeting vulnerable groups – such as low-income individuals, migrants, people with disabilities or chronic illnesses and individuals who experienced domestic violence – often yield short-term improvements in financial knowledge, attitudes and behaviors. These effects are particularly evident when education is provided “just in time” in situations most relevant to participants' financial lives. Interventions tied to financial assistance programs or debt management for individuals in financial distress show positive effects, especially on savings and credit behavior. However, long-term impacts are uncertain. Digital interventions have increased accessibility and engagement, particularly for migrants and welfare recipients, yet their effectiveness in driving lasting behavioral change remains unclear.

The effectiveness of financial education for retirement planning varies depending on target populations and intervention designs. Educational videos and in-person seminars for retirement fund members improve financial knowledge and influence investment decisions. However, self-selection bias and conflicts of interest due to economic interests of pension funds may affect outcomes. Interventions aimed at employees to increase contributions to employer-sponsored retirement plans are more effective when incorporating behavioral nudges or simplified information, particularly among employees with lower financial literacy. However, overall effects remain modest, and the long-term retention of financial knowledge from these interventions is uncertain.

For the general adult population, interventions can be classified into digital and in-person programs. Digital financial education programs (e.g. videos, interactive tools) typically enhance short-term financial knowledge, but they often fail to sustain behavioral changes due to declining user engagement. In-person financial education programs for adults have yielded improvements in financial knowledge, though participation remains a challenge in voluntary settings, even when incentives are provided. Regarding financial behaviors, some in-person programs also yield positive effects on financial behaviors when linking education provided “just in time” to immediate financial decisions, particularly in improving savings habits and reducing financial delinquencies.

6 Methodological recommendations

We find considerable variation in methodological approaches, methodological rigor and transparency across studies, although the research field has shown substantial improvements in recent years. This section

provides an overview of common methodological approaches and limitations within the study pool and offers recommendations for improving the research methodology in future evaluations and impact assessments, aligning them as closely as possible with “gold standard” research practices. We acknowledge that implementing many of these recommendations is challenging in most evaluation and research contexts and may often be impossible due to practical and resource constraints. Some recommendations thus attempt to take typical limitations into account.

6.1 Classifying interventions and outcomes

Most interventions found in the literature are described as “financial education” interventions. At least to some degree, meta-analyses and literature reviews (including this review) treat these interventions as a theoretically coherent group of interventions. However, as described in section 1, financial education interventions by definition largely depend on the intended outcomes of “financial literacy” and its assumed causal mechanisms. In an extreme interpretation of the concept, “financial education” could thus be considered a collection of many distinct types of interventions related only by the content area of “finance.”

It may thus be beneficial to classify financial education interventions further, by the assumed underlying causal mechanisms. Indeed, the World Bank (World Bank, 2013) differentiated between three types of studies that assess interventions with different mechanisms, namely (1) traditional methods of financial education, (2) innovative methods that either use novel approaches to impact financial capability or influence behavior more directly and (3) a combination of methods. Under (2), the World Bank also subsumes tools that improve financial behaviors (e.g. savings) without clear cognitive mechanisms. However, it may be disputed whether all interventions in this category (such as counseling, nudges or information framing) should be labeled as financial education (e.g. Willis, 2022).

Building on the World Bank’s classification and the OECD’s definition of financial literacy as knowledge, attitudes and behaviors, we propose a classification of common causal channels interventions address and potential outcomes they aim to affect directly. While real-world interventions certainly combine multiple of these channels and outcomes, the categorization illustrates possible key causal channels interventions may use.

It is important to note that any of the suggested channels may be aimed at different ultimate goals, e.g. at individual or – like in PISA’s definition of financial literacy (OECD, 2023) – at societal financial well-being. Indeed, Kaczko (2025) focuses on a similar distinction of overarching goals, defining a spectrum between “individual-oriented” and “socially-oriented” interventions and the related pedagogical notions of “financial training” and “financial education”.

The following suggested categories of causal channels are ordered by the approximate prevalence in currently available impact assessments of financial education interventions:

- (1) **Factual knowledge:** This channel focuses on building an understanding of financial terms, concepts and facts in the general area of (personal) finance and is often the theoretical foundation of higher order procedural skills. Effects on financial behaviors and well-being are assumed to be largely mediated by increased knowledge.
- (2) **Procedural skills:** This channel emphasizes the practical application of financial knowledge through actions and decision-making, often in real-world or simulated environments. Procedural skills are inherently adaptive, enabling learners to apply financial strategies flexibly across diverse and evolving situations. They serve as a critical bridge between the acquisition of knowledge and the development of actual financial behaviors.
- (3) **Instructions:** Through this channel, information and guidance about beneficial behaviors or decisions in specific situations are given. Related interventions do not aim to promote understanding or knowledge but address behaviors directly. Nevertheless, some amount of active deliberation may be necessary on the side of recipients.

- (4) **Nudging:** This channel aims to promote behaviors without providing a significant amount of information and may skip deliberate cognitive processing altogether; it may involve designing decision situations or information framing in a way that guides people toward desired behaviors.
- (5) **Attitudes:** Rather than imparting knowledge, this channel aims to influence participants attitudes toward financial topics and decisions; related interventions may, for example, be aimed at attitudes toward saving and spending, interest in financial topics, perceived financial self-efficacy or social responsibility.
- (6) **Self-regulation:** This channel is aimed at furthering executive functioning and meta-cognitive and emotional skills. Related interventions may aim to foster awareness about one's own thinking, attitudes, behavior, motivations and emotions, for example by training self-control through mental strategies or fostering awareness about one's own psychological biases.
- (7) **Critical thinking:** This channel focuses on promoting reflection on (complex) financial topics, situations and systems. While we assume that such interventions may also aim to foster knowledge, behaviors and well-being, this channel may put a stronger focus on social responsibility and societal well-being as opposed to individual well-being.

All interventions included in this review can be considered combinations of these channels, with most appearing to put the primary focus on a smaller subset of the channels. Indeed, interventions focusing on factual knowledge can be found for all populations. They are most commonly classroom-based and have been tested most rigorously with school children. Knowledge-focused interventions may also address secondary channels with varying intensity, such as procedural skills, instructions and, more rarely, attitudes, among other potential channels. Some interventions, for instance experimental school-based programs that use simulations of real-life situations, could be considered multi-pronged by nature as they may directly or indirectly address multiple channels, i.e. factual knowledge, procedural skills, attitudes, self-regulation and critical thinking.

Another common type of interventions focuses more strongly on providing instructions to adults to encourage specific behaviors. Such interventions can focus on varying issues and be of varying intensity and format and may also address other channels, particularly factual knowledge. They are often conducted "just in time," i.e. directly preceding the relevant decisions.

Few studies in our pool directly target attitudes, self-regulation or critical thinking, both with regard to the reported interventions and the study design and outcome measures used. Although these channels may be addressed indirectly, it is largely unclear whether they are affected positively, negatively or not at all. We thus recommend that these missing channels are included in future studies on financial education, both through intervention designs and their assessments.

Moreover, concepts of financial literacy typically imply or explicitly define individual or societal financial well-being as the ultimate goal of financial education. These goals are, however, rarely addressed in studies. We therefore recommend that studies attempt to include these downstream effects in their study designs, in combination with the causal channels that are hypothesized to affect them.

