Assessing the relative need and demand for financial education programs: A case study of graduate students

Abstract

We measure the relative need and demand for financial education programs among graduate students at a large university system. We find self-assessed and measured financial literacy is significantly related to interest and demand for financial education. Individuals who self-report a high level of financial literacy but have low measured financial literacy are significantly less likely to be interested in financial education, while the opposite is true for financially literate individuals self-reporting a low level of financial literacy. Our study adds to recent research showing the importance of both believed and actual financial literacy measures. These results have implications for financial education and employee benefit programs.

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1. Introduction

Over the last several decades, there has been a substantial increase in the investment, health, and longevity risk burdens borne by individuals. This shift has increased focus on the importance of household financial literacy in managing these risks and enhancing financial well-being. As noted by Lusardi and Mitchell (2014), a lack of financial literacy can have long-term impacts on households' financial well-being. For example, not properly managing debt or planning for retirement can have substantial impacts on financial well-being over the lifecycle. While recent research has documented the link between low financial literacy and financial fragility, many adults continue to have poor understanding of basic personal finance concepts.[1] However, effectively engaging individuals in improving their financial literacy has proven challenging. In this paper, we conduct a case study on the need and demand for financial education programming by graduate students in a large university system. Leveraging the differences between self-assessed and actual financial literacy levels, we find that students most in need of additional financial education are least likely to take advantage of programming.

Graduate students are good candidates to receive financial education programming. They are among the most receptive consumers of education, command commensurately higher life-time earnings post-graduation, and may be more likely to have complex financial planning needs over the lifecycle. Many also have prior workforce experience, which may expose them to employer-sponsored benefits and retirement savings plans. But this prior workforce participation may make graduate students more anxious about their financial security due to low earnings and savings, and likely increased debt, during graduate studies. Providing financial education programming during this time can help students gain confidence in their long-term financial well-being.

Our interest in studying financial education programming is whether it is economically rational for individuals to invest in financial education, and relatedly, can financial education programs improve outcomes. Regarding the latter, evidence increasingly suggests that financial education affects outcomes across a variety of contexts.[2] With respect to financial education investment, Lusardi, Michaud, and Mitchell (2017) discuss that investment in financial literacy should be a function of the associated expected benefits. They find that low-education

low-lifetime income groups might rationally choose *not* to invest in obtaining financial literacy skills because of their larger relative reliance on public social welfare programs. Because our target sample is of high-education and higher-than-median expected lifetime income, they should rationally choose to invest in financial literacy education.

We measure self-assessed and tested financial literacy for graduate students in a large public university system. Similar to past studies, we find measurable weakness in the populations' understanding of basic personal finance concepts, despite most students expressing concern regarding their own personal finances. Regarding financial education engagement, we document two main findings. The first is that interest in financial education relates significantly to an individual's self-assessed level of financial knowledge relative to their actual measured financial literacy level. Individuals who estimate they have a high level of financial literacy but perform poorly on a financial literacy quiz are significantly less likely to be interested in financial education, while the opposite is true for financially literate students who self-report a low level of financial acumen.

We also find that while receptivity to financial education programming increases significantly with financial literacy levels, overall engagement in financial education is low, despite nearly half of survey respondents signaling interest in programming. The students mostly likely to indicate interest in financial education are the ones with higher financial literacy and lower overconfidence in their financial literacy. Our work adds to the small body of existing research, namely Allgood and Walstad (2016), and Anderson et al. (2017), that perceived financial literacy and actual financial literacy are dually important. Our results indicate that employers using financial education programming need to adopt innovative engagement strategies to improve the financial literacy and well-being of those employees who need it most.

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1   For research on financial literacy see Yakoboski, Lusardi, and Hasler (2019), Clark, Lusardi, Mitchell (2017), Lusardi and Mitchell (2014), Lusardi, Mitchell, and Curto (2014), Lusardi and Mitchell (2011), among others. For a broader discussion on financial literacy, financial education, and economic outcomes see Hastings, Madrian, and Skimmyhorn (2013).

2   Bernheim and Garrett (2003), Lusardi (2004), Maki (2004), and Bayer, Bernheim, and Scholz (2009) have studied employer-sponsored financial literacy programs and retirement preparedness. Other studies have found other positive benefits to financial education programs (i.e., Clark, d'Ambrosio, McDermed, and Sawant, 2006; Skimmyhorn, Davies, Mun, and Mitchell, 2013; and Seligman and Bose 2012).

2. Research design and methodology

Our educational protocol was developed using an early career workplace education offering from a large financial services organization.[3] We targeted the financial education offering to the entire pool of graduate students with the following research protocol. At the beginning of the academic year, and ahead of inviting the graduate student population to take our initial survey, we developed a series of prompts. These consisted of 5x7 inch postcards announcing the project with lighthearted financial literacy questions on a front side and the correct answer along with a description of what to expect next on the back.[4] We developed three distinct cards, with the goal that students might compare the particular card they received to others and discuss them. Regarding signals of validity, integrity, and quality of the effort, the cards prominently featured the collaborating university and were placed in orientation packets for incoming students by the university. The university also placed cards at each department's reception desk. A research assistant (RA) was assigned to attend graduate student council meetings and other graduate student group meetings of various types across the university system. In these student meetings, the RA was granted five-minute slots to discuss the project and the potential benefits of participation and left cards at each meeting.[5]

Two weeks after the cards were distributed initial invitations for the online survey were sent to all graduate students (17,819) in a large public university system. These invitations were designed to resonate with the information on the cards we had just distributed. The survey was designed to record information on students' individual and educational characteristics, financial aspirations, personal financial concerns, self-assessed financial acumen, and a financial literacy quiz.[6] Once the survey was completed, we provided quiz scores to students and offered them the correct answers to missed questions. We then asked whether a respondent was interested in taking part in a financial education seminar or webinar in the near future.

