

FiCycle Standards for Personal Finance and Mathematics: Feedback Document, April 2024

Introduction:

Financial Life Cycle Education (FiCycle) has developed standards for Math and Personal Finance Education. FiCycle released the standards for public comment on January 24, 2024 with the comment period ending on March 1, 2024. FiCycle received many comments via e-mail and through an online comment form.

The final standards incorporate revisions based upon the comments we received. This document summarizes the comments and our responses to them.

1. General Overview Statements

Many of the comments contained general statements about the standards and were supportive of combining mathematics and personal finance.

The standards are on target, and we continue to enjoy the value that FiCycle brings in educating our high school juniors and seniors in the areas of math and finance!

I applaud your efforts to educate students about their personal finances, including insurance, investments, interest expense related to borrowing, etc.

Just to concur with what you laid out, I hope that courses based on these standards do get developed and widely adopted as elective replacements for third- or fourth-year math courses.

I've read your proposed standards and I like them very much.

We are grateful for the many commenters who reviewed the standards, support the mission of FiCycle to improve math and personal finance education and believe that the Standards advance the effort to achieve our objectives.

The Standards were motivated by five principles related to mathematics and personal finance education. Some comments directly related to the principles:

I have been reading over your document and really liked your five principles. There are many connections to the New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills.

Let me start by saying that the standards document you all put together is really fantastic! I especially love that you begin by laying out some of your core 'principles.' I also very much

appreciate how, overall, you are showing the high school math ed community an example of how we can simultaneously teach students 'grade-level' mathematics AND teach them about important issues in their lives and in the world!

I agree with the need for this change in education for our students. I also agree that it is necessary for everyone to understand these standards for success in adult life and I like that it is tied to math standards.

You have presented the rationale for this course very clearly.... I am well aware that conceptual understanding is vital to go along with procedural fluency and as a basis for problem solving and you have stated this in straightforward terms.

I agree with this as a math course, and this should be required for all students.

At least one commenter was less supportive of combining mathematics and personal finance and our principle: *A conceptual understanding of personal finance requires understanding the underlying mathematics*

I disagree that a full understanding of the math is necessary or even advised when exposing the general student population to managing their personal finances. Math turns off many people, myself included....Let's stick to making sure all students understand what insurance is, how credit cards and scores work. They don't need to analyze the "mathiness" of it. Leave that to courses in Economics.

We have also seen comments like these in other forums. For example, in an article about FiCycle in the New York Times on March 4, 2024, one commenter wrote:

Financial literacy isn't math. It can be taught in an economics department. Math is Newtonian mechanics, it is statistics and probability, it is geometry and astronomy and differential equations and linear algebra. Math is about the way the world works. It isn't about filling in a spreadsheet.

As outlined in the introduction to the Standards, FiCycle believes that there is strong evidence supporting the combination of mathematics and personal finance knowledge and education in producing better financial outcomes. We recognize that this approach may not be right for everyone. We also are not advocating for requiring a specific course based on these standards. Rather, we would like to see these standards used for courses that combine mathematics and personal finance and that these standards be more generally incorporated into personal finance and mathematics education.

Another area of discussion in the comments was whether relevance aided mathematics instruction, as we claim “Many students who are disengaged with pure mathematics find applications to finance relevant and interesting.”

I am persuaded by the background and justification, particularly making mathematics relevant. Without relevancy, how else will students persist through the tedium and difficulty of any content area, but especially math?

And as a teacher educator at the university level, I concur with the statements about problems teachers have with student disengagement in traditional courses.

I appreciate your statement that “Integrating financial applications into a mathematics course will improve mathematics education by increasing engagement. The connection between mathematics and finance education is bi-directional, as a financial context helps students grasp and retain principles of mathematics, and mathematics skills enhance financial decision-making.”

However, not everyone agrees, one commenter on the NY Times article wrote:

The myth that “students can learn math if we just make it interesting enough” needs to die. Sure, some students might find finance interesting and thrive. Others will find it fantastically boring. ... I have no problem with financial education, but pretending it’s the solution to our math problem is a mistake.