Nevertheless, one of the main obstacles hindering conclusions about the effectiveness and causality of financial education appears to be the heterogeneity in interventions and outcomes. We therefore recommend that studies always clearly and explicitly indicate not only content, method and practical aspects of the intervention under examination but also the presumed causal channels as (for example) listed above and the assumed goal dimensions. One approach to theoretically model the underlying causal channels of the intervention is conducting a theory of change exercise, ideally already at the outset of the planned intervention (NEFE, 2016; Finney, 2020; University of Wisconsin-Madison, 2025). We thus also call for future meta-analyses to integrate a classification of causal mechanisms. Overall, we suggest that the research field at large should move away from treating "financial education" as a single class of interventions and instead focus on clearly identifying causes, mechanisms and (intended) effects.

6.2 Reporting intervention and study details

A substantial proportion of the studies lack detailed descriptions of interventions' content and didactic aspects. A few studies altogether omit information on delivery format or curriculum. Similarly, some publications leave essential methodological aspects unclear, such as the procedures used to assign participants to treatment and control groups.

Next to our call for a more deliberate focus on underlying causal mechanisms, another important recommendation mirrors one already made by Fernandes et al. (2014), namely that publications should clearly describe all relevant aspects of interventions and studies in sufficient detail to allow meaningful comparisons and conclusions. Descriptions should include details of the intervention (i.e. format, timing, content, didactic aspects), participants and staff (i.e. population context and sociodemographics, teachers' qualifications, if applicable), study method and procedure (e.g. group assignment method) and all other relevant factors that may improve comparability of results across studies.

6.3 Choosing appropriate statistical models

Concerning the choice of statistical model, studies generally use appropriate difference-in-difference (or similar) estimates with all available data points. However, some studies conducted both pre- and post-tests but only analyzed post-treatment data without further explanation. If non-compliance (i.e. participants do not take part in the intervention) is an issue, some studies use intention-to-treat models, i.e. keep "non-compliant" participants in the analyses to increase internal validity (e.g. Maldonado, De Witte and Declercq, 2022).

Almost all school-based studies use clustered standard errors to account for the clustered structure of the data, e.g. with students clustered in classes and classes clustered in schools. Multilevel models are used by three papers. Two use random intercepts (Amagir et al., 2022; Johnson et al., 2021) and only one (Dare et al., 2020) attempts to model a potential heterogeneity of the treatment effect across clusters as random slopes. As a result, standard errors of treatment effects may be underestimated in many studies using clustered data.

Lastly, some studies use non-significant differences as evidence for the *absence* of a difference or an effect. However, if the absence of differences is of interest, it should be tested using *equivalence testing*. To this end, researchers pre-define upper and lower limits of differences that they consider negligible. If the measured difference falls within these limits with a certain confidence, conclusions about a "significant non-difference" are appropriate.

We therefore recommend that studies use appropriate statistical methods for the collected data. In general, this includes using all available data points and, particularly in a school context, modeling hierarchical data structures using multilevel (mixed) models and taking potential heterogeneous treatment effects across clusters into account using random slopes models.

6.4 Validating outcome measures

We found that studies varied widely in how they defined and measured financial literacy, behavior and well-being. This results in inconsistency and the usage of non-standardized outcome measures. Some used their own independently designed financial literacy tests, while others relied on established measures like Lusardi and Mitchell's "Big Three" questions (e.g. Isler et al., 2022; Lusardi, Samek, et al., 2017). This lack of standardization makes it difficult to compare results across studies and synthesize broader conclusions.

As Fernandes et al. (2014) observed, many studies appear to draw on skill- or competency-oriented concepts of financial literacy and education. However, many fall back on very few questions of financial knowledge. In addition, some studies appear to avoid excessive "curricular validity" or "teaching to the

test” by using independently developed or published test questions, others specifically develop tests to better capture the content taught in the intervention. While both approaches may have merit, their side-by-side application again limits the comparability of studies.

Moreover, a major limitation arises due to the frequent use of self-reported outcome measures, which can be influenced by social desirability bias. Such measures can lead to overestimation or show little correlation with actual behaviors (as in e.g. Postmus et al., 2011). Only a few studies involving adults used objective financial data (e.g. bank balances, credit scores, savings deposits) that provide more reliable indicators (e.g. Skimmyhorn, 2016).

Many studies rely on some kind of knowledge test and many assess attitudes or behaviors using questionnaire items. However, a large proportion of the studies do not report any statistical validation efforts of the instruments used. This means that no validity or reliability checks (e.g. correlations with convergent or divergent criteria, internal consistency, factor analyses or more advanced analyses) are reported for the questionnaire items. Moreover, some publications appear to give undue weight to significance tests of effects on only single items from composite scales. Only few studies (e.g. Angel, 2018; Batty et al., 2020) used item response theory (see De Ayala, 2013) to validate the knowledge test they use; few report Cronbach’s alpha values or results from factor analyses.

We thus recommend that studies validate outcome measures or use instruments where validation results are reported elsewhere. Moreover, measurement instruments should be used in their intended composition. Analyses of single items of composite scales should be framed as exploratory analyses and, in case of multiple significance tests, results should be interpreted cautiously or alpha level corrections should be applied. Additionally, incorporating objective financial indicators, such as administrative data, can help mitigate biases associated with self-reported data and provide a clearer picture of actual improvements in financial behaviors and outcomes.

6.5 Testing long-term effects

While many studies used pre- and post-tests in their design, most measured effects immediately or a few months post-intervention, making it difficult to assess whether financial behavior changes are sustained over time. As an example, Barcellos et al. (2016) found short-term financial knowledge gains among migrants, but these gains disappeared after six months. Few studies conducted long-term follow-ups beyond a year. Gerrans (2021), for example, reports on the effectiveness of an intervention up to three years after the treatment. Ultimately, however, insights into long-term effects on financial knowledge and behavior, let alone financial stability, wealth and long-term financial well-being are limited.

To understand the effectiveness of financial education, future research needs to prioritize longitudinal study designs with follow-ups extending beyond one year, allowing for a better understanding of long-term changes in financial behaviors and financial well-being.

6.6 Using suitable study designs

We only included studies with at least a quasi-experimental design in our review. The majority of studies we considered in our analyses thus used either randomized experiments, randomly allocating participants to the treatment and control groups, or quasi-experimental designs with a non-random group allocation. In general, however, research designs were remarkably simple, with surprisingly few studies comparing different treatment combinations. In the school context, for example, such designs appear useful to test treatments in combination with system-oriented factors such as teacher engagement or parent involvement (e.g. Compen, De Witte and Schelfhout, 2020; Maldonado and De Witte, 2021). In all contexts, however, targeted treatment comparisons would be useful to isolate the effect of intervention aspects,

e.g. different combinations of content or format. Such designs, however, need to ensure that the effects of treatment aspects can be isolated (see subsection 6.7).

