International Review of Economics Education 16 (2014) 39–50

Contents lists available at ScienceDirect

International Review of Economics Education

journal homepage: www.elsevier.com/locate/iree

The features and effectiveness of the *Keys to Financial Success* curriculum☆

Carlos J. Asarta [a,*], Andrew T. Hill [b], Bonnie T. Meszaros [c]

[a] Department of Economics, University of Delaware, 102 Alfred Lerner Hall, Newark, DE 19716, United States
[b] Federal Reserve Bank of Philadelphia, United States
[c] Department of Economics, University of Delaware, United States

ARTICLE INFO

Article history:
Received 22 October 2013
Received in revised form 30 April 2014
Accepted 11 July 2014
Available online 24 July 2014

JEL classification:
A21
G00

Keywords:
Financial literacy
Financial education
Assessment
Financial Fitness for Life

ABSTRACT

The global financial crisis of 2007–2009 generated a renewed interest in including personal finance in the secondary curriculum in the United States and in many countries around the world. This paper explains the features of a successful and unique high school personal finance curriculum, *Keys to Financial Success*, which is offered by a consortium of partners in Delaware, Pennsylvania, and New Jersey, and is available to teachers from the Federal Reserve Bank of Philadelphia. Using the *Financial Fitness for Life High School Test* (*FFFL-HS Test*), pre- and posttest results are reported for 967 students who participated in a one-semester *Keys* course during the 2011–2012 and 2012–2013 academic years. The survey results indicate that the training of teachers in the *Keys* curriculum, and the implementation of a one-semester *Keys* course, significantly improve the average personal finance knowledge of students in each of the standards and concept areas of the *FFFL-HS Test*. These results contribute to the growing literature showing the positive effects of a well-designed personal finance course, taught by properly trained teachers, on the financial knowledge of high school students, and should be of interest to an international audience.

☆ The views expressed in this paper are those of the authors and do not necessarily represent those of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

* Corresponding author. Tel.: +1 302 831 4868; fax: +1 302 831 6659.
E-mail addresses: asarta@udel.edu, asarta@economiceducator.com (C.J. Asarta), andrew.hill@phil.frb.org (A.T. Hill), meszaros@udel.edu (B.T. Meszaros).

http://dx.doi.org/10.1016/j.iree.2014.07.002
1477-3880/

1. Introduction

The global financial crisis of 2007–2009, and the ensuing fiscal instability in many parts of the world, brought renewed attention by policymakers in many countries to the need for a more financially literate society. Part of the responsibility to ensure that this goal is reached rests in secondary schools. Students leaving high school should be grounded in the fundamentals of personal finance to be prepared for their roles as consumers, savers, and investors. Yet, several recent studies have reported discouraging findings. For example, Mandell (2008) reports that the financial literacy of high school seniors was at its lowest level since the first Jump$tart survey was administered in 1997. Lusardi et al. (2009) showed that young adults lack even the most basic knowledge of personal finance topics such as interest rates or risk diversification. Butters et al. (2012) reported that students struggled in many concept areas of the *Financial Fitness for Life High School Test* (*FFFL-HS*) during the 2011 National Personal Finance Challenge competition. And Atkinson and Messy (2012) analyzed survey data from the Organization for Economic Co-operation and Development's (OECD) International Network on Financial Education and found a general lack of financial knowledge for large portions of adults in the 14 countries examined.

The U.S. is not alone in believing that financial education in the K-12 curriculum is necessary to prepare tomorrow's citizens for the financial opportunities and challenges they will face. More and more policy makers throughout the world have come to the same conclusion. International organizations, such as Child and Youth Finance International (CYFI) and its partner organizations in 120 countries, reach out to youth throughout the world. CYFI's goals are clear: every child will have access to financial services, financial awareness through education, a reliable source of income, and the will to save and build assets to promote their future stability. Individual countries are also focusing energy and financial support on training young adults and school-age children in personal finance. For example, financial illiteracy is of growing concern in Russia. In 2011, the Russian Finance Ministry launched a $113 million program to improve financial understanding among students (Filatova, 2013). And, students from 18 countries, including the United States, recently participated in the OECD's first large-scale international study to assess the financial knowledge and capabilities of 15 year olds.