We do not suggest these standards provide a universal solution to student engagement with math, but evidence shows that many students who are not interested in traditional pure math are interested in financial applications. Math is a very broad subject matter, and some people may be interested in one part of it but not others. We believe that offering high quality financial math will provide a more compelling entry point for many students.

On a related note, one commenter felt that we overstated how financial education can overcome poor financial outcomes.

In Section 2 (on Page 2), the second paragraph begins “Financial education has been proposed as a solution to this pressing problem.”... [This suggests] financial education is a panacea, but we don’t view it this way. We take the position that financial education is one lever, albeit an important one, that can help people make better financial decisions and help reduce the wealth gaps in this country... Maybe just change to “Financial education has been proposed as one solution...”

This comment aligns with our beliefs and we made the suggested change in wording.

2. Comments about the language of the document

As with any document intended for multiple audiences, getting the language and tone correct is difficult and, in some cases, commenters say we missed the mark. These three comments are examples:

I think that "finance and "personal finance" are used somewhat interchangeably in the document and they should not be.

The document is very academic and uses a lot of technical terms. Is this appropriate for your intended audience? Some of the people you are trying to reach may tune out if the document is too dense.

There is some pretty technical language in the standards that the document assumes that readers should just know. Efficient Market Hypothesis, for example. Or Growing Payment series. Will this cause your audience to zone out?

Your choice of, and focus on, the word "wealth" sets a tone that you are teaching students how to be good consumers of investment products. (Perhaps a bit self serving).

Your "essential understanding" F1 is that "the fundamental measure of financial wellbeing is wealth". I see what you are trying to say, but a) is it worth clarifying that by wealth you mean net worth, that is financial assets + real assets – liabilities.

We took these comments very seriously and have made some changes to the Standards and the introductory material to address these concerns. We agree that personal finance is not the same as finance, but rather that personal finance is a subset of the larger field of finance which also includes corporate finance and government finance. However, we do believe that personal finance should be taught as a part of a larger body of work and that the principles of finance apply to personal finance and can be taught in the context of personal finance. That is the spirit of the Standards.

As to the use of technical terms, we would hope that educators, who are teaching a subject such as personal finance or mathematics would be acquainted with the technical language of that subject. One obstacle in personal finance education is that few teachers are trained in finance. We believe strong course materials and focused professional development are necessary ingredients in successful personal finance education. We have worked on providing such materials ourselves, taking care to rigorously define all financial vocabulary, and hope others also do so, using these standards as a benchmark for their course materials.



Finally, we understand that “wealth” is a charged word and may seem to segment the student population, or that “wealth” is a substitute for the expression “wealth management” used by financial institutions. We have tried to clarify that wealth is a financial term and that everyone’s financial actions interact with wealth. Though for a range of understandable reasons, many people find such terms off-putting, we believe it is important, being thoughtful and sensitive in how the issue is broached, to provide people with the vocabulary used to navigate the financial settings and tools they may previously have been excluded from. (We elaborate on this in our discussion of equity below.)

We have also clarified in the introduction to the standards that wealth includes both financial and real assets. For example, a monthly transit pass is an asset that may reduce monthly expense, relative to purchasing rides daily. In this way, the pass is an asset that enhances wealth. Similarly, a car is an asset and it provides an alternative to the use of public or for-hire transportation.

In the FiCycle Math course, we have an introductory lesson: “Wealth Not Cash” which emphasizes the central role of “wealth” in understanding financial transactions. Thus the Standards place greater focus on wealth and changes in wealth, than on budgeting, which is primarily focused on “cash” which is just one aspect of wealth.

3. Comments on the Standards:

3a. General:

We received a number of comments that were supportive of our standards. We are very appreciative of this feedback.

I can follow the Financial Standards as very practical real-life issues, yet I am not qualified to assess the Math Standards, while I so appreciate how they are clearly laid out together.