Some studies, particularly in the school and university context, used some type of waitlist design (e.g. Torma et al., 2023).²¹ Such designs have the distinct advantage that being allocated to the control group is not associated with missing out on a potential beneficial intervention indefinitely. Instead, the control group receives the treatment after a predefined delay and after completing the post-test. In situations with limited resources and ethical or practical concerns about withholding the treatment from study participants, such designs can prove helpful to guarantee internal validity. It is important to note, however, that because in these designs the control group typically receives the intervention not long after the treatment group, it becomes impossible to analyze longer-term differences between the groups.

Nevertheless, we recommend considering waitlist designs in situations where a pure control group would be unfeasible or where assignment to a pure control group could lead to strong unintended effects such as compensatory behavior or resignation. As detailed in the following subsection, if sample sizes are sufficiently large, future studies should attempt more complex research designs in order to compare intervention characteristics and combinations thereof.

6.7 Enabling useful treatment comparisons

Most studies in our pool compare the effects of a financial education program against the alternative of not providing (additional) financial education. However, some interventions take a different approach, comparing two (or more) alternative interventions with each other (Lusardi et al., 2017). For example, some interventions compare the effectiveness of online vs. offline interventions. Studies specifically in the school context compare pedagogical approaches (see e.g. Sconti, 2022) or test the effects of additional teacher trainings (see e.g. Compen et al. 2023).

When rigorously implemented and evaluated, this comparative approach provides deeper insights into the relative impact of specific program components by isolating one aspect while keeping as many other conditions as possible constant across interventions. Such an approach can be extremely valuable in the search for the relevant factors that make financial education interventions effective.

Conversely, comparing different treatments can also severely limit the usefulness of results if these treatments are not carefully implemented. Few studies appear to unsystematically combine several treatment factors into treatment groups, making clear conclusions on the cause of different outcomes impossible. For example, comparing two delivery formats when they are each combined with a different didactic method and course duration makes it impossible to attribute group differences to any one of these factors alone. If such confounded designs do not have a true control group that receives no financial education treatment, possible conclusions are even more limited. As result, such designs only give an indication that one specific combination of treatment factors is more effective than another. The results, however, may be impossible to generalize to other interventions and situations.

We thus recommend that studies always include a true control group that receives either no treatment whatsoever or some type of placebo intervention. Even in the absence of treatment differences, a control group allows interpretations of the overall effects of the interventions. We also recommend that studies make a deliberate effort to isolate the effects of single treatment factors that may influence the effectiveness of financial education. This means that studies could vary specific intervention characteristics, while keeping all other aspects of the intervention constant. Larger sample sizes may also allow more complex designs. For example, a 2x2x2 factorial design could simultaneously test the three factors “type of content,”

²¹ Depending on context and implementation, such research designs may also be called delayed intervention, staggered roll-out or phase-in intervention designs.

“level of intensity” and “didactic method” and their interactions. The challenge, however, lies in keeping the other factors constant when varying any of the included factors, which may require considerable sacrifices in the overall design of the intervention.

6.8 Preventing sample attrition

Voluntary participation generally led to low rates of take-up of the interventions. Consequently, many studies, particularly those with (young) adults, suffer from small sample sizes and thus limited statistical power. Another common issue across all studies with repeated measurements is considerable sample attrition (dropout) over time, which becomes increasingly severe with longer study periods. Attrition is highly problematic as it limits internal validity and statistical power. Even school-based studies with typically short study periods usually lose over 30% of the sample between pre- and post-test. Attrition was particularly severe in some digital and online interventions (e.g. Angel, 2018; French et al., 2020) and in studies on vulnerable groups (e.g. Postmus et al., 2011).

Studies deal with this issue in different ways. Many do not consider attrition at all, others test for systematic attrition and very few use more robust estimation methods, such as weighted regression models (e.g. Maldonado, De Witte and Declercq, 2022).

We highly recommend that studies should put a stronger focus on reducing attrition by proportionally allocating more resources to *retaining* participants through follow-ups and incentives as opposed to only recruiting a very large initial sample. A large initial sample becomes virtually useless if only a small proportion of the sample participates in the post-test. Moreover, attrition may be highly problematic, as it threatens internal validity by introducing an additional source of sampling or self-selection bias that may be associated with the effectiveness of the intervention. Attrition should also be considered in the analyses. At the minimum, this should include testing for non-randomness of dropout and for systematic differences in attrition between the treatment and control groups. Ideally, however, attrition should also be considered in the statistical analyses through (inverse probability) weighting methods.

6.9 Sampling and randomization

Across contexts, most studies are limited by non-random sampling. While experimental or quasi-experimental designs may provide excellent or good internal consistency, results may not be transferable to the general population due to self-selection. For example, participants may consist exclusively of people already interested in actively engaging with financial topics, thus reacting differently to the intervention than the general population would.

Moreover, some studies with adults focus on highly specific populations, making it difficult to apply findings to the general adult population. For instance, studies targeting military personnel (Skimmyhorn, 2016; Skimmyhorn et al., 2016) may not reflect the financial behavior of civilians. Other interventions rely on country-specific financial systems, limiting their relevance elsewhere. For instance, pension fund interventions (e.g. Billari et al., 2023, in Italy; Foster et al., 2015, in Australia) may not be transferable to other countries due to varying retirement savings schemes across countries.

In the school context, most studies are conducted with (likely highly motivated) schools or teachers that actively self-select into the studies. While many studies use randomization mostly at the school level, in some quasi-experimental studies schools or teachers actively self-select into treatment and control groups. While pre- and post-tests allow difference-in-difference estimates, the parallel trends assumption necessary for such models can hardly be deemed fulfilled. Self-selection into treatments (as opposed to random or quasi-random assignment) must thus be considered a severe threat to internal validity.

Concerning non-random sampling from populations, there may be situations of experimental research where non-random sampling does not pose a severe threat to external validity, for example, when university

students participate in a short incentivized laboratory experiment without having much information about the content of the experiment beforehand. However, in the case of financial education, participating individuals, schools or teachers often commit to a larger time investment. Allowing self-selection into the study may thus represent a threat to external validity of a larger magnitude.

We therefore recommend that interpretations of impact assessments be limited to the appropriate population, for example the population of interested or motivated schools that have self-selected into the study. Moreover, we recommend that future studies put more emphasis on internal validity and only allow self-selection into the treatment group as a last resort and combined with thorough analyses of group differences and, if possible, pre-treatment trends.

6.10 Exploring mechanisms and processes with mixed methods

Impact evaluations predominantly rely on quantitative study designs. However, methodological limitations such as sampling biases, lack of randomization and other constraints often severely limit their robustness. While quantitative approaches are certainly essential for estimating an overall impact of an intervention, qualitative methods can offer valuable insights into causal mechanisms and processes that should inform future research.

The studies included in this review are almost exclusively quantitative, with only a few incorporating both qualitative and quantitative methods. However, some of them do not fully qualify as mixed-methods research but rather as multi-mode studies (as in e.g. Compen, De Witte and Schelfhout, 2020; Özdemir and Kaya Uyanik, 2021). For instance, Compen, De Witte and Schelfhout (2020) employed classroom observations to examine student-teacher interactions, tracking how students progressed along an adaptive learning path and the extent to which teachers provided content-related assistance.