Our survey was open for one month between mid-September and mid-October, ahead of mid-term examinations. Over this four-week period the student received an initial invitation and up to four reminders targeted to students who had not taken the survey nor opted out of email engagement. Initial and reminder response survey engagement rates are shown in Figure 1. Our email prompts to engage the survey were successful with approximately 60% of the survey sample engaged the survey following a reminder as seen with the spikes in the response rate, supporting Dechausay et al.'s (2015) result that reminders can improve engagement.

3   In the previous year, we piloted a similar survey and education to a small group of students. While the test group gave good feedback and generally positive reviews, we adjusted both our materials and engagement strategy to improve participation.

4   This postcard campaign is consistent with findings on the positive value of prompts from Dechausay, Anzelone, and Reardon (2015).

5   The RA had previously served as President of the Graduate Student Council and thus was a familiar and respected source of information across the body of groups we engaged.

6   Lusardi, Mitchell, and Curto (2014), Schmeiser and Seligman (2013), and Knoll and Houts (2012) have published work evaluating questions on measuring financial literacy using three independent methodologies. We take our financial literacy questions from this work, and consultation with financial counselors, and use a set of 12 questions from these studies.

Figure 1. Survey response rates
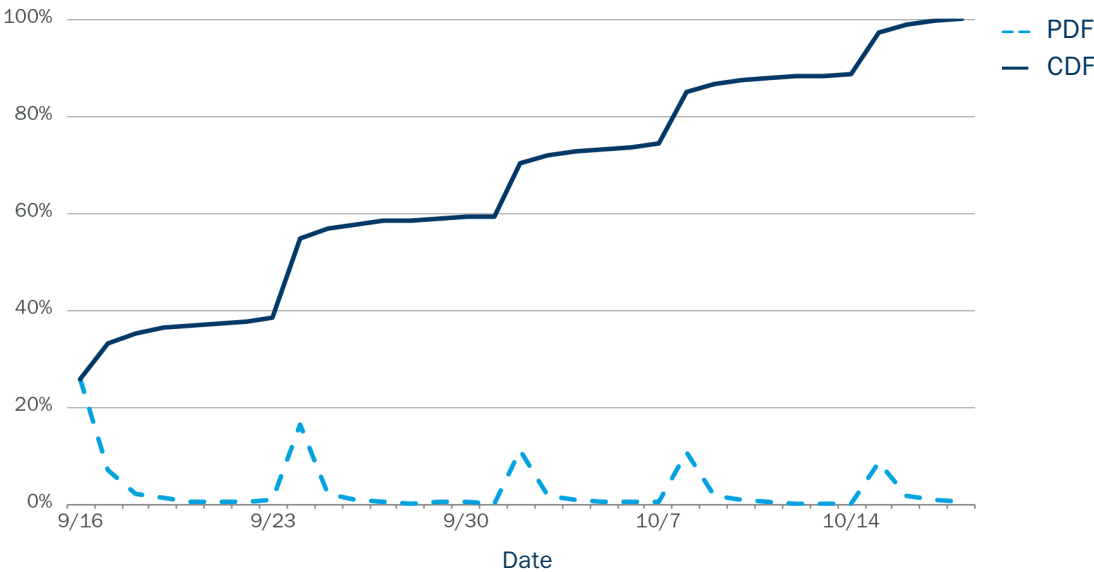
From the initial invite population, 2,487 students (14%) engaged the survey. To set up the second stage of our study we invited a matched, random subsample of our surveyed students to a financial education seminar or webinar, whichever they preferred. We randomly selected 1,632 students to match to invited and non-invited groups. Of the 1,632 students eligible for invitation, roughly two-thirds (1,101) were invited to participate.[7] Our invited student group was designed to be a balanced representation of participants across several dimensions: gender, degree of concern regarding financial matters, score on the financial literacy quiz, and whether or not the student was in a quantitative field.[8] Invitations were also balanced across those who did or did not initially indicate interest in the program. This allowed students to change their mind if they later decided they wanted to attend. The invitation email contained a link for those wishing to sign up and clicking the link brought the student to a standard web-based submission form. In the invitation to participate, we offered two mid-day and two early evening times for either seminar or webinar at each campus in the university system. We also offered lunch or dinner to seminar participants – something our pilot run in the previous year had revealed as being important.

3. Results

In this section we present results from our survey and financial education engagement protocol. We begin by examining the demographic, educational field, and financial literacy characteristics of students who engaged the survey. Section 3.2 examines how financial literacy (both self-assessed and actual) relate to interest in attending a financial education seminar. In section 3.3, we employ regression analyses to examine correlates of interest in financial education interest and engagement.

3.1. Survey sample characteristics

Table 1 presents characteristics of survey respondents. The average student who participated in the survey is nearly 30 years old and has almost 10 graduate course credits. Women (57%) were more likely to participate compared to men, approximately a quarter are international students, 57% of the graduate students attend the flagship campus, and nearly one in four graduate students work as research or teaching assistants. Half of the students in the sample are pursuing a Masters degree, over a quarter a doctorate, and other degree types represent less than 10% of the survey respondents. About two-thirds of survey participants have prior work experience.

