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Combining Personal Finance and Mathematics Education: A Case Study

Executive Summary

This study investigates student learning after taking a high school course combining mathematics and personal finance. We find that:

- Teaching personal finance within a math course leads to strong student learning in finance, making it an effective way to meet personal finance standards.
- Teaching math through financial applications leads to substantial increases in math knowledge.
- Overall, student scores improved by over 20 percentage points after taking the course, well above recognized benchmarks for successful educational interventions.

For schools and districts looking to incorporate personal finance standards into their curriculum, doing so within a math course may be an attractive option as it allows for effective financial learning, while reinforcing rather than sacrificing mathematics learning.

1. Introduction

Financial education programs are spreading rapidly across US high schools, with the majority of states now requiring students to take a course in personal finance in order to graduate.[1] With the question of *whether* to teach personal finance mostly determined, attention has turned to *how* it should be taught. This question is pertinent given that research suggests that the effectiveness of different personal finance courses varies substantially, and that, at times, such courses can lead to counter-productive over-confidence (Marley-Payne & Davidson 2025).

Debate has focused on whether there must be a standalone personal finance course or if personal finance lessons can be embedded in another course (Collins & Urban 2025). The standalone vs embedded debate muddies a number of important distinctions, most notably, *who* is teaching the course. Standalone course mandates usually lead to

[1] See https://www.councilforeconed.org/survey-of-the-states/

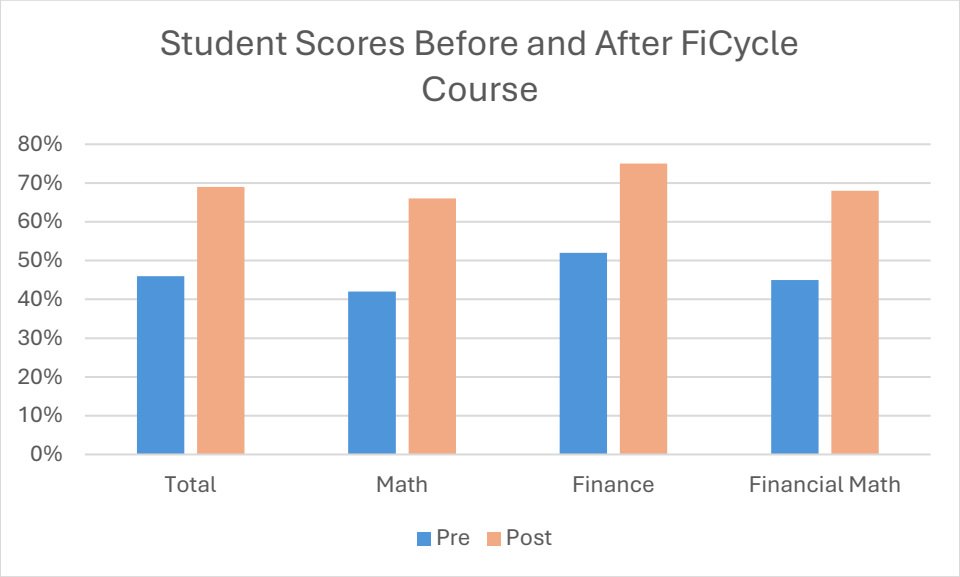
personal finance being taught by a social studies or other non-STEM teacher while embedded requirements allow for personal finance lessons to be taught by teachers in a range of domains, including *mathematics*. It is possible, though, for a standalone personal finance course to be taught as an applied mathematics course, given the essential mathematical components of the fundamental concepts in personal finance.

The question of whether to teach personal finance as a mathematics course merits examination separately from the embedded vs standalone debate. Research suggests that a combination of mathematical and financial knowledge is optimal for beneficial financial behavior (Marley-Payne et al. 2025). It is plausible to think that teaching the two subjects in combination could have benefits.

This study addresses this question by assessing learning for students who took a course that combines finance and mathematics. We find substantial gains in both financial and math knowledge.

- Overall scores improved from 46% to 69%
- Math scores improved from 42% to 66%
- Finance scores improved from 52% to 75%
- Applied financial math scores improved from 45% to 68%.

This points to the advantages of teaching personal finance within a mathematics course.



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2. Study Methods

In this study, we measured student learning in a school district on the US West Coast. Students in junior and senior years of high school took the Financial Life Cycle Mathematics course, a yearlong course teaching the fundamentals of personal finance along with the associated high school level algebra, statistics and probability skills. Student learning was measured using a validated survey instrument for assessing levels of knowledge personal finance, mathematics, and applications of mathematics to personal finance.[2] This survey, "The Finance and Mathematics Examination (FAME)", was composed of 34 multiple choice questions divided into three mutually exclusive categories (sample questions are included below):

- Mathematics: Questions in pure mathematics.
- Finance: Question on topics in personal finance with no mathematical component.
- Financial Math: Questions that apply mathematical concepts to topics in personal finance.

A sample of 194 students took the survey before and after taking the FiCycle course. We compared their pre- and post-survey scores to measure student learning.

	Math	Finance	Financial Math	Total
Pre	43%	53%	46%	47%
Post	65%	75%	67%	69%
Change	22%	22%	22%	22%
St Dev	25%	23%	24%	22%
Change/St Dev	0.88	0.96	0.92	1.00

Note that the bottom row 'Change/St Dev' is a measure used to assess the effectiveness of educational programs. A value of 0.4 is considered the threshold for a *substantial effect* while 0.8 is considered a *strong effect* (Hattie 2012). Learning in all areas exceed the strong threshold. The change in overall learning corresponds to a student moving from the 50th percentile to above the 78th percentile.