Complementary qualitative research is particularly useful for understanding underlying processes better (see e.g. Lorenz 2024). We recommend that future research considers incorporating mixed-methods approaches, and indeed, when robust quantitative evaluations are not feasible, qualitative approaches are viable alternatives. For example, more research is needed to assess the impact of financial education on very young children. At the same time, evaluating financial education for this age group presents unique challenges, as traditional assessment methods may not yet be suitable. Consequently, alternative research approaches, such as qualitative studies, can provide valuable insights into early financial education.

Lastly, regardless of the methodological approach, we recommend that future studies generally look into causal mechanisms and processes in greater detail. For example, treatment uptake, knowledge, attitudes and behavior may be considered mediating variables as opposed to outcomes in and of themselves (also see subsection 6.1).

7 Conclusions

In this article, we take a thematic approach to summarizing recent empirical evidence on financial education impact evaluations. We analyze 68 experimental and quasi-experimental peer-reviewed studies published between 2010 and 2024, implemented in OECD countries based on key program characteristics. Where feasible, we highlight program features that show promising effects on the effectiveness of financial education in improving financial literacy – including knowledge, skills, attitudes and behaviors.

Financial education programs targeting children and adolescents are almost exclusively implemented in school settings. However, they are typically not integrated into the mandatory school curriculum but rather offered on a voluntary basis to schools. Program intensity is relatively homogeneous across school-based studies, with programs typically lasting a few hours over several weeks. Most school-based interventions are designed for specific grade levels, predominantly at the secondary school level and delivered through classroom sessions using in-person and/or digital didactic approaches. These programs typically

emphasize personal finance topics over a broader understanding of financial literacy, focusing primarily on financial knowledge. By comparison, financial attitudes and behaviors receive less attention.

Financial education interventions for adults exhibit substantial heterogeneity. They range from one-on-one in-person sessions to digital tools and apps incorporating alternative methods (e.g. nudging) that may not be inherently considered as financial education alongside traditional education. Many adult-targeted programs are brief – often a one-time information treatment, a single session or a short course – raising concerns about the depth of learning. Unlike school-based interventions, adult programs tend to focus more on improving financial behavior as opposed to financial knowledge.

Few questions on the effectiveness of financial education can be answered conclusively based on the current state of research. In line with existing literature, our findings confirm predominantly positive effects of knowledge-based interventions on short-term financial knowledge. Although different learning approaches have been tested, particularly in school-based interventions, none have emerged as superior. Early evidence also suggests that parents and teachers are important moderators for the effectiveness of financial education on children.

Studies also yield mixed results regarding financial attitudes and behaviors. Just-in-time interventions tied to a specific decision and interventions directly addressing behaviors as opposed to knowledge appear promising at least with regard to their short-term effects. However, robust evidence is lacking. Financial attitudes are rarely studied independently as the main outcomes of interventions and are often measured alongside financial knowledge or behavior. Long-term outcomes and causal mechanisms are rarely assessed. Additionally, the impact on financial well-being remains almost completely unexplored.

Study results depend not only on the interventions but also to a large degree on research context and methodology. For example, studies involving the adult population that focus on specific behavioral outcome measures typically examine interventions that address these specific behaviors more directly than purely knowledge- or skills-based interventions. Few studies were able to use outcomes beyond self-reports. Those that do use objective measures from administrative data are set in specific contexts, where e.g. retirement savings were increased through pension fund intervention.

Many studies considered are facing major methodological limitations. To strengthen future evaluations and to enhance the robustness of future literature synthesis, we propose explicitly identifying the causal pathways between financial education and various financial outcomes, suggesting seven potential causal channels prevalent in scientific discourse. Additionally, we advocate more detailed descriptions of core program characteristics, particularly in terms of instructional methods and content, and stronger methodological rigor in study design with a focus on causal identification strategies and comparative effectiveness studies that isolate individual program components. We also recommend increasing efforts to mitigate sample attrition and increasingly adopting of mixed-methods approaches to enhance the depth of analysis. Finally, we need more long-term evaluations to assess sustained impacts.

For program and evaluation designers, we recommend developing higher-intensity interventions, as brief programs may lack the depth required for lasting impact. Additionally, programs may consider incorporating emerging topics and broader financial education topics that have gained policy attention but remain currently underrepresented in the programs we considered. Notably, digital financial literacy and sustainability have not been widely integrated into financial education initiatives. While substantial evidence supports the effectiveness of financial education for secondary school students, research on younger children remains limited, highlighting a critical gap that future programs should address. Likewise, financial attitudes, self-regulation and critical thinking are rarely explored as causal channels of financial education. Ultimately, the research field presents ample opportunity to test the effects of both innovative and conventional approaches that go beyond the immediate improvement of financial knowledge.

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Annex

Table 1

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
01	Agasiti et al. (2022)	online financial education course for students majoring in languages, sciences and humanities	Italy	secondary school grade 12	students' teachers but with limited role; no prior instructor training	10h over ca. 9 weeks	bank accounts, interest rates, choosing the best installment purchase agreement	online classroom lessons	experimental: random assignment for classes within one school in Milan	financial knowledge
02	Amagir et al. (2022)	real-life financial education initiative with emphasis on financial behaviors	Netherlands	secondary school grade 9 (age: 15 years)	students' teachers; 3h prior instructor training	6.67h over 8 weeks	budgeting, setting savings goals, avoiding unnecessary expenses	in-person classroom lessons	experimental: random assignment for classes that signed up	financial knowledge, financial behavior, financial attitudes
03	Batty et al. (2020)	experiential, non-lecture-based financial education program using an economy simulation	USA	primary school grade 4 (age: ca. 10 years)	students' teachers; no prior instructor training	10 weeks	financial responsibility and decision-making, planning and money management, saving and investing	in-person classroom lessons	experimental: random assignment for schools that signed up; with waitlist design	financial knowledge
04	Batty et al. (2015)	traditional classroom lessons improving financial knowledge and decision-making skills	USA	primary school grade 4 and 5 (age: 9-10 years)	students' teachers or educators from a local credit union; 3h prior instructor training	3.75h over 5 weeks	savings, financial decision-making and money management	in-person classroom lessons	experimental: random assignment for all classes in two school districts; with waitlist design	financial knowledge, financial behavior, financial attitudes
05	Becchetti et al. (2013)	traditional classroom lessons with very limited content information	Italy	secondary school (age: ca. 18-19)	no information available	16h over 13 weeks	no information available	classroom lessons	experimental: random assignment for schools/ or classes from Milan and Rome that already had prior experience in teaching the program (no information how they were selected)	financial knowledge, financial behavior
06	Bhattacharya and Gill (2020)	in-person classroom education featuring two distinct treatments: one centered on money management and the other on financial investment	USA	secondary school grade 11 and 12	instructors from university; no prior instructor training	8h over 8 weeks	budgeting, borrowing, saving, and understanding economic principles relevant to personal finance and focus on money management or financial investment	in-person classroom lessons	quasi-experimental: non-random assignment for classes that signed up to the program, assignment according to predefined logistic constraints	financial attitudes

Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
07	Bhattacharya et al. (2016)	voluntary summer camp that blends traditional financial education with a savings-based intervention	USA	secondary school grade 8	external trainers from university and a certified financial advisor; no prior instructor training	12.5h over 1 week	economic fundamentals; money management fundamentals; saving and investing; credit and borrowing; financial risk management	in-person financial literacy camp	experimental: random assignment for only a small part of the intervention; among three schools, parents voluntarily signed their children up for the program, random assignment to 90 minutes of extra financial education (+14%) among registered students	financial knowledge
08	Coda Moscarola and Kalwiji (2021)	extracurricular financial education program during standard schooling hours at the Museum of Savings in Turin called the Money Learning program	Italy	primary school grade 4 and 5 (age: 8–11)	museum staff, no prior instructor training	one museum visit	origins of money, principles of a loan, implications of inflation, barter versus monetary exchange economies, history of the Templars and the concept of interest rates, origin of the euro, interest compounding	museum visit with short videos and interactive intertemporal-choice game	experimental: random assignment for schools that arrived at the museum; waitlist design	financial knowledge
09	Compen et al. (2020)	interactive online teacher training paired with three distinct student treatments, each varying in the level of teacher involvement	Belgium (Flanders)	secondary school and students (age: 13–15) and their teachers	students' teachers with different intensity of teacher role depending on the treatment: 3h of instructor training	3.33h	saving and investing	students: digital learning path; teachers: online webinars	experimental and mixed methods: qualitative teacher class observation; random assignment for schools that signed up except for one treatment; three different treatments with one treatment only included teachers who signed up for teacher training	financial knowledge, financial behavior
10	Compen et al. (2023)	online teacher training module paired with a digital financial literacy game, where student pairs solve problems based on ability matching	Belgium (Flanders)	secondary school and teachers (age: 13–15) and their teachers	students' teachers with limited role; ca. 3 hours of prior instructor training	3.33h	payment methods	students: digital game, classroom lessons; teachers: online platform	experimental and mixed methods: qualitative teacher class observation; random assignment for schools that signed up; two different treatments	financial knowledge, financial behavior

Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
11	Dare et al. (2020)	large-scale national financial education program involving 124 schools, with two modules: one focused on responsible spending and the other on performing transactions	Netherlands	primary school grade 5 (age: 9–13)	students' teachers; no prior instructor training	sometime between October and March	responsible spending: making budget choices, peer pressure and advertising, estimating prices; performing transactions: cash and digital money, proactive attitude toward money matters, security features of money	digital learning path classroom lessons	quasi-experimental: schools were randomly chosen by the ministry, schools that used the program previously were assigned to treatment and the schools that did not use the program were previously assigned as the control group	financial knowledge
12	De Becker et al. (2021)	digital learning path featuring various exercises (videos, games, case studies), primarily implemented in subsidized private schools, combined with a discrete choice experiment	Belgium	secondary school	students' teachers, but with limited role; no prior instructor training	4h	general concepts in financial literacy education, including saving and investing and deals with budgetary choices in everyday life	digital learning path classroom lessons	experimental: random assignment for schools that signed up	financial knowledge, financial behavior
13	Gill and Bhattacharya (2015)	comparison of two well-known interventions: one focused on personal finance (FFL program) and the other on investment (SML), implemented in low-income schools	USA	secondary school grade 11 and 12	economics university professor; no prior instructor training	7h	both interventions: principles of economic thinking, banking and financial services; saving and investment, credit and borrowing; FFL intensive: the above topics more intensively; SML intensive: the topic of investing more intensively	digital and in-person classroom lessons	quasi-experimental: non-random assignment, randomization is not really addressed in the paper	financial knowledge
14	Harter and Harter (2010)	well-known stock market game (SMG) paired with a comprehensive, complementary stock market learning curriculum	USA	secondary school grade 9–12 (age: 14–18)	students' teachers; prior instructor training without information about intensity	NA	stock market simulation	digital and in-person classroom lessons	quasi-experimental: non-random treatment and control assignment, randomization is not really addressed in the paper	financial knowledge

Note: NA = information not available.

Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
15	Iterbeke et al. (2020)	combinations of ability matching and differentiated student instruction, tailored to their proficiency levels, using an interactive learning game and paper-based materials	Belgium (Flanders)	secondary school grade 8 and 9 (age ca. 13–14)	students' teachers but with limited role; no prior instructor training	3.3h	means of payment, including bank accounts, bank cards, direct debits, standing orders and security issues such as skimming and phishing	digital and in-person classroom lessons	experimental: random assignment for schools that signed up	financial knowledge, financial behavior
16	Johnson et al. (2021)	story-driven narrative with interactive activities where students take over the role of a town's Mayor, navigating real-life financial decisions	USA	secondary school grade 7 and 8	students' teachers, but with limited role; no prior instructor training	4h	financial values and goal setting; budgeting and opportunity cost; saving and investing; payment types; banking, risk versus return; planning for the future	digital and in-person classroom lessons	experimental: random assignment for schools that were recruited and already had prior experience in teaching the program	financial knowledge, financial attitudes, financial behavior
17	Kalmi (2018)	peer learning between higher and lower secondary students, where the former developed digital financial education materials	Finland	secondary school (age: 15)	students from an upper secondary school under the supervision of their teachers; no prior instructor training	1h	no information available	digital classroom lessons	quasi-experimental: non-random assignment, assignment according to location of the school; treatment group is located in the area of the sponsoring bank	financial knowledge, financial attitudes, financial behavior
18	Kalmi and Rahko (2022)	comparison of traditional teaching methods versus a game-based approach, exploring how interactive, gamified learning impacts financial understanding and decision-making	Finland	secondary school grade 9 (age: ca. 15)	students' teachers; no prior instructor training	TR1: 4–6h; TR2: 2h; TR3: 5–8h	TR 1: work-life skills, personal finance; TR2: personal finance skills; TR3: teamwork skills, communication skills, decision-making calculations	classroom lessons with digital elements depending on the intervention	quasi-experimental: random assignment for only one out of three treatments for schools that signed up, 3 different treatments	financial knowledge, financial behavior

¹ TR = Treatment group.
Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
19	Kalwij et al. (2019)	45-minute cash quiz and short video presented during Global Money Week	Netherlands	primary school grade 5 and 6	employees from the financial sector acted as quiz master, no prior instructor training	1h	banks, money, transactions, planning and managing, savings, borrowing, risk and reward, the financial landscape, Dutch central bank tasks, how to earn income, entrepreneurship, happiness and money, costs of a smartphone	in-person classroom quiz	experimental: true RCT with random assignment for all primary schools and a small share of schools that already participated in previous study	financial knowledge, financial behavior
20	Lühmann et al. (2015)	intervention led by an external coach, featuring three modules on shopping, financial planning, and saving/investing, designed for lower-track students	Germany	secondary school (age: 13–15)	employees of sponsoring firms, prior instructor training without information about intensity	4.5h	shopping decisions, financial planning, saving/investment choices	in-person classroom lessons	quasi-experimental: non-random assignment for schools that signed up for the teacher trainings; allocation to treatment and control according to time constraints; waitlist design method	financial knowledge, financial attitudes, financial behavior
21	Lühmann et al. (2018)	intervention led by an external coach, featuring three modules on shopping, financial planning, and saving/investing, designed for lower-track students	Germany	secondary school (age: 13–15)	employees of sponsoring firms, prior instructor training without information about intensity	4.5h	shopping decisions, financial planning, saving/ choices	in-person classroom lessons	experimental: true RCT with post-test only and random assignment for all lower-track high schools	financial knowledge, financial attitudes, financial behavior
22	Maldonado and De Witte (2021)	parental financial education information and parental homework involvement combined with a classroom-based intervention	Belgium (Flanders)	secondary school students grade 8 and 9 (age: 13–14) and parents	students' teachers but with limited role; no prior instructor training	4h	saving and investing	in-person classroom lessons with some digital elements	quasi-experimental: non-random assignment for schools that signed up, assignment according to time preferences for implementation, with waitlist design	financial knowledge, financial skills
23	Maldonado et al. (2022)	parental involvement in homework activities, combined with a classroom-based intervention	Belgium (Flanders)	secondary school students grade 8 and 9 (age: 13–14) and parents	students' teachers but with limited role; no prior instructor training	4h	payment methods	classroom lessons combined with digital homework assignment	experimental: with random assignment for schools that signed up	financial knowledge, financial behavior

Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
24	Moscarola and Migheli (2017)	children had to draw what they want to save for and discuss with the researcher how long they need to save to achieve that goal	Italy	children (age: 8-9)	researchers	1h	saving; intertemporal choice	laboratory in-person intertemporal choice task	quasi-experimental: random selection of schools but non-random assignment for classes – headmaster decided which class participates	financial attitudes
25	Oezdemir and Kaya (2021)	financial literacy course consisting of eight modules, with lack of further information	Türkiye	secondary school grade 10	no information available	over 8 weeks	financial terms, budgeting, debts, saving, spending, sharing, rational decisions	no information available	experimental (?) and mixed methods: qualitative interviews with students on students' opinions; no information about randomization and level of treatment	financial attitudes, financial behavior
26	Sconti (2022)	digital program (short quizzes on an interactive multimedia whiteboard) versus in-person program (using slides and the rule-of-thumb approach)	Italy	secondary school (age: 16-18)	students' teachers and financial advisor but with limited role of teachers; no prior instructor training	8h over 4 weeks	both treatments cover the same topics: motivational lecture, price and inflation, savings and payment instruments; financial markets; mortgages, insurance and retirement	in-person or digital classroom lessons	experimental: random assignment for classes within one school	financial knowledge
27	Sule and Seda (2018)	teaching the consequences of actions when making intertemporal decisions using mini case studies	Türkiye	primary school grade 3 and 4	students' teachers; instructor training without information about intensity	2h over 8 weeks	temptation goods, smart shopping, coping mechanisms against temptations to meet saving targets	in-person classroom lessons	experimental: random assignment for schools that signed up; version of a waitlist design	financial attitudes
28	Urban et al. (2018) ²	impact of state-level personal finance education requirements on credit outcomes	USA	(age: 18-21)	depends on the state	over one semester	personal finance standards for the treated states of Georgia and Texas	classroom lessons	quasi-experimental synthetic control: Georgia and Texas had financial education mandates already before 2011; calculation of synthetic controls based on state-level macro variables of remaining states	financial behavior

² Note that state-level interventions were only included where sufficient information about the policy intervention was provided. Source: Authors' compilation.

Table 1 continued

Overview of financial education assessments for school children

No.	Study	Intervention summary	Country	Target group	Instructor information	Intensity	Content	Format and delivery channel	Study design	Outcome measures
29	Walstad et al. (2010)	video-based financial education program accompanied by lesson materials including instructional activities and assignments	USA	secondary school (age: 15-18)	students' teachers; 3-4 hours prior instructor training	6h over 4 weeks	key concepts in personal finance such as saving, wealth building and money management, opportunity costs related to financial decision-making, earning an income; banking and checking practices, credit, debt, annual percentage rate (APR), credit scores, budgeting, saving, investing, and risk tolerance	in-person and video classroom lessons	quasi-experimental: non-random assignment for classes that signed up, assignment according to treated teachers' preferences	financial knowledge

Source: Authors' compilation.

Table 2

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
Financial education for vulnerable groups									
01	Barcellos et al. (2016)	financial education for immigrants; focus on general-purpose and immigrant-specific financial information	USA	migrants: first- and second-generation Americans	one-time information	banking services, saving, investing (+ immigrant-specific information in a second version)	online information material (two versions)	experimental: used nationally representative online panel, random assignment, measurement up to six months after intervention	financial knowledge, hypothetical financial behavior
02	Blanco et al. (2023)	community-based digital financial education program including nudges for motivation	USA	Hispanics: low-to-moderate income	6 months (with weekly reminder)	monthly topics: financial goal setting, financial product selection, bill payments, credit scores, debt and saving; activities include income tracking, financial planning; language: English + Spanish	online program + nudges (mobile phone-delivered, motivational text messages)	experimental: waitlist control group design with block randomization, measurement immediately after intervention	retention rate, financial behavior, financial stress
03	Collins (2013)	mandatory financial education which is linked to institutional financial assistance	USA	very low-income families in a subsidized housing program	5 courses over 2 months (total: 12h)	personal finance, budgeting, credit reports, credit management, banking, financial planning, saving, paying bills	in-person, mandatory course	experimental: field experiment with waitlist control group design and random assignment; measurement up to 10 months after intervention	self-reported financial behavior, bank account balance, credit reports
04	De Bruijn et al. (2022)	a behaviorally informed financial education program (need-driven adaptive approach) compared to a traditional program for financially vulnerable individuals	Netherlands	financially vulnerable consumers (debt and welfare service)	5-6 weekly classes (total: 12.5-15h)	traditional: income types, expenditures, financial products, budgeting, applying for allowances, tracking expenses; BI: income, financial administration, making ends meet (now or later)	in-person, course (traditional vs behaviorally-informed program)	quasi-experimental: only partial randomization was possible, two studies: (1) program with behavioral insights (BI) vs. control group and (2) BI vs. traditional educational program	financial skill and knowledge, financial-psycho-logical indicator, financial behavior, financial well-being, financial situation
05	Elbogen et al. (2016)	supporting veterans with psychiatric disabilities in money management (focus on self-directed care taking)	USA	veterans with psychiatric disabilities	one time (1-3h)	money management: needs vs. wants, budgeting, saving for emergencies, and handling disability income (e.g. veteran discounts, how much additional earning without losing disability benefits, avoiding financial exploitation)	in-person (psychoeducational one-on-one intervention)	experimental: random assignment with clinical trial, measurement 6 months after intervention	money-knowledge and saving behavior, perceived empowerment, debt, employment, psychiatric symptoms, homelessness
06	Gibson et al. (2014)	financial literacy to help migrants become better informed consumers, shopping for better remittance deals	New Zealand and Australia	migrants	one time (ca. 2h)	components of remittance costs, strategies for reducing these costs, sources of information for comparing costs, remittance products	in-person, course	experimental: random assignment, measurement up to 6 months after intervention	remittance-specific financial knowledge, broader financial knowledge

Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
07	Haynes et al. (2011)	financial education as part of health education for women to help manage financial challenges, with or without social networking component	USA	chronically ill rural women	22 weekly lessons	recording income and expenses, assessing net worth, navigating government assistance programs; second version includes expert round table + discussion forum	online lessons consisting of 1-to-2-page instructional guide (2 versions)	experiment: random assignment to two treatment (two versions) and one control group	financial knowledge
08	Hetting et al. (2016)	financial literacy curriculum to support financial independence of victims of domestic violence	USA and Puerto Rico	survivors of intimate partner violence	4–8 weekly workshops (1–2h each); individual session (30–60 min)	disentangling joint financial relationships, repairing credit damaged by abusers, economic safety plans, protecting against financial abuse; language: English + Spanish	in-person workshops + individual session	experimental: random assignment, with face-to-face (or telephone) interviews, measurement immediately after intervention	perceived financial knowledge, financial behaviors, financial stress
09	Modesi et al. (2019)	financial literacy and one-on-one coaching with a credit building counselor for low-income young adults	USA	low-income young adults (age 18–29)	one-time workshop (1h); coaching over 1 year (initial session: 1h)	workshop: credit building and access, saving products; coaching: individual's credit report, development of budgeting and credit action plan	in-person workshop + one-on-one coaching	mixed method: (1) quasi-experimental, random assignment among applicants; (2) two focus groups (during + after intervention)	financial knowledge, self-efficacy, financial behavior, credit data
10	Postmus et al. (2015)	financial literacy curriculum to support financial independence of victims of domestic violence	USA and Puerto Rico	survivors of intimate partner violence	4–8 weekly workshops (1–2h each); individual session (30–60min)	disentangling joint financial relationships, repairing credit damaged by abusers, economic safety plans, protecting against financial abuse; language: English + Spanish	in-person workshop + individual session	experimental: random assignment, with face-to-face (or telephone) interviews, measurement immediately, 6 and 12 months after intervention	perceived financial knowledge, financial behaviors, financial stress
11	Reich and Berman (2015)	financial literacy classes targeting low-income individuals	USA	low-income individuals receiving services in nonprofit residential program	4 weekly sessions (ca. 2h each)	budgeting, loan repayment, noncash payment, checking accounts, credit, identity theft, credit report management	in-person course	experimental: with phase-in, random assignment; measurement immediately after the intervention	financial knowledge, self-reported financial behavior and negative financial life events

Financial education for retirement planning

12	Bilari et al. (2023)	financial education provided by a pension fund to motivate proactive financial decision making	Italy	employees enrolled in pension fund	one time (25 minutes)	expected lifetime and pensions, retrieval of information on retirement income, importance of investment choices in pension funds, effects of inflation on investment decisions, concept of portfolio diversification	online video + nudge (encouraging to gain more info)	experimental: stratified random selection of treatment- and control group, measurement 2 weeks, 3 and ca. 9 months after the intervention	demographic survival literacy, financial knowledge, self-reported financial behavior, pension fund data
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Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
13	Boyer et al. (2022)	provision of targeted information to improve individuals' ability to choose the most tax-efficient savings option	Canada	adults (age 35-55)	one time (longer video: 101 seconds)	video 1: tax features of front-loaded (individuals contribute post-tax income) and back-loaded (individuals contribute pre-tax income) savings plans; video 2: tax features + clawbacks on government benefits	online video (2 versions)	experimental: survey experiment via online panel, random assignment, measurement immediately after intervention	hypothetical saving choices
14	Clark et al. (2014)	low-effort intervention (information nudges) to increase employee participation in the employer's 401(k) plan	USA	newly hired employees of a large financial institution	one-time information	information on the employer's 401(k) plan: highlighting employer matching contributions, benefits of compounding savings over time	online e-mail flyers (hard copies for no computer access) including motivational nudges	experimental: field experiment, random assignment, measurement ca. 2 months after intervention	participation in employer's 401(k) pension plan
15	Collins and Urban (2016)	field study on financial education during work hours to improve retirement savings	USA	employees at 45 credit unions	ca. 8.75h	basics of finance, basics of investing, basics of financial planning, basics of retirement, saving strategies, mutual funds, saving for college, understanding investment risks, working with financial advisers, getting started	online course (10 self-paced modules during work time)	experimental: field experiment, random assignment	self-assessed financial knowledge, self-reported financial behavior, data on retirement contributions
16	Foster et al. (2015)	manipulation of information presentation to impact the accessibility and assessability of retirement savings statements	Australia	members of retirement savings funds	one-time information	retirement fund information including administrative costs (manipulation of information location)	online information (different formats)	experimental: survey experiment, random assignment, measurement immediately after the intervention	financial knowledge, self-assessed financial understanding and behavior
17	Ghafoori et al. (2021)	a large-scale financial education intervention focusing on pension planning	Australia	pre-retiree pension fund members (age 53+)	one time (90 minutes)	retirement and preservation ages, determining retirement money needs, monitoring personal retirement savings, age pension mechanics, additional super contributions and tax benefits, asset allocation fundamentals, retirement income streams, financial advice and action planning	in-person seminar	quasi-experimental: fund members who are yet to attend their seminar act as a de-facto control group	voluntary pension contributions

Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
18	Goda et al. (2014)	variations of retirement income projection information	USA	university employees (below age 65)	one-time information	planning treatment: general saving information for retirement; describing options for signing up for or changing contributions to pension plan; balance treatment: adds customized projection of hypothetical additional contributions; income treatment: adds customized projection of the additional annual retirement income	online, e-mail brochures (with and without customized saving projections)	experimental: random assignment, measurement ca. 7 months after intervention	voluntary pension contributions
19	Heinberg et al. (2014)	short interventions using psychological principles to increase the appeal of retirement saving and motivate behavioral change in retirement saving	USA	adults	one time (5 videos/narratives; each ca. 5 minutes long)	five basic financial planning concepts: compound interest, inflation, risk diversification, tax treatment of retirement savings vehicles and employer matches of defined contribution savings plans	online videos vs. narratives (with and without behavioral insights)	mixed method: (1) two focus groups to feedback intervention, (2) field experiment with online panel, random assignment, measurement immediately and 8 months after intervention	financial knowledge, self-efficacy
20	Isler et al. (2022)	nudging compared to financial literacy training focusing on the self-management of online retirement accounts	Australia	adults	one time	educational nudge: giving feedback on answers to prior financial knowledge test before allocation task; default nudge: automatically distributing savings in the money allocation task	online money allocation task with educational nudges	experimental: convenience sampling from university-based online platform, random assignment, measurement immediately after intervention	financial knowledge, financial behavior (saving)
Financial education for a more general adult population and general financial topics									
21	Angel (2018)	digital financial education formats influencing personal finance behavior	Austria	adolescents (age 16-22)	movie (75 minutes); app (4-7 weeks); exercise (NA)	documentary movie: over-indebtedness; mobile budgeting app: track income and expenses web research and exercise: budgeting, saving and debt	online movie, smartphone budgeting app and web research exercise	experimental: random assignment, all measures via online survey, time between pre and post measurement: 4-7 weeks	financial knowledge, financial attitudes, self-reported financial behavior
22	Bruhn et al. (2014)	large-scale financial education program, focusing on low take-up rates for voluntary financial training	Mexico	clients of financial institution (mean age 33)	one time (4 hours)	savings, retirement planning, credit management	in-person (classroom setting)	experimental: random assignment, measurement immediately and ca. 6 months after intervention	objective + subjective financial knowledge, financial behavior, for a subsample: saving account and credit card balance