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7   A control group that was roughly one-third of eligible participants was not invited so as to be able to carry forward with other research questions.

8   We defined a student as being in a quantitative field if the student's program is in economics, business, engineering, statistics, mathematics, physics, chemistry, or computer science.

We categorize a student's program or major into four mutually exclusive groups: Liberal Arts (e.g., liberal arts, humanities, language, music, social sciences), STEM (e.g., science, engineering, medicine, mathematics, technology), Professional (e.g., public health, public administration, education, nursing, law, other (pre) professional programs), and Business (e.g., economics, finance, business, accounting). Enrollment in a professional program represents the plurality of students surveyed (37%) followed by enrollment in STEM (27%), Liberal Arts (20%), and Business (14%) programs.

Table 1. Characteristics of targeted graduate student population

Student Survey Sample Summary Statistics						
	Mean/Proportion	St. Dev.	Obs		Proportion	Obs
Student Characteristics				Degree Type		
Age	29.5	7.5	2,487	Masters	0.50	2,487
Credits Taken	9.8	5.1	2,487	Certificate	0.02	2,487
Married	0.37		2,306	Law	0.07	2,487
Women	0.57		2,487	Doctorate	0.27	2,487
International Student	0.26		2,487	Medical	0.08	2,487
Research/Teaching Asst	0.24		2,487	Post-Doc	0.01	2,487
Flagship Campus	0.57		2,487	Other/Non-degree	0.05	2,487
Prior Work Experience	0.68		2,288			
Education Program Type						
Liberal Arts	0.20		2,487			
STEM	0.27		2,487			
Professional	0.38		2,487			
Business and Economics	0.14		2,487			

Table 2 displays financial education engagement numbers. Of the nearly 18,000 students we sent a survey, about 14% (2,487) responded. Of the representative 1,101 students to whom we sent invitations, 16% (176) accepted. Among the accepted group, 36% (64) attended a session with 44 opting for an in-person seminar and 20 for an online webinar.

Acceptance rates for students who initially indicated interest (25%) were significantly higher than those who did not signal interest (8%), shown in Table 2. Program attendance rates for those initially indicating interest were also higher (39% vs. 29%) but the difference is not significant.

Table 2. Financial education engagement results

	Number	Number Invited	Proportion
Survey Respondents	2,487	17,819	0.14
Eligible for Invite	1,101	1,632	0.67
Interested in Fin Ed | Eligible	511	1,101	0.46
Accepted | Invited	176	1,101	0.16
Attended | Accepted Invite	64	176	0.36
Conditional on indicating interest			
Accepted Invite	383	511	0.25
Attended | Accepting Invite	50	128	0.39

We next tabulate personal financial characteristics and engagement across program type and survey variables. Table 3 Panel A displays measurements of financial literacy, personal financial concerns, and education engagement for all surveyed students by program type. Financial Literacy Quiz Score is the average number of questions students answered correctly on our financial quiz (out of 12).[9] Financial IQ is the average of students self-assessed rating of how high their financial knowledge or IQ is, ranging from 1 (very low) to (7 very high). Relative FinIQ is an individual's relative financial knowledge calculated as the relative difference between performance on the financial literacy quiz and one's self-assessed financial IQ level and normalized on a scale of 0 to 1. Values below 0.5 represent over-confidence and values above 0.5 represent under-confidence. For example, a value of 0 indicates complete overconfidence in the self-assessment compared to their actual measured financial literacy knowledge and corresponds to a student answering 0 out of 12 financial literacy questions correctly and indicating a very high level (7) of Financial IQ on the self-assessment, whereas a value of 1 indicates complete under-confidence. A value of 0.5 indicates neither over- nor under-confidence.

Our personal finance concern metric is measured on an intensity scale from 1 (no concern) to 5 (great concern) across five areas (career goals, current finances, future finances, owning a home, and retirement), with a possible range from a low of 5 to a high of 25, which we normalized from 0 to 1. For engagement metrics, we list

the percentage of students who responded to the survey, indicated that they were interested in financial education, accepting an invitation for an educational session, and attended a seminar or webinar (conditional on accepting an invitation).

Table 3 shows the average student got 65% of the financial literacy questions correct, with business students scoring significantly higher than any of the other program groups.[10] The mean self-reported financial IQ was 4.7 out of 7, again with business students indicating a significantly higher level of self-reported financial knowledge compared to non-business students (5.28 vs. 4.60 for non-business students). The average student was slightly under-confident in their financial knowledge. There are limited differences in the relative measure by program type; however, STEM students display significantly greater under-confidence compared with the rest of the surveyed population. We find no significant differences by program for students who begin the survey or for those who indicated interested in attending a financial education seminar or for acceptance rates. For seminar attendance, however, we find a significantly greater proportion of Liberal Arts students attend a seminar compared to students in other programs.

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9   The financial literacy quiz covered questions on interest, inflation, bond prices and interest.

10 We control for degree type in our regression analysis.

Table 3. Financial literacy, financial concern, and financial education engagement

	Overall	Program Type			
		Liberal Arts	STEM	Business	Professional
Financial Literacy and Concern					
Financial Literacy Quiz Score (0-12)	7.81	7.57	7.66	8.71	7.71
Financial IQ , self-assessed (1-7)	4.67	4.58	4.42	5.28	4.73
Relative FinIQ (0-1)	0.52	0.52	0.53	0.51	0.51
Personal Finance Concern (0-1)	0.72	0.73	0.70	0.71	0.73
Education Engagement					
Responded to survey	14%	14%	14%	14%	14%
Interested in Financial Education	48	47	48	46	50
Accept Invite | Invited	16	17	15	13	17
Attend Financial Education conditional on accepting invite	36	51	27	42	33

Means or Proportions Reported.