As the demand for personal finance education has increased, so has the availability of instructional materials. In recent years, there has been a proliferation of nonprofit organizations, financial institutions, and governmental agencies, both in the United States and internationally, promoting financial literacy. In the United States, the Jump$tart Coalition website lists over 800 financial education resources including print and online materials, videos, DVDs, and games. Additionally, based on a recommendation from the President's Advisory Council on Financial Capability, the website Money As You Learn was created to offer teachers personal finance lessons that can be integrated into existing math and English courses. Internationally, CYFI's website lists programs and initiatives taking place in its partner countries, and OECD's International Gateway for Financial Education serves as a global clearing house that allows one to search for K-12 instructional materials using any or all of the following criteria: country, theme, target groups, and sector. Some of these materials focus on a specific age group; others on very specific content areas such as credit, budgeting or retirement, and still others offer isolated lessons that can easily be integrated across the curricula. While educators worldwide have a wealth of materials available to them, very few curricula offer a well-articulated plan for a semester course in personal finance. Too often, individual teachers are left with the daunting task of assembling sometimes disjointed lessons into a course. Most teachers lack the time to review materials and, in some cases, the content knowledge to design their own personal finance curriculum. The curriculum presented in this paper was designed to address these challenges by offering teachers a longer and more intensive intervention for their students, using a semester-long curriculum already assembled by trained economic education experts.

One of the most discouraging aspects of financial education, both in the United States and internationally, is the lack of adequate assessment of program effectiveness. In fact, Hathaway and Khatiwada (2008) found that most research has not proven the effectiveness of financial education programs, concluding that there are two likely reasons for this finding. First, the programs may not be effective in transferring knowledge because of either their design or how they are administered.

Second, it is possible that the programs are not being evaluated properly. Although Hathaway and Khatiwada reviewed research mainly focused on adult programs, their findings have implications for K-12 personal finance education. They concluded that a standard but adaptable framework for evaluation of all types of literacy programs is needed. This conclusion is supported by Fox et al. (2005), who recommended Jacobs's (1988) five-tiered approach to evaluation with applications for personal finance. Walstad et al. (2010) also stressed the use of Jacobs's model when evaluating the video-based curriculum *Financing Your Future* (Emery and Suiter, 2007). They outlined the five stages for personal finance program evaluation. First, set a clear definition of content. Second, train teachers in content and use of program materials. Third, specify knowledge outcomes that are measured with reliable and valid instruments. Fourth, collect data on pre- and posttests. And fifth, rigorously analyze data using appropriate forms of statistical analysis.

The purpose of this study is twofold. First, the features of a successful personal finance curriculum are presented. Appropriate for U.S. and international audiences, *Keys to Financial Success* is unique because it combines highly engaging lessons from a variety of personal finance sources to create a plan for teaching a semester personal finance course. These lessons use a range of instructional approaches, which allow for differentiated instruction. Many lessons address 21st century skills, including technology, which are woven throughout the curriculum. The *Keys* program comes with supplemental materials such as posters and ongoing instructor support through emails, seminars, and a website. At the end of the semester *Keys* course, students leave with skills on how to access up-to-date financial information as well as a personal finance manual they construct throughout the course. This student-created manual can serve as a reference for them when they face financial issues as adults.

The second purpose of this study is to investigate the effectiveness of *Keys* on the personal finance knowledge of students. *Keys* was designed with Jacob's five-tiered approach for program evaluation in mind. First, the *Keys* program clearly defines the content to be taught in a semester personal finance course by delineating 52 lessons, covering 23 personal finance topics as spelled out in the *National Standards in K-12 Personal Finance Education* (Jump$tart Coalition, 2002). Second, teachers receive extensive, specific training in content and pedagogy in order to teach their own high school personal finance course using the *Keys* model. Third, each of the 52 lessons in the *Keys* model identifies specific knowledge objectives correlated with the 23 personal finance topics. Those knowledge objectives are tested using the *FFFL-HS Test*, a valid and reliable test instrument that is highly correlated to the coverage of the *Keys* course. Fourth, students are pretested to determine their beginning financial knowledge and posttested to assess changes in their financial understandings. And fifth, the *Keys* data is rigorously analyzed, using appropriate forms of statistical analysis.