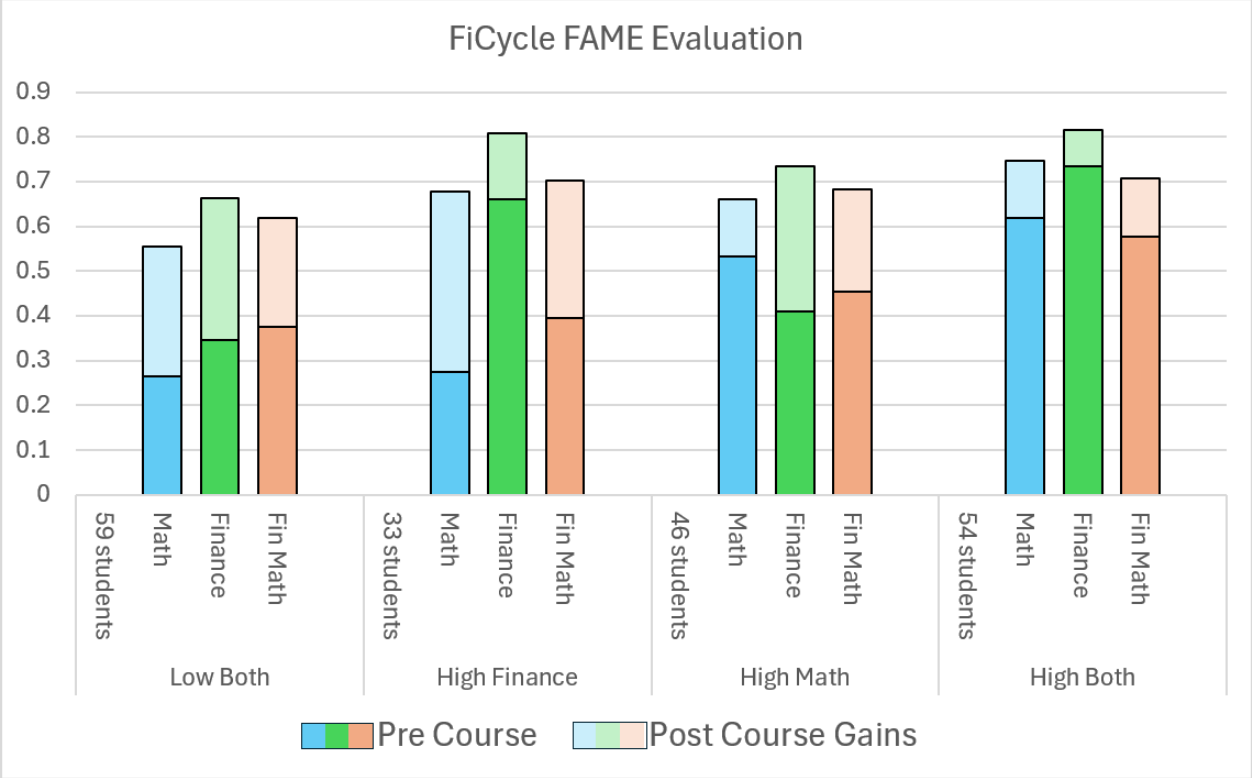
[2] See, https://ficycle.org/wp-content/uploads/2022/01/FAME.pdf

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As well as the overall improvement, it should be noted that students of all knowledge levels coming into the course made significant learning gains. We grouped students into one of four categories according to their prior knowledge levels, relative to the sample median on the pre-test

	Low Prior Math Score	*High Prior Math Score*
Low Prior Finance Score	Low Scorers	High Math
High Prior Finance Score	High Finance	High Scorers

Each group made substantial learning gains.



In particular, students who started out with higher math knowledge and lower financial knowledge made outsized gains financial learning, while those with who started out with higher financial knowledge and lower math knowledge made outsized gains in math learning. This shows that students' relative weaknesses tended to catch up to their strengths. This highlights the potential benefits of teaching personal finance within a math class: it can leverage financial knowledge to improve math learning and math knowledge to improve finance learning.

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Takeaways

- *For Math Teachers*: Teaching math as an application of finance is a powerful way to engage students, especially those who have been less engaged with traditional algebra courses.
- *For Finance Teachers*: Teaching personal finance within a math course leads to strong student learning.
- *For Administrators*: When looking for a place to incorporate a personal finance class into a curriculum, placing it within a math class makes it effective for financial learning while not sacrificing math education. In fact, it may enhance math learning.

References

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Appendix: Sample FAME Questions

These sample questions had the highest improvement in student correct responses for each category. Math questions had 4 of the top 5 score improvements.

Mathematics:
What is 5^a x 5^b equal to?
a. 5^(a+b)
b. 5^(ab)
c. (5a)^b
d. 25^(ab)
(13% correct on pre-test to 47% correct after FiCycle Math course)

Finance:
When is it most appropriate to invest in stocks?
a. You need to double your money in a year.
b. You want to use your investment for a down payment on a house in 3 years' time.
c. You are saving for retirement which is 20 years away.
d. You will use this money to pay your bills at the end of the month.
(41% correct on pre-test to 75% correct after FiCycle Math course)

Financial Math:
Imagine that the interest rate on your savings account is 1 percent a year and inflation is 2 percent a year. After 5 years, how much would the amount of money in your account likely buy at the grocery store?
a. More
b. Same
c. Less
d. Cannot be determined
(46% correct on pre-test to 75% correct after FiCycle Math course)

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