Table 4 shows asset and debt characteristics of the surveyed students. We hypothesize that greater participation in financial services and the incidence of debt would be positively correlated to signaling interest in financial education. And having life insurance or an investment account may signal greater interest in financial planning over the life cycle. We include the incidence of students with a checking account, savings account, investment account, or a life insurance policy.

Nine of ten students surveyed have a checking account, with three in four having a savings account. The third row list the proportion of students with an investment account, which we define as having a brokerage account, an IRA, or an employer-sponsored retirement savings plan. This is owned by a minority of students (38%), but varies significantly by program type ranging from 22% for STEM students to 50% for business students.

Table 4. Other student characteristics, assets and debt

	Overall	Program Type			
		Liberal Arts	STEM	Business	Professional
Banking, Assets, Insurance					
Checking Account	90%	93%	88%	88%	90%
Savings Account	74	78	71	72	75
Investment Account	38	38	22	50	44
Life Insurance	34	29	23	38	42
Student Debt					
Only Undergraduate	9	12	9	5	8
Only Graduate	19	16	22	26	17
Both Undergrad and Grad	28	30	22	15	36
Any Student Debt	56	57	53	46	61
Other Debt					
Credit Card	31	34	23	26	37
Auto	20	16	15	23	24
Mortgage	20	20	11	24	25
Home Ownership					
Home Owner	22	21	12	27	28
Plan to purchase home	46	39	55	50	43

We posit debt should be positively correlated with financial education interest. Graduate students with student loan debt need to manage loan repayments in conjunction with other consumption, savings, and investment goals and in context of their post-graduate career outlook. Over half of the sample has some form of student loan debt, and this varies significantly by a student's major field. Professional students were significantly more likely to have any debt, both debt from graduate and undergraduate studies and from credit cards. Credit card debt may demonstrate greater need for financial education since it relates to household balance sheets and not to human capital acquisition or indicates the reliance on high-cost credit card debt to finance education expenses.

Our final category is home ownership. About one in five already own a home and roughly 50% of students are planning to purchase one in the next ten years, which varies significantly by a student's major field. We later control for this in our regression analysis because purchasing a home involves a substantial amount of financial planning, and we expect those planning to purchase a home to have greater interest in financial education.

3.2. Interest in financial education

In this section, we explore the relationship between self-assessed and measured financial literacy and graduate student initial interest in attending a financial education seminar. Nearly half (48%) of the students who participated in the survey indicated they were interested in financial education. In Table 5, we find differences for indicated interest across nearly all individual characteristics. While individuals who do not interact with financial institutions may gain marginally greater benefit from financial education, we find that those without checking and savings accounts, or life insurance are significantly less interested in financial education. However, on the liability side of household balance sheets, students with student loan debt or credit card debt were more likely to be interested in the educational offerings.

Table 5. Student characteristics by financial education interest

| Survey Characteristics	Interested	Not Interested	Sig
Financial Literacy and Concern			
Financial Literacy Quiz Score	8.31	7.19	***
Financial IQ (self-assessed)	4.59	4.82	***
Relative FinIQ	0.55	0.48	***
Personal Finance Concern	0.75	0.69	***
Banking, Assets, Insurance			
Checking Account	98%	81%	***
Savings Account	83	65	***
Investment Account	42	34	***
Life Insurance	37	31	***
Student Debt			
Only Undergraduate	11%	7%	***
Only Graduate	21	18	*
Both Undergrad and Grad	32	24	***
Any Student Debt	64	48	***
Other Debt			
Credit Card	37%	26%	***
Auto Loan	23	17	***
Mortgage	20	20	
Home Ownership			
Own home	21%	23%	
Plan to own home	55	39	***

Means or proportions shown. In column Sig * and *** indicates differences are significant at the 10% and 1% levels, respectively.

Graduate students signaling interest in financial education have significantly higher financial literacy, with interested students averaging about 1.2 more correct answers compared to non-interested students. Further, non-interested students are significantly more *over-confident* in their financial knowledge. This is also shown by the distribution of Relative FinIQ shown in Figure 2, which displays kernel density estimates of Relative FinIQ by indicated interest in financial education. The two distributions are significantly different (p<0.01), with non-interested students having a greater estimated density

in the over-confidence range (values below 0.5). This result is economically meaningful as the mean difference of 0.07 in the relative measure between interested and non-interested students equates to 1.68 fewer questions answered correctly (out of 12) on our financial quiz for the relatively more over-confident student given a fixed self-assessed score. Alternatively, a 0.07 difference results in a 0.84 greater self-assessed score, given a fixed quiz score, for the relatively more over-confident student.