2. Literature review

There are a limited number of studies that have examined the effect of a specific personal finance curriculum on student achievement. In a survey of students who completed the *NEFE High School Financial Planning Program*, Todd (2002) found that, following training, 50 percent of the students reported increases in financial knowledge. Todd's work supports findings from an earlier survey (Boyce and Danes, 1998) that found students are more financially literate after participating in the *NEFE* high school program. Furthermore, Varcoe et al. (2005) used a 10-item pre- and post-true/false instrument to determine the impact of the *Money Talks: Should I Be Listening?* curriculum (University of California Cooperative Extension, 2011) on student achievement. The test results and the self-reported data indicated that students who participated in *Money Talks* seemed to improve their financial knowledge. However, these studies failed to include one or more of the steps recommended in Jacobs's (1988) five-tier approach to evaluation. More recently, Walstad et al. (2010) conducted a study to evaluate the effect of *Financing Your Future* (*FYF*) on student achievement and showed that students taught with *FYF* showed a statistically significant increase in their personal finance knowledge over their peers in the control group.

Walstad and Rebeck (2005) measured student achievement in personal finance based on the content in *Financial Fitness for Life* (*FFFL*) (Morton and Schug, 2001), a personal finance and economics curriculum published by the Council for Economic Education (formerly the National Council on Economic Education). After receiving training in the *FFFL* curriculum, high school teachers gave a

pretest, taught the lessons, and administered a posttest. The results showed that students receiving instruction from trained teachers using *FFFL* had higher achievement scores than students in the control group. Swinton et al. (2007) examined student scores on Georgia's economics end-of-course test. Students in classrooms with teachers who attended a *FFFL* workshop scored significantly higher on the required end-of-course test than students taught by teachers who did not attend the workshop. Furthermore, Harter and Harter (2009) conducted a study in eastern Kentucky to assess the effectiveness of the *FFFL* lessons in elementary, middle, and high school. Teachers participating in the study attended a workshop on the use of the *FFFL* materials prior to teaching with them in their own classrooms. At the high school level, student achievement gains from the pretest to posttest were significant when compared with the control group.

Two recent studies have used the *FFFL-HS* test instrument to make international comparisons of financial literacy levels among high school students. Borodich et al. (2010) examined and compared the knowledge of students from Belarus, Japan, and the United States, while Cameron et al. (2013) focused on students from New Zealand, Japan, and the United States. Both studies found similar results indicating that, although Japanese high school students outperform their international peers, the overall level of financial literacy across countries is relatively poor. In both papers, the authors emphasize the need for these nations to develop the personal finance literacy of their high school students.

3. The *Keys to Financial Success* curriculum

In the spring of 2001, the University of Delaware Center for Economic Education and Entrepreneurship (Center), the Federal Reserve Bank of Philadelphia, the Delaware Bankers Association, and the Consumer Credit Counseling Services of Maryland and Delaware formed a partnership to provide curriculum resources and teacher training to Delaware high schools interested in teaching a semester personal finance course. Work commenced in the late spring and early summer of 2001 to create a 90-day instruction plan. A committee of four economic educators met to delineate the content to include in a semester course. These economic education experts have advanced degrees in economics or economic education, as well as extensive experience in teaching classes for teachers. The committee's goal was to identify a curriculum that would approach the teaching of personal finance using materials based on economic principles and grounded in the economic way of thinking. The curriculum would use active- and collaborative-learning methods, allow the course to be flexible enough to be taught by teachers in the social studies, family and consumer sciences, mathematics, and business departments, and provide an element of real world experiences. After reviewing an array of instructional materials, the committee determined that no one existing curriculum covered the content from an economic perspective and met all of the committee's criteria.