Note: NA = information not available.
Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
23	Fan and Chatterjee (2018)	information sheet and situational stimuli	USA	undergraduate students from a public university (age 18+)	one time (whole experiment took 1 hour)	stocks, bonds, interest rates, risks and returns, tax-advanced accounts	information sheet (printed copy)	experimental: random assignment, control group and 3 treatment groups: (1) info sheet, (2) + (3): info sheet + situational stimuli of psychological pressures; measurement immediately after intervention	investor knowledge
24	French et al. (2020)	financial education smartphone apps	Northern Ireland	members of a large credit union (age 16–65)	apps available for 6 months	apps: (1) loan interest comparison, (2) expenditure tracking, (3) cash calendar, (4) debt management; money management skills workshop to demonstrate capabilities of app; money skills competition: required app usage	smartphone apps (4 versions) + push notifications + workshop + contest	experimental (?): market research company carried out pre- and post-surveys; apps were evaluated together because sample would have been too small to evaluate apps separately; treatment group (those who complied) + control group (those who would have complied), no further info on participant selection or randomization, measurement immediately after 6 months availability	financial and digital knowledge, self-reported financial behavior, financial well-being
25	Fürstenau and Hommel (2019)	online mortgage loan calculator	Germany	economics and business undergraduate students	one time (NA)	calculator to calculate, e.g. income and expenses, the affordable purchase price for a property, the annuity and costs for renting or buying	online (loan calculating tool)	quasi-experimental: random assignment, very small sample, measurement immediately and 2 weeks after intervention	objective and subjective financial knowledge, self-reported previous investing experience
26	Horowitz et al. (2021)	workplace financial education program	USA	employees of financial services companies	10 weeks (weekly sessions, each 1 hour)	compound interest, risk diversification, stock market basics; budgeting, financial planning	in-person (classroom setting)	quasi-experimental: participants self-selected into treatment, control group received passive educational intervention (booklets with similar content), measurement immediately after intervention	financial knowledge
27	Kothakota and Kiss (2020)	visual representation combined with text-based financial education compared to text-only explanations	USA	adult population (age 18–65)	one time (10–15 minutes)	financial information (not specified)	online (text-only vs. text with visualization)	experimental: survey experiment via SurveyMonkey, control group and 2 treatment groups: (1) text-only presentation and (2) text + visualization; measurement immediately after intervention	financial knowledge

Note: NA = information not available.
Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
28	Lusardi et al. (2017)	different digital financial literacy information formats	USA	adults (representative of US households)	one time ("short")	risk diversification and investment decision making	online (4 different formats: informational brochure, interactive visual tool, written narrative, video narrative)	experimental: survey experiment via online panel (ALP), random assignment to control group and 4 treatment groups, measurement immediately after intervention	financial knowledge, self-efficacy and confidence
29	Moulton et al. (2015)	financial planning program and coaching for first-time homebuyers	USA	first-time homebuyer (average age: 33)	over 12 months (9-20 contacts during that period)	online platform: financial assessments, changes in certain financial variables (e.g. amount saved each month) affecting future time periods; identify specific goals and set up plan for 1 year; calls: implemented monitoring schedule	online (interactive platform) + phone calls with financial coach	experimental: field experiment (sample consisted of participants of subsidized homeownership program), measured 30-, 60-, 90-day delinquency rates and had 1-year follow up	mortgage delinquency and default, self-reported financial behavior
30	Skimmyhom (2016)	mandatory in-person financial education interventions in military settings	USA	new enlistees of US military	2 sessions (total: 8 hours)	spending plans, credit, debt management, insurance, consumer awareness, financial ethics, military retirement savings	in-person (mandatory classroom setting)	experimental: staggered rollout across location, measurement 1 and 2 years after the intervention	administrative data of credit behavior, retirement savings, military labor market outcomes
31	Skimmyhom et al. (2016)	mandatory in-person financial education interventions in military settings	USA	undergraduate university students (military academy)	4 sessions (each: 2 hours) integrated into a semester-long economics course	budgeting, consumption, time value of money	in-person (mandatory classroom setting), 2 versions: (1) principles-based approach (2) rules-of-thumb approach	experimental: random assignment to control group and 2 treatment groups, measurement immediately after intervention	objective and subjective financial knowledge, self-reported behaviors, self-efficacy
Financial education for university and college students									
32	Agasisti et al. (2023)	financial education module embedded in course on business economics; on-campus lectures compared to online video lectures	Italy	undergraduate university students	3 hours (on campus), 55 minutes (online videos)	bank accounts, simple/compound interest, shares and bonds, loans and mortgages	online lectures or in-person lectures as part of experimental design	quasi-experimental; group assignment based on last name; pre- and post-test	financial knowledge test

Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
33	Anderson and Card (2015)	different formats of financially responsible behavior	USA	first year undergraduate university students	not reported	responsible consumption behavior and credit card use	in-person lectures or online (social media and website) as part of experimental design	randomized experiment	compulsive buying and degree of irrational credit use
34	Choi et al. (2023)	weekly emails and text messages with different content and linking to financial education online platform	USA	undergraduate and graduate university students	weekly reminders for three months; new curriculum options each week; time spent with material not reported	budgeting, paying for college and debt and saving as topics	emails and text messages leading to online platform	randomized experiment; waitlist design	financial self-efficacy, financial health
35	Gerrans and Heaney (2019); Gerrans, (2021)	semester unit of a "managing personal finances" course	Australia	university students	11 weeks (105 minutes + 45 minutes tutorial per week)	financial planning, savings, debt, personal taxation, investments and diversification, home ownership, insurance, consumer law, behavioral finance, long-term planning, retirement, marriage	on-campus, classroom setting	self-selection quasi-experiment, follow up-surveys up to three years later (reported in Gerrans, 2021)	financial knowledge test, self-assessed financial literacy, decision confidence and satisfaction, self-reported and intended financial behaviors
36	Handy et al. (2021)	personal finance lectures	USA	college students	six sessions	budgeting, credit management, risk and return, mutual funds, retirement planning and risk management (insurance)	on-campus lectures	self-selection quasi-experiment	financial knowledge, confidence in post-college financial future
37	Kuntze et al. (2019)	financial education video module, micro-lectures that could be watched at participants' own convenience	USA	business college students	67 minutes videos in total	not reported	online videos	randomized experiment implied, but not clearly reported	financial knowledge test

Source: Authors' compilation.

Table 2 continued

Overview of financial education assessments for adults

No.	Study	Intervention summary	Country	Target group	Intensity	Content	Format and delivery channel	Study design	Outcome measures
38	Salas-Velasco (2022)	laboratory experiment, intervention focused on debt-financed graduate education decision-making	Spain	final year undergraduate students	"short"	economic viability of investing in a master's degree and financing the master's degree with a student loan; second treatment group with additional information on availability bias	computer-based	randomized experiment	topic-specific knowledge test, self-confidence, self-efficacy
39	Torma et al. (2023)	financial literacy lectures	Croatia	university students	four 90-minute lectures	not reported	on-campus lectures	randomized experiment; waitlist design	financial knowledge test, self-assessed knowledge, financial interest, impulse buying, hypothetical financial decisions and consumption

Source: Authors' compilation.