Figure 2. Kernel density estimates of Relative FinIQ by indicated interest in financial education
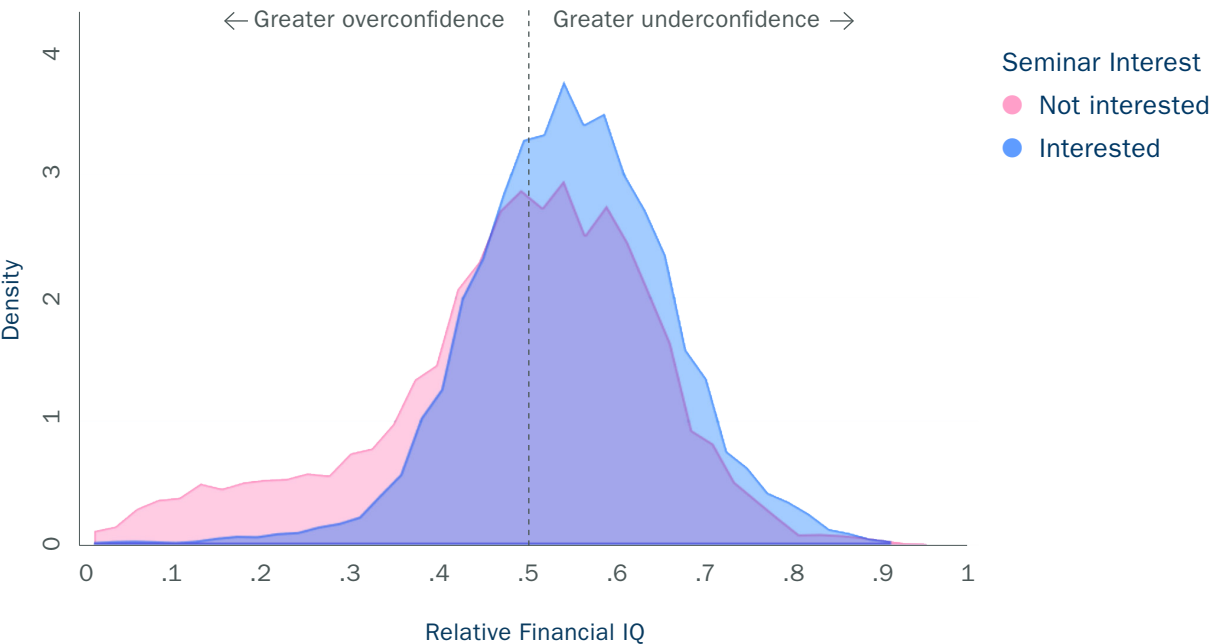
Over-confident students with low measured financial literacy would arguably benefit the most from financial education. Unfortunately, Table 5 and Figure 3 indicates that these students were least interested in improving their financial knowledge. In Table 6, we examine the percentage of students interested in financial education by their self-assessed financial IQ rating and how well they did on the financial literacy quiz, grouping the latter into four categories. The data suggest there is a strong negative correlation between over-confidence and interest in financial education.[11] This finding is highlighted by Figure 3, which displays a wireframe surface plot on the data points shown in Table 5. Financial literacy and self-assessed financial IQ are shown on the x and y axes, and the percentage of students who indicated they

are interested in financial education is shown on the z (vertical) axis. Here the relationship is clear: students who have high financial literacy but self-asses a low level of financial IQ are the most interested in financial education (often over 70 percent). Comparatively, students with *low* financial literacy but self-assess a *high* level of financial IQ are less interested (generally less than 30 percent of the time).

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11 Our relative measure cannot examine whether there are differences in student interest across the entire cross product of the financial literacy score and self-assessed financial IQ measure.

Table 6. Financial education interest by measured and self-assessed financial literacy

| Self-assessed Financial IQ | Percent Interested in Financial Education | | | | | |
| | Percent of Financial Quiz Questions Correct | | | | | |
	0 – 25%	26 – 50%	51 – 75%	76 – 100%	Mean	N
1 (very low)	50%	80%	50%	0%	55%	20
2	29%	65%	72%	82%	63%	80
3	26%	61%	68%	70%	62%	236
4	20%	49%	61%	58%	56%	646
5	22%	30%	64%	59%	57%	481
6	6%	30%	57%	55%	51%	484
7 (very high)	22%	0%	50%	45%	42%	153
Mean	20%	55%	62%	39%	48%	
N	221	257	974	1,035		2,100