I appreciate the display of each financial standard paired with a math standard. These are laid out logically and, again, in clear language that reflects real life essential understandings as in F1.3, for example, about understanding the key factors that influence wealth. All of the Financial Standards are stated in very clear, practical terms. Again, I admit that I am not capable of understanding all of the Math Standards, yet the clarity with which they are linked to Financial Standards that I DO understand as very critical issues of real life makes me excited to envision students following this curriculum. Especially, again, those in underserved schools/communities.

I very much appreciate the pairing and explicit formulas demonstrating usefulness.

The focus on modeling in your mathematical understandings also marries well with the NJSLS-Math for high school.

A number of comments had questions or criticisms around our focus on student “understanding” in the standards.

Clarify what is meant by mathematical 'understanding': I see the word understanding being used a lot in the standards document, but don't necessarily see the opportunities for conceptual understanding present in the curricular materials that develop these ideas. I think teaching for understanding at the high school level would involve students either a) building the procedures being used, or b) being able to justify the generalization of a particular procedure, and/or c) say why it works. As examples: Why is $\text{prob}(a \text{ and } b) = p(a) \times p(b)$? Where does the formula for combinations come from and why does it work? What is the repeated calculation that allows us to express percent growth as $FV = PV (1 + r/n)^{nt}$?

Most statements start with either "students know" or "students understand," is that deliberate? If so, it might suggest a rethinking of the structure.... benchmark statements usually reflect both the concept that we think they should understand and examples of how they can demonstrate that knowledge. This has been well received by educators as it helps them move from the conceptual to the real. There were some places where you made statements that moved toward the latter, but they felt like throwaway statements and they certainly weren't consistently applied across the entire document.

Standards that begin with "students understand" are less useful than those that point to measurable student access such as "describe, can differentiate, can evaluate, or even 'demonstrate understanding by [discernable action and concept such as risk's relationship to reward]"

These comments raise an important point as developing student understanding is one of the central goals of our standards. In response to this, we have added a detailed discussion of what we mean by “understanding” to the document and how educators should approach teaching it. We have also made explicit places in the standards where students can demonstrate their understanding by using it in particular contexts. As we note in our explanation of the standards, understanding is essentially open-ended and flexible and so cannot be reduced entirely to more concrete and discrete skills. Such skills may be easier to teach and to measure, but they are far less valuable both in further education and in the real world. For this reason, we keep the focus on understanding.

One comment raised questions about how the standards are laid out:

I struggled to understand if there was any association between the math and finance statements. For example, does F1 connect in some way with M1? They were next to each other so visually it seemed like they should, but I couldn't always tell. I think you could say a little bit at the beginning of section 7 that describes how the standards are laid out, to help the reader more easily decipher them.

We reformatted our standards to make clear when math and finance topics were aligned, and we added an explanation above the standards in line with this recommendation.

3b. Individual Standards:

We also received a number of detailed suggestions about individual standards. Some of these concerned a lack of clarity in our wording:

F2.2: Interest is the only reason that the value of money changes over time? That's how I read this statement. I don't think that's true

F2.3.e: Please define "high" for me! One person's definition of high might be different than another person's. And given one's circumstances, a different number might be high for you. For example, if I've been offered credit cards at 25% and one comes along that is 20% is 20% high? Or is it low?

F2.3 Given the added emphasis on CTE and alternative educational pathways outside of college, perhaps not limiting the statement below to "college" but to something like "additional education or training in specific fields" would be helpful. "Spending money on college gives one a qualification that can lead to a future career with a higher income."

We reworded our standards where necessary to remove ambiguity, and make clear when we were referring to important ideas that are generally but not universally true.

We also received comments pointing out ways our standards might come across as moralizing:

F1: There are some normative statements that are not always true, such as "buying a house builds wealth" and "a credit card... comes with a high interest rate", "upon retiring, one will no longer have income..." Even if these are often useful rules of thumb, they are not always true and should not be presented as standards.

F2.4.e: "one must invest" is a value statement. Not everyone may need to do this and you're telling them that they must.

F2.4.f. You and I may think that having an emergency fund is important, but for those not in a position to do so they may need to make other decisions with how to utilize their

resources, does that mean they shouldn't be making this other decision and instead put money in an emergency fund? There are any number of reasons one would choose differently and they're not necessarily "right" or "wrong."