In order to fully meet its selection criteria and content coverage requirements, the committee decided to assemble its own curriculum using lessons from existing resources. The resulting course plan, called *Keys to Financial Success*, makes extensive use of lessons from the Council for Economic Education's widely distributed *Financial Fitness for Life* (*FFFL*) (Morton and Schug, 2001; Gellman and Laux, 2011) and *Learning, Earning, and Investing* (*LEI*) (Caldwell et al., 2004). These lessons use active- and collaborative-learning methods, incorporate the economic way of thinking, deepen students' understanding of personal finance from an economic perspective, and engage students in their own learning. Since these two curricula did not include enough lessons on several topics in personal finance, such as risk management, goal setting, and career planning, lessons were developed by the staff at the Center and the Federal Reserve Bank of Philadelphia, or were taken from *Practical Money Skills* (2000), *Virtual Economics* 4.0 (2011), and *Capstone: Exemplary Lessons for High School Students* (Lopus et al., 2003).

There could be a number of possible pitfalls associated with cobbling together a curriculum from lessons written by different authors. Perhaps the most important is that disparate lessons written in different formats, and with different pedagogical approaches and goals, could result in significant confusion for teachers and students alike. The *Keys* committee overcame this problem by relying primarily on lessons written to the Council for Economic Education's lesson model, and by creating an overarching and uniform lesson framework embodied in the *Keys* teacher's manual. Using this

framework, activities and procedures from the different lessons were referred to and brought together.

In order to add relevance to the course, and bring an element of real world experience, teachers are instructed to ask their students to research different potential careers and set personal and financial goals during the first two units. Then, based on their research findings, students select a future career for the life of the course. The students' goals and careers, including their entry-level wages, are revisited throughout the course so that students can apply what they have learned, using the income associated with their chosen career, and determine how their decisions will impact them reaching their goals and their future lives. The intent of this approach is to motivate students, help them see the real-world relevance of being financially literate both now and as adults, and attempt to change their skills and attitudes related to a host of personal finance topics.

Schools participating in the program commit to offer the *Keys* course at least once per academic year. Teachers attend a week-long training program, taught by the curriculum committee members, at the Federal Reserve Bank of Philadelphia. The teacher-training program is offered every summer, includes 30 h of professional development, and is focused on familiarizing the teachers with the *Keys to Financial Success* curriculum prior to their first semester teaching the course. The training is a mixture of lesson demonstrations, content presentations, and hands on familiarization with the *Keys* teacher's manual. Eight lessons from the 2011 edition of the *FFFL* high school curriculum are demonstrated to the teachers during the training program (lessons 1, 2, 3, 7, 9, 18, 19, and 20). In addition, one lesson from the *FFFL* middle school curriculum, two lessons from *Learning, Earning, and Investing*, and numerous *Keys*-author created activities are demonstrated. Teachers also spend two afternoons in the computer lab learning about online resources for teaching personal finance and experiencing CEE's *Virtual Economics* 4.0. This online component allows teachers to identify the relevant *FFFL*, *LEI*, and *Capstone* lessons they will use when teaching their own *Keys* course. Two speakers from the Federal Reserve, one on credit reports and scores, and the other on identity theft, speak to the teachers for an hour each during the training. Additionally, teachers participating in the program are invited back to the Philadelphia Fed or the University of Delaware to receive supplemental hours of professional development to keep them apprised of ongoing changes in financial sector products, services, laws, and regulations. Finally, in order to provide support to the teachers on a regular basis, the authors are always available to answer teachers' questions via email.

The *Keys* course consists of 52 lessons built around nine themes: goals and decision-making, careers and planning, budgeting, saving and investing, credit, banking services, transportation issues, housing issues, and risk protection. Table 1 presents these themes and lessons, and provides the links to the other curriculum materials used in the course. In the first two columns, we indicate the *Keys to Financial Success*'s lesson numbers and titles from the teacher's manual. It is important to note that the first edition of *Financial Fitness for Life* was released in 2001, but was refreshed by the Council for Economic Education in 2011 (Gellman and Laux, 2011). Originally, the *Keys* course made use of the first edition of *FFFL* but was later updated in 2012 to make use of the 2011 edition. The 2011 edition updated the lessons to provide current examples, address current trends, and reflect changes in technology. The academic content covered in each of the *FFFL* lessons, however, remained fundamentally the same. The third and fourth columns of Table 1 show the relationship between the *Keys* lessons and the two versions of *FFFL*.