Figure 3. Surface plot of financial education interest by measured and self-assessed financial literacy
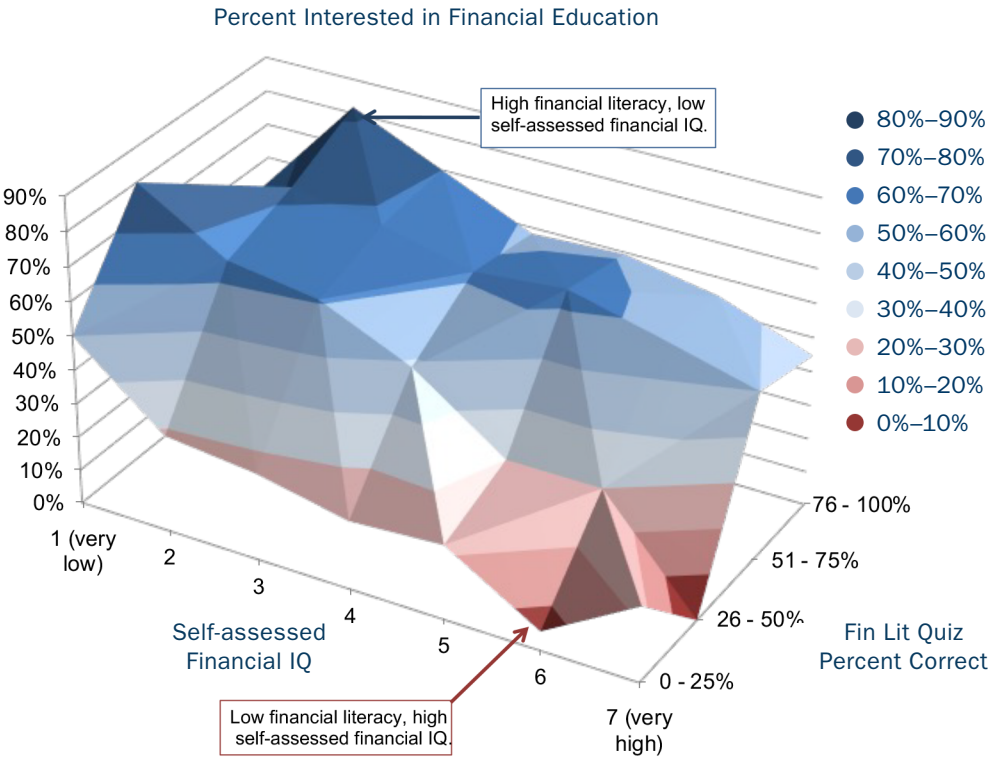
In order to understand this relationship over all possible values, Figure 4 displays predicted probabilities of financial education interest. The predicted probabilities are generated using a simple logit model estimating the likelihood that students indicated interest in financial education regressed on a student's FinIQ and Financial Literacy Quiz Score, treating the two exogenous variables as categorical variables.[12] The full profile of predicted probabilities is shown in Appendix Table A.1. Figure 4 replicates and smooths the relationship shown in Figure 3. Generally, the predicted probability that a student signals interest increases significantly in one's measured financial literacy, but significantly decreases as a student's self-assessment increases. Students with a combination of *high* self-assessed financial IQ and *low* actual financial literacy are predicted to be the

least likely to signal interest in financial education. For example, a student answering all questions correctly but self-assesses the lowest level of financial knowledge is predicted to signal interest with a probability above 60%, which decreases to 45% for a student self-assessing the highest level of financial knowledge. By contrast, a student answering no questions correctly on the financial literacy quiz but is most confident in their financial knowledge, is predicted to signal interest with a likelihood of under 6%, increasing to only 11% for a student self-assessing the lowest level of financial knowledge. Program sponsors need to be innovative when thinking about how to engage the population of students who would most benefit from financial education.

Figure 4. Predicted probabilities of education interest by measured and self-assessed financial literacy

Predicted Probability of Financial Education Interest

- 70%–80%
- 60%–70%
- 50%–60%
- 40%–50%
- 30%–40%
- 20%–30%
- 10%–20%
- 0%–10%

High financial literacy, low self-assessed financial IQ.

Low financial literacy, high self-assessed financial IQ.

Self-assessed Financial IQ

Financial Literacy Score

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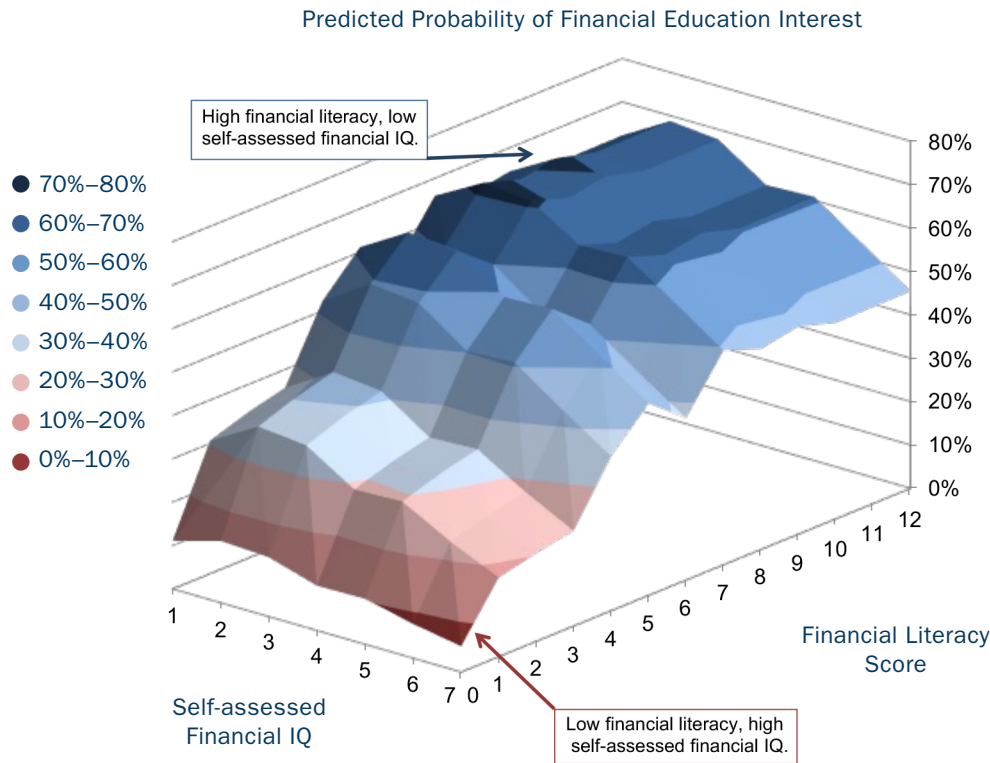
12 The overall model is significant (p<0.01 with a Chi-squared test). Moreover, the predicted probabilities for each combination of FinIQ and Quiz score (91 combinations) are all significant at the 5% level.

