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Open Letter to the Financial Education and Mathematics Education Communities

Executive Summary

- Financial education must overcome the profit seeking motives of providers of financial services, which requires that financial education builds analytical skills as well as product knowledge.
- Mathematics provides analytical skills for financial decision making.
- Financial literacy requirements that do not provide the opportunity for students to earn mathematics graduation credits may limit the math content covered in financial literacy courses.
- Effective financial education requires mathematics and financial educators to work together to advocate for graduation requirements that provide the framework to implement teaching practices that best serve students.

Introduction

Recently FiCycle filed a comment letter in support of the NY State proposed Financial Education requirements. (https://ficycle.org/ny-pf-letter/) We wrote: "FiCycle supports allowing Financial Education requirements to be met in a variety of modes, including being embedded in Mathematics courses. Our experience and research show that Financial Education leads to better financial outcomes when combined with mathematics." It is in this context that we reach out to both the financial and mathematics education communities to work together, to ensure students' needs are met.

While many in the financial education community support a required stand-alone Financial Education course as the gold standard for financial education, in some cases, embedded financial literacy requirements, especially when linked to math courses, may be preferable to stand-alone requirements that limit how financial education can be delivered.

FiCycle is a New York based non-profit 501(c)(3) organization dedicated to improving the quality and effectiveness of Financial Education through research, curriculum design, and professional development. Our work sits at the intersection of research, standards, and classroom practice. Our materials have been used in hundreds of schools, serving thousands of students across urban, suburban, and rural communities.

Our view is based on the following observations, backed up by our research and experience.

1. Effective Financial Education

Every financial education graduation requirement entails "opportunity costs," in that students are required to take a Financial Education course that they otherwise would not have taken, which

must reduce study in another area. This creates a high burden on the providers of financial education to demonstrate that the course is an effective use of student and school time and resources.

While some research points to the benefits of financial education programs, other research shows mixed results. Some experts find that financial education is a powerful tool for improving financial behavior (Kaiser & Lusardi, 2024); others believe it has limited effectiveness (Campbell & Ramadorai, 2025).

When it comes to the effectiveness of high school programs, the gaps in our knowledge are particularly pronounced. Research here tends to work in broad strokes, looking at changes in financial behaviors across entire states with and without financial education mandates (Collins & Urban 2025, L'Esperance et al. 2025). Depending on the specific outcomes studied and datasets used, results can vary widely. In addition, these studies provide little or no insight into the details of the content taught within these financial education classes and which aspects of the mandates are responsible for various effects. Studies in other educational fields, such as mathematics and literacy, provide much more fine-grained analysis of what is effective.

One area of concern is that some research shows that financial overconfidence, where financial confidence exceeds financial skill, can lead to negative financial outcomes. Our recent research suggests that financial education tends to increase overconfidence and negative behaviors (Marley-Payne & Davidson 2025). This stands in contrast to research on financial education that focuses on subjective self-assessments and levels of engagement with financial products. These measures may not fully reflect the use of risky investment products, boosted by overconfidence (see, e.g., papers included in Kaiser et al.'s 2022 metastudy).

These results are significant given that financial decision making often involves learning about complex financial products with hidden risks and costs. The interests of financial institutions are in many ways adverse to the interests of consumers in that they seek to maximize fees and revenue, rather than benefit consumers. Thus, it is important that financial education provides skills at least in proportion to confidence.

2. The Need for Mathematics in Financial Education

A standalone course with greater focus on financial vocabulary and products rather than on conceptual understanding and the mathematics of finance, risks leaving students vulnerable to misleading financial product marketing. We believe, and research supports, that mathematics helps provide the necessary financial skills to address the profit-seeking activities of financial companies.

Fixed: Why Personal Finance Is Broken and How to Make It Work for Everyone, a recent book co-authored by the preeminent Harvard economist John Campbell (Campbell & Ramadorai, 2025), explains the need for mathematically based Financial Education. "[In] personal finance, we struggle against our biological limitations and predispositions in environments where

suppliers have incentives to exploit our human weaknesses… To manage financial challenges, people must do some math… [a] natural approach is to offer Financial Education in high school as a part of the math curriculum."

Yet math teachers are often a scarce resource in K-12 schools, and many schools cannot dedicate a math teacher to a course that will not provide students with the necessary math credits for graduation. Standalone courses that do not offer dual credit opportunities for math and personal finance may limit the use of math teachers for financial education.