The fifth column in Table 1 indicates the source of other materials used in each *Keys* lesson. In 15 of the 52 lessons, original content is either used exclusively or augments lesson content from *FFFL*. Seven lessons rely either in part, or in whole, on lesson content from *Practical Money Skills.* Six lessons rely exclusively on materials from the 2004 edition of *Learning, Earning, and Investing.* Another four lessons rely on other lessons on CEE's *Virtual Economics* 4.0. There is one lesson that relies on lesson 18 from CEE's *Capstone High School Economics* and one lesson that relies on lesson 15 from the *Financial Fitness for Life* middle school curriculum (Flowers and Laux, 2010).

4. Data

The data used in this study come from the delivery of one-semester *Keys to Financial Success* courses in Pennsylvania, New Jersey, and Delaware during the fall and spring semesters of the 2011–2012 and

Table 1
Keys to Financial Success themes and lessons with correlations to *FFFL* and other curriculum materials.

Keys lesson number	*Keys* lesson title	FFFL2001	FFFL2011	Other
Theme 1: goals and decision making				
1.1	How to really be a millionaire	1	1	
1.2	The economic way of thinking	2	2	
1.3	Making decisions	3	3	
1.4	How can we decide?	3	3	PMS, K
1.5	How to set goals			K
Theme 2: careers and planning				
2.1	What do you mean I have to earn an income?			K
2.2	Making a job	5	5	
2.3	Invest in yourself			L(3)
2.4	Why some jobs pay more than others	6	6	
2.5	What else is out there and how would I find it?			K
2.6	Dreams and plans			K
Theme 3: budgeting				
3.1	Why should I have a budget?			K
3.2	Funding my goals by planning			K
3.3	Uncle Sam takes a bite: forms, forms, forms	7	7	
3.4	Managing your money	20	8	
3.5	Preparing my own budget			K
Theme 4: saving and investing				
4.1	Pay yourself first, early, and often	8	20	
4.2	Why should I have a savings plan?			K
4.3	How do I decide whether to save, invest, or both?			L(12)
4.4	There is no free lunch in investing	9	21	
4.5	Financial institutions in the U.S. economy			L(11)
4.6	Reading the financial pages: in print and online			L(5)
4.7	Research companies			L(13)
4.8	How to buy and sell stocks and bonds			L(8)
Theme 5: credit				
5.1	Extra "CREDIT": cash or credit			K
5.2	What is credit?	11	11	
5.3	Cash or credit? Which should I use and when?			FFFL-MS(15)
5.4	Making credit choices	12	12	K
5.5	Finding your way through the credit maze			C(18)
5.6	Applying for credit	13	13	
5.7	All about interest	14	14	
5.8	Shopping for a credit card	15	15	
5.9	Consumer credit protection	18	18	K
Theme 6: banking services				
6.1	What financial institutions can do for me			K
6.2	Checking accounts: not all are created equal	21	9	K
6.3	Practice, practice: how to record deposits, keep a running balance, and reconcile a checking account	21	9	
Theme 7: transportation issues				
7.1	How do you get wheels and what are the costs?			PMS, K
7.2	What do I want and what can I afford?	3	3	PMS, K
7.3	What are warranties and service contracts and why do I need them? Or do I?			K
7.4	Have I got a deal for you! Loan or lease?	17	17	
7.5	How costly will my car insurance be?	22	10	PMS
Theme 8: housing issues				
8.1	Moving into my own place	3	3	PMS
8.2	How comfortable will my place be?			K
8.3	Tired of renting: should I buy my own house?			K
8.4	Can I really afford that house?			PMS, K
8.5	Obtaining financing: shop for your mortgage	16	16	PMS, K

Table 1 (*Continued*)

Keys lesson number	*Keys* lesson title	FFFL2001	FFFL2011	Other
Theme 9: risk protection				
9.1	Let the buyer beware			K
9.2	Credit scams, schemes, identity theft, and privacy issues	19	19	K
9.3	Why insurance and how does it work?			VE
9.4	The basics of life insurance			VE
9.5	Everything you ever wanted to know about automobile insurance			VE
9.6	Why renter's insurance?			VE

Note: C denotes *Capstone-High School* lesson. FFFL-MS denotes *Financial Fitness for Life, Grades* 6–8 lesson. K denotes original lesson content developed for the *Keys* curriculum. L denotes *Learning, Earning, and Investing, Grades* 9–12 (2004 Edition) lesson. PMS denotes *Practical Money Skills* content. VE denotes *Virtual Economics* 4.0 lesson. Lesson numbers, where applicable, appear in parentheses.