3.3. Regression analysis of financial education interest and engagement

We begin our regression analysis with first considering who takes the survey. Table 7 employs ordinary Probit regression estimating whether a student engages in the survey or not using student and program characteristics, displaying marginal effects on the coefficients and standard errors in parenthesis. Because those who do not take the survey do not offer us data on their financial literacy, we only leverage the university system's administrative data. Women and student workers are significantly more likely to engage the survey. While there is no significant relationship for graduate students at the flagship campus, student workers at the flagship campus are significantly less likely to engage the survey, indicated by the interaction term in Model 2. These students may be more time constrained with their studies and work duties than their counterparts. We find no significant effect for international students. Students who have taken more graduate credits are significantly less likely to take the survey, but the marginal effect is small and has significant attenuation. There were no significant differences in a student's major subject area. When examining degree type, law students were significantly less likely and doctorate students only marginally less likely to engage in the survey, highlighting the possibility of time constraints for students in terminal degree programs.

Table 7. Regression estimates of survey engagement

	(1)		(2)		(3)		(4)	
Student Characteristics	Mar. Coeff.	St. Err.	Mar. Coeff.	St. Err.	Mar. Coeff.	St. Err.	Mar. Coeff.	St. Err.
Woman	0.030***	(0.005)	0.030***	(0.005)	0.030***	(0.005)	0.030***	(0.005)
Age	-0.000	(0.000)	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Intl Student	0.009	(0.006)	0.007	(0.006)	0.008	(0.006)	0.006	(0.006)
Main Campus	0.002	(0.006)	0.009	(0.006)	0.007	(0.006)	0.008	(0.006)
Student Teaching/Research Asst	0.037***	(0.007)	0.075***	(0.014)	0.077***	(0.014)	0.073***	(0.014)
Educ Credits	-0.006***	(0.001)	-0.006***	(0.001)	-0.006***	(0.001)	-0.005***	(0.002)
ln(educ credits)	0.061***	(0.011)	0.061***	(0.011)	0.060***	(0.012)	0.056***	(0.012)
Main Campus * Student Asst			-0.050***	(0.016)	-0.049***	(0.016)	-0.046***	(0.016)
Program type (baseline=Liberal Arts)								
STEM					-0.002	(0.009)		
Professional					0.003	(0.008)		
Business					0.007	(0.010)		
Program type (baseline=Masters)								
Doctorate							-0.012*	(0.007)
Law							-0.033***	(0.009)
Other/Non-degree							-0.000	(0.013)
Certificate							-0.027	(0.018)
Post-Doc							-0.017	(0.032)
Medical							-0.016	(0.011)
Observations	17,750		17,750		17,750		17,750	

Probit specifications with marginal coefficients reports and standard errors in parenthesis. *, **, *** represents significance at the 10%, 5%, and 1% levels, respectively.

Table 8 estimates the likelihood that a student indicates interest in financial education using ordinary Probit specifications showing marginal effects and standard errors in parenthesis. We display five specifications: Model 1 uses administrative data plus financial literacy characteristics, and Models 2 and 3 add asset and debt characteristics. Model 4 adds home ownership characteristics, and Model 5 uses the relative FinIQ measure on the full specification instead of quiz score and self-assessed financial IQ. Beginning with Model 1, younger students are significantly more likely to signal interest, but this is not robust in later specifications. Professional students are significantly more likely to signal interest, however this is only significant at the 10% level when controlling for debt characteristics. We find no significant correlation for business students.[13]

In all specifications, financial literacy quiz scores and self-assessed Financial IQ have large significant effects on the likelihood to signal interest. These effects pull in the opposite directions, as discussed in section 3.2., with predicted interest increasing in quiz score but decreasing in the self-assessed measure. An additional question answered correctly on the quiz score increases the estimated likelihood to indicate interest by 4%, while a one unit increase in the self-assessed measure decreases the likelihood by 5%. The personal finance degree of concern composite measure is significantly and positively related to indicating interest, following

our hypothesis. In Model 5, we use Relative FinIQ as a regressor, instead of quiz score and the self-assess measure; and find estimated interest significantly increases (decreases) as under-confidence (over-confidence) increases.

Adding individual asset, debt, and banking information in Model 2 has no significant impact. Model 3 includes student loan debt as a categorical variable (with no student loan debt as the baseline). Undergraduate student loan debt has a significant impact on the likelihood to be interested in financial education, compared to those without student loan debt. Although we do not find a (robust) significant effect for either graduate debt only or both debt from undergraduate and graduate school, the coefficient is positive – in the hypothesized direction. Debt management is likely to become a larger concern for graduate students in the accumulation phase of their lifecycle, especially since this group delays employment income, savings, and loan repayment before (re)entering the labor force, albeit at an expected relatively higher salary. Credit card debt was not a significant correlate. This may be of concern because some students may be using high-cost debt to finance part of their education and this group would benefit from financial education. When including home ownership characteristics in Model 4 we find those planning to purchase a home in the next ten years are significantly more likely to signal interest, following our hypothesis.

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13   In separate regressions (not shown) we controlled for degree type and prior work experience; there were no significant differences.