3. Linking Mathematics and Financial Education

While requiring financial education to be embedded in other courses may address the two factors described above, research also suggests that embedded financial education mandates often lack the specificity and accountability of requirements for a standalone course, resulting in students receiving insufficient financial education. Therefore, given the need for mathematics in financial education, it is not sufficient to merely add some math to a finance class or to have some financial examples in a math class. To prepare students to apply mathematical and financial reasoning together in real-world contexts outside the classroom, it is necessary to fully integrate mathematics and financial content within the classroom.

We have developed standards linking financial concepts directly to mathematical concepts at the level of middle school mathematics and high school mathematics, using the concepts of wealth, time, risk, and value. These concepts have both mathematical and financial dimensions and provide a framework for covering typical Personal Finance standards while also addressing the math needed to make these classes most effective.

In this way, the financial topics are not just appended to the math class, rather they form an integral combination.

In a comment letter to the Board of Regents, the Math Assistant Principal at one of the schools that uses our course expressed this view more elegantly than we can:

> I am writing to share some insights on why anchoring financial literacy within a formal mathematics curriculum offers unique and long-term benefits for students. Instead of just using a calculator, students learn the power of the number e and continuous compounding. This helps them visualize how debt or investments grow over time using the formula $A=Pe^{rt}$. It instills in them an understanding of investments and saving which can give them the tools to invest as an adult. By applying probability and statistics, students can move beyond "guessing" and actually calculate the expected value of financial decisions, helping them navigate insurance, stock market volatility, and interest rate changes.

> By treating finance as a mathematical discipline, we empower students to be "creators" of their financial future rather than just "consumers" of financial products. This rigorous foundation is essential for navigating the complexities of the modern economy.

Our Recommendation

While we strongly favor linking financial education to mathematics, we believe that connections are also possible to other subjects. These connections require clear statement of the connection and reason for the delivery of financial education in these contexts. This goes beyond merely covering topics like earning money, saving, and investing within another course — there needs to be a conceptual link between the subjects that will enrich student understanding of both subjects as we have demonstrated with mathematics.

Rather than advocating for stand-alone Personal Finance courses which do not allow for credit in mathematics or other subjects, we recommend that the Financial Education community support joint credit for courses that integrate financial education and other disciplines, especially mathematics, and encourage the development of guidelines for creating standards that explicitly integrate financial education in the titles and throughout the curriculum of such courses.

A Call to Mathematics Educators

As we have noted, effective financial decision making depends on mathematical knowledge and skills. Students cannot meaningfully comprehend many personal finance concepts without engaging in the mathematics that underpin them, making mathematics a necessary foundation of any financial education course. If schools are going to provide students with education around financial topics and products, then they must also ensure they give them the knowledge and skills, in this case mathematical, required to think about these topics and be an informed consumer of these products. Thus, for financial education to be effective, it is also important for the mathematics education community to recognize the need for financial education to be a part of mathematics.

State treasurers, legislatures, and education leaders have voiced their support for financial education through the establishment of financial education requirements. Whether through courses that directly combine mathematics and finance or through horizontal integration of financial education across core subjects that include math, math teachers are best prepared to bring the necessary mathematical training to students. Without the involvement of the mathematics community, we cannot have effective financial education.

But this is not a one-way street. As described in an article by our Director of Education in NCTM's *Mathematics Teacher: Learning and Teaching PK-12* (Dituri, 2025), combining mathematics and finance education has benefits that go beyond improving students' financial outcomes. Many people do not realize that much of the mathematics taught in schools was originally developed to meet the needs of finance. As a result, finance provides a fertile context for teaching and deepening understanding of mathematical topics and standards already found in

the curriculum, from Algebra to Data Science and beyond. By grounding mathematics instruction in relevant real-world problems, we make mathematics more relevant, more engaging, and more meaningful, avoiding the familiar trope of a bored student sitting in math class wondering, "When am I going to use this in real life?" In addition, teaching personal finance through mathematics exposes students to a wide range of career opportunities in fields such as accounting, banking, financial planning, insurance, and investment management, while demystifying the kinds of work and mathematics these careers actually require.

Conclusion

Meeting the goal of improving financial outcomes with the potential pitfalls present in our financial system creates unique challenges for financial education. Combining mathematics and financial education offers the opportunity for enhanced effectiveness and improved outcomes. Through continued dialog, research, and innovation, as educators, we can work to deliver high quality financial and mathematics courses to all students. We look forward to working together on this essential endeavor.

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