2012–2013 academic years. Teacher participation in the training program can occur in one of two ways. A teacher may decide on her own that she wants to teach a *Keys* course, and given her school's approval, she participates in the training program. Or, a school may decide to offer a *Keys* course and ask its teachers to sign up for training. While our sample is not random, it is representative of schools and teachers who are willing to devote time and resources to improve the personal finance knowledge of their students. As such, our work should be framed in the context of schools where student success is a priority. This context is similar to the one found in other studies using the *FFFL* curriculum and test (Harter and Harter, 2009; Butters et al., 2012).

Table 2 reports basic descriptive statistics for the students participating in this study, as well as the number of sections implementing the *Keys* course. A total of 967 students, taught by 19 teachers in 35 different sections, participated in the assessment reported in this study. Females accounted for 54 percent of the students in the sample. Additionally, 40 percent of students were 15 years of age or younger at the time of the pretest. Schools are split on when to offer the *Keys* program. Some offer it to juniors and seniors in high school. Others offer it to freshmen and sophomores. The course is, however, most often offered as an elective and it is open to all students across the high school grades. Therefore, students were asked to self-report their age rather than their high school grade. Finally, each semester provided between 21 and 30 percent of the observations in our study.

Table 2
Descriptive statistics (Students $N=967$; sections $N=35$; teachers $N=19$).

Variable	Mean	*n*
Student gender		
Female	0.54	519
Male	0.46	446
Unknown	0.00	2
Student age		
≤15 years	0.40	384
16 years	0.22	214
17 years	0.21	206
18 years	0.15	148
≥ 19 years	0.02	15
Participating students		
2011 – Fall	0.30	293
2012 – Spring	0.21	205
2012 – Fall	0.26	247
2013 – Spring	0.23	222
Participating sections		
2011 – Fall	0.26	9
2012 – Spring	0.17	6
2012 – Fall	0.31	11
2013 – Spring	0.26	9

From the inception of the *Keys* program, the partners recognized the importance of measuring the impact of the course on the personal finance achievement of students. As such, a 50-question personal finance test was created based on the 50-item *FFFL-HS* multiple-choice test. The *FFFL-HS Test* was developed by a National Advisory Committee and its content validity was established using the *National Standards in K-12 Personal Finance Education* (Jump$tart Coalition, 2002). Field testing was done in 2003 with high school students from three different U.S. states (Arizona, Delaware, and New Jersey) and the final version of the test was used during the 2003–2004 academic year to pre- and posttest high school students in Texas. The *FFFL-HS Test*'s coefficient alpha is .86, indicating that it contains good internal consistency and measures financial literacy with accuracy. This instrument is well suited for measuring student achievement in the *Keys* course since *Keys* makes use of all but two lessons from the *FFFL* curriculum. In order to be able to test students on the content not covered in the *FFFL* curriculum, the authors independently developed four multiple-choice questions. Questions 12, 13, 16, and 49 were dropped from the *FFFL-HS Test* and replaced with these "in-house" questions. The four *Keys*-authored questions were not normed, and are not reported in the results presented below.

Participating teachers were asked to administer the pretest on the first day of the course, and before teaching any content. The *FFFL-HS Test* is designed to be used for pre- and posttesting purposes, but the instrument itself is the same in both cases. As such, Walstad and Rebeck (2005) recommend that the results of the pretest, specifically any references to the actual questions or answers, should not be shared with the students if the intent is to posttest them at the end of the course. With this in mind, our teachers were instructed not to share the pretest questions or results with the students, and to destroy all test instruments following the administration of the pretest. In each of the sections, the posttest was administered during the last day of the semester course. It is possible that some of the knowledge improvements reported in the next section may be due to students being familiar with the test instrument. However, the directives given to the teachers, and the length of time (over four months) that elapsed between the pre and posttest, should minimize the effect that familiarity with the test instrument may have on student performance.