We appreciate these comments as we believe that a course in personal finance should not be issuing moral judgments or telling students what they should be doing. Our goal is to point out how if someone has a certain goal, certain steps are necessary to achieve. We have reworded our standards where necessary to make this clear.

We received a very thoughtful comment on our fourth understanding about the interaction of risk and return for long term investing.

... "Understanding F4" states, "Investments in the stock market can be modeled using probability distributions to assess risk and return. These tools can be used to demonstrate that for sufficiently diversified stock market portfolios, over long investment horizons, the additional expected return increases more rapidly than the risk, increasing the probability of outperforming lower risk, lower-return investments."

While this is true, a key point is that even though the probability of outperformance increases, the consequences of potential underperformance also increases. This is what leads the investor to choose the same stock allocation for all horizons in the model analyzed by Merton's classic 1969 paper.

There is widespread misconception around this in practice and it can lead to poor financial planning. So I hope that F4 can be modified to better reflect the expected utility framework of the lifecycle model which considers the relevant magnitudes involved, not just the probability of outperformance.

Without getting into a detailed discussion of utility functions, we do not fully agree with the commenter, but we have made changes to Understanding 4 to clarify the significant risks of long term stock market investment and the need to balance risk and return. We also note that the standards in Understanding 3 focus on the importance of understanding not just expected value, but expected utility in evaluating financial transactions. We hope that courses based on these standards encourage students to explore financial theories and ideas in their further education.

4. Comments about what we didn't include:

We also received suggestions for things to add to the document that currently were not present. A number of these comments concerned issue of equity:



Include standard(s) about the history of structural racism and inequity: I think any modern financial education in the United States must directly address both the historical and current conditions that have led to (racial) wealth inequality. This, I think, could be incorporated in the curriculum to include an analysis of our system of taxation (unit 1), the historical exclusion of people of color to lending and homeownership (units 2 and 3), the interconnectedness of race and health (unit 4), and the ethics and (non-)benefits of investing in the stock market (unit 5). I worry that without this, students may come to believe that individuals are solely responsible for their financial position and, thus, for overcoming it (perpetuating the American dream and/or bootstraps mentality).

What is exciting here is that for students in underserved communities who have always been systemically and purposefully cut off by our individualistic, competitive, capitalist economy from access to building generational wealth, providing these tools of understanding that system is an action toward equity.

Would be helpful to clarify that this is applicable to kids across the income and abilities spectrum.

We firmly believe that effective financial education must be equitable, and neglecting this issue can do students a disservice. As addressing topics in finance equitably is highly context specific, depending on the background of students in a particular classroom, we do not believe a one-size-fits-all set of standards is appropriate here. Based on this feedback however, we have added a section discussing how issues of equity factor into financial education and how educators can think about approaching it in their classroom. We believe this issue is of vital importance to the field and hope that we and others further develop it in the future.

One commenter drew our attention to mathematical practice:

Would it be worth it to include the Standards for Math Practice (or something similar)? In my years working with high schools, it is depressingly rare to see classrooms where students are engaged in activity that would develop valuable mathematical habits of mind like: justifying, generalizing, patterning, creating representations, listening to others, etc.

We believe that the Standards for Math Practice are a valuable tool for math educators and we had envisaged them being used in conjunction with our standards. We have added a note explicitly directing educators to these complementary standards.

Another comment concerned the tools of economics:

The explicit absence of some decision-making approaches like cost/benefit analysis and demand and supply conspicuous.

While we believe that these are valuable concepts for students to learn about, they fit more naturally in an economics course than personal finance. We cover aspects of *financial* decision making through concepts like discounting and expected utility. These are the concepts best suited to looking at individual decision making rather than the economy as a whole.

5. Conclusion

We are immensely grateful to everyone who took the time to share their expertise with us in providing comments on our standards. Whether supportive or critical, they have all been useful to us. Our final standards document has benefited greatly from this input. We look forward to continuing the conversation our standards inspire.