Table 8. Regression estimates of seminar interest

	(1)	(2)	(3)	(4)	(5)
Student and Program Characteristics					
Woman	0.023	0.021	0.021	0.019	0.001
	(0.022)	(0.023)	(0.023)	(0.022)	(0.022)
Age	-0.004***	-0.004**	-0.003**	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Int'l Student	0.035	0.029	0.065**	0.059*	0.042
	(0.027)	(0.028)	(0.031)	(0.031)	(0.031)
Main Campus	0.008	0.003	0.009	0.005	0.004
	(0.024)	(0.024)	(0.024)	(0.024)	(0.025)
Research/Teaching Asst	-0.001	-0.008	-0.010	-0.015	-0.017
	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)
Credits	-0.005**	-0.006**	-0.006**	-0.006**	-0.006**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
STEM	0.044	0.043	0.047	0.038	0.035
	(0.033)	(0.033)	(0.033)	(0.033)	(0.034)
Business	0.014	0.021	0.023	0.018	0.036
	(0.038)	(0.039)	(0.039)	(0.039)	(0.039)
Professional	0.053*	0.056*	0.055*	0.051*	0.054*
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Financial Literacy Characteristics					
Financial Literacy Quiz Score	0.043***	0.043***	0.044***	0.044***	
	(0.004)	(0.004)	(0.004)	(0.004)	
Self-assessed Financial IQ	-0.052***	-0.051***	-0.050***	-0.050***	
	(0.008)	(0.009)	(0.009)	(0.009)	
Relative FinIQ					0.853***
					(0.072)
Personal Finance Concern	0.458***	0.461***	0.452***	0.431***	0.426***
	(0.055)	(0.055)	(0.055)	(0.056)	(0.056)
Banking, Assets, and Insurance					
Investment or Retirement Account		-0.019	-0.015	-0.005	0.010
		(0.026)	(0.026)	(0.027)	(0.026)
Savings Account		0.025	0.028	0.028	0.036
		(0.029)	(0.029)	(0.028)	(0.028)
Life Insurance		-0.027	-0.031	-0.019	-0.018
		(0.025)	(0.025)	(0.025)	(0.025)
Debt					
Student Debt (Undergrad only)			0.108***	0.101***	0.099***
			(0.038)	(0.038)	(0.038)
Student Debt (Grad only)			0.027	0.019	0.016
			(0.030)	(0.030)	(0.030)
Both Undergrad and Grad Debt			0.060**	0.051*	0.043
			(0.029)	(0.029)	(0.029)
Credit Card			-0.051	-0.059	-0.050
			(0.063)	(0.063)	(0.063)
Auto			0.032	0.042	0.041
			(0.027)	(0.027)	(0.027)
Home Ownership					
Own Home				-0.068*	-0.057
				(0.037)	(0.037)
Plan to purchase home				0.053**	0.061**
				(0.027)	(0.027)
Observations	2,098	2,098	2,098	2,098	2,098

Probit with marginal effects shown. Standard errors shown in parenthesis. *, **, *** indicates significance at the 10%, 5%, or 1% level.

4. Discussion

This paper examined financial education interest among graduate students in a large public university system. We find a strongly positive and significant correlation between under-confidence (over-confidence) in self-measured financial knowledge and (lack of) interest in financial education programming. This finding suggests the need for innovative engagement strategies to identify and provide programming to individuals who would benefit the most from improving their financial literacy.

The results speak to several components regarding the timing and delivery of financial education. The first is whether the timing is optimal for graduate students to engage in improving their financial literacy. Because many graduate students are close to (re)entering the workforce, they may be focused on the near-term issues of graduating, finding a job, or moving. This can make them subject to present bias through the belief that they have scant time to devote additional resources to improving their long-term financial well-being. Innovative engagement strategies, such a providing lunch or tchotchkes, may nudge active participation in financial education. However, we find these nudges did not address to our main finding that those confident in their financial knowledge but have low financial literacy are significantly less interested in financial education.

How should these individuals be engaged in financial education? Mandatory financial education could be one response, and many states have begun to institute mandatory financial literacy programs in high school. Stoddard and Urban (2020), Urban, Schmeiser, Collins, and Brown (2018), and Collins (2013) find some benefits to mandatory education. However, there needs to be further research in this area as there remain many open questions, including whether the education benefits persist in later life, how such programs are implemented, what is included in the content, and when in the lifecycle are they delivered, among others. With most programs continuing to rely on voluntary education efforts, often offered by employer benefit programs, designers and implementers of financial education will need to consider how to attract individuals over-confident in their knowledge of personal finances.

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Appendix

Table A.1. Predicted probabilities of indicating interest in financial education by financial literacy and self-assessed financial IQ

Financial Literacy Quiz Score	Self-Assessed Financial IQ						
	very low 1	2	3	4	5	6	very high 7
0 (0%)	11.1%	14.3%	13.7%	10.3%	10.5%	7.9%	5.9%
1	30.6	37.1	35.9	28.9	29.3	23.3	18.2
2	33.6	40.3	39.1	31.8	32.2	25.8	20.3
3	35.8	42.6	41.4	33.9	34.4	27.7	21.9
4	52.3	59.4	58.1	50.2	50.7	42.9	35.6
5	61.1	67.7	66.6	59.2	59.7	51.9	44.3
6 (50%)	54.1	61.2	60.0	52.1	52.6	44.8	37.3
7	65.9	72.1	71.1	64.1	64.5	57.1	49.4
8	63.0	69.4	68.3	61.1	61.5	53.9	46.2
9	64.5	70.8	69.8	62.7	63.1	55.6	47.9
10	62.0	68.6	67.5	60.1	60.6	52.9	45.2
11	62.2	68.7	67.6	60.2	60.7	53.0	45.4
12 (100%)	62.3	68.8	67.7	60.3	60.8	53.2	45.5

Predicted probabilities from Logit model as described in Section 3.2, all are significant at the 5% level.

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