Was *Keys to Financial Success* effective in significantly improving the personal finance knowledge of students? And if so, in what standards and concepts did students perform significantly better or worse? Which standards and concepts would benefit from additional classroom emphasis? Finally, are our results consistent with previous research findings in the literature? To answer these questions, we examine the average performance of students in the overall, standard, and concept specific areas of the *FFFL-HS Test* and use appropriate forms of statistical analysis to compare that performance to the results from the norming of the *FFFL-HS Test*.

5. Results

Table 3 presents the overall, standard, and concept specific pre- and posttest average performance of students on the 46 test items from the *FFFL-HS Test*. This table also reports the percentage point change, as well as the percentage change in student performance from the pre- to the posttest. The overall average pretest score was 41.50 percent correct, while the overall average posttest score was 66.84 percent correct. For the high school students in our sample, the use of the *Keys to Financial Success* curriculum by trained teachers resulted in an average knowledge improvement of 25.34 percentage points, or a change of 61 percent. That percentage change in average knowledge can be put in context by comparing it to other research findings in the literature. For example, U.S. data on high school students from Harter and Harter (2009) shows that students whose teachers were trained in the *FFFL* curriculum exhibited and overall average knowledge improvement of 9.06 percentage points, or a change of 23.86 percent (versus 61 percent in *Keys*). It is worth noting that these students' average pretest score was lower than that for the *Keys* students by about 3.5 percentage points (37.97 percent correct). To compare our overall results with those obtained from students internationally, we used data from Borodich et al. (2010) to construct a comparable overall score using the corresponding 46 items from the *FFFL-HS Test* for high school students who received no personal finance training and college students who received some basic personal finance training through a required college course in Belarus. The resulting percentage point difference in performance between the Belarusian high school and college students is 6.56 percentage points, or 14.18 percent. Regardless of whether we

Table 3
Differences in student performance by standard and concept (N=967).

	FFFL items	Pretest	Posttest	Difference	% Change
A. Income		48.80	75.09	26.29[a]	53.87%
1. Sources of income	1, 11	57.14	85.94	28.80[a]	50.41%
2. Determinants of income	9, 14, 15, 17	48.91	76.09	27.17[a]	55.55%
3 Taxes and transfer paymets	18, 19, 20	43.09	66.53	23.44[a]	54.40%
B. Money management		42.87	66.89	24.02[a]	56.03%
1. Limited resources and choice	5, 8	44.52	62.56	18.05[a]	40.53%
2. Opportunity cost	7	23.78	56.98	33.20[a]	139.57%
3. Personal financial responsibility	6	80.25	89.66	9.41[a]	11.73%
4. Financial decision making	10	36.19	75.90	39.71[a]	109.71%
5. Inflation and investing	28	22.23	43.64	21.41[a]	96.28%
6. Insurance, risk management	46, 47, 48, 50	50.08	67.45	17.37[a]	34.69%
7. Budgeting	41, 42, 43	37.16	64.46	27.30[a]	73.47%
8. Use of money management tools	44, 45	39.87	74.41	34.54[a]	86.64%
C. Spending and credit		33.72	61.71	27.99[a]	82.99%
1. Benefits and costs of spending	3, 4	40.64	60.70	20.06[a]	49.36%
2. Information on products					
3. Costs and benefits of payment methods	31, 32	46.23	73.01	26.78[a]	57.94%
4. Risk and credit	35, 36	47.00	67.37	20.37[a]	43.34%
5. Sources of credit	37, 40	22.54	49.74	27.20[a]	120.64%
6. Credit history and records	33, 34	20.53	60.86	40.33[a]	196.47%
7. Managing financial difficulties					
8. Rights and responsibilities of buyers, sellers, and creditors	38	17.06	55.43	38.37[a]	224.85%
D. Saving and investing		41.45	65.16	23.71[a]	57.20%
1. Saving and investing	21, 23	23.89	49.69	25.80[a]	108.01%
2. Reasons for saving and investing	2	87.18	96.28	9.10[a]	10.44%
3. Risk, return, and liquidity investment	25, 26, 27	44.61	66.49	21.89[a]	49.07%
4. Buy and sell investments	29, 30	44.93	78.54	33.61[a]	74.80%
5. Rate of return on investments	22, 24	26.47	47.10	20.63[a]	77.93%
6. Sources of investment information	39	44.36	70.32	25.96[a]	58.51%
7. Government and saving and investment					
Total		41.50	66.84	25.34[a]	61.05%

Note: Standards and Concepts were obtained from William B. Walstad and Ken Rebeck, *Financial Fitness for Life: High School Test Examiner's Manual* (2005) and are based on the *National Standards in K-12 Personal Finance Education* (Jump$tart Coalition, 2002).
[a] Difference of means is statistically significant at the 1% level.

compare our results to U.S. or international findings, the 61 percent average knowledge improvement exhibited by students participating in the *Keys* program is remarkable.

Examining the pretest results, students achieved the highest average scores in the Income standard (48.80 percentage) and the lowest average scores in the Spending and Credit standard (33.72 percentage). Student performance at a more disaggregate level demonstrates that the Saving and Investing concept entitled *Reasons for saving and investing*, and the Money Management concept entitled *Personal financial responsibility*, exhibit the highest student pretest results with average scores of 87.18 and 80.25 percent correct, respectively. On the other hand, the Spending and Credit concept entitled *Rights and responsibilities of buyers*, *sellers*, *and creditors*, and the two concepts on *Credit history and records* exhibit the weakest average student pretest performance at 17.06 and 20.53 percent correct, respectively. Other concepts where students struggled at the beginning of the semester include *Inflation and investing*, *Sources of credit*, *Opportunity cost*, and *Saving and investing*. Using data on the comparable 46 *FFFL-HS Test* items from Cameron et al. (2013), we constructed standard specific measures of personal finance knowledge and found that our pretest results are also consistent with those found for high school students in New Zealand and Japan.

The overall average posttest score was 66.84 percent. The performance ranking of standards at the posttest level is similar to that found at the pretest level. The income standard exhibits the highest average score at 75.09 percent correct, while the weakest performance is found in the Spending and

Credit standard at 61.71 percent correct. The concepts *Reasons for saving and investing* and *Personal financial responsibility* continue to exhibit the highest student performance with average posttest scores of 96.28 and 89.66 percent correct, respectively. Similarly, and even after instruction, students continue to find challenging the concepts related to *Inflation and investing*, *Rate of return on investments*, *Sources of credit*, and *Saving and investing*. These results are consistent with recent U.S findings by Butters et al. (2012) on high school students enrolled in consumer science, personal finance, and other similar courses in eleven U.S. states. Overall, the data provides us with evidence of the stumbling blocks for most high school students across countries: students understand topics related to income and its sources relatively well, but have difficulties knowing how it should be spent, saved, invested, or managed.

So, where was the *Keys to Financial Success* curriculum most effective in improving the personal finance knowledge of students? The results in Table 3 indicate that the curriculum and the training of teachers significantly improved, at the 1 percent level, the average performance of students in each of the standards and concept areas of the test. Of special importance is the percentage point change and overall percentage change experienced by students in the two concept areas where they struggled the most at the beginning of the semester. *Credit history and records* and *Rights and responsibilities of buyers, sellers, and creditors* experienced a percentage point gain of around 40 points, equivalent to a percentage change of between 196 and 225 percent. Other areas where students saw very large improvements in their knowledge include the concepts on *Opportunity cost* (139.57 percentage change), *Sources of credit* (120.64 percentage change), *Financial decision making* (109.71 percentage change), and *Saving and investing* (108.01 percentage change). In summary, the *Keys to Financial Success* course had its largest effects in the areas where the students needed the most help.

To put our posttest overall and standard specific findings in context, we report in Table 4 the posttest results from the norming of the *FFFL-HS Test*, and compare them to the performance of the students in this study. Since the *Keys to Financial Success* assessment only made use of 46 out the 50 items available in the *FFFL-HS Test*, we use the item-specific information reported in the *FFFL-HS Test Examiner's Manual* (Walstad and Rebeck, 2005) to construct new 46-item adjusted overall and standard scores. The average overall score was 10.80 percentage points higher for the sample of students examined in this study than for those who participated in the norming of the *FFFL-HS Test*. This finding is also true at a more disaggregate level, with standard specific scores ranging anywhere between 9.07 and 12.33 percentage points higher for the *Keys* sample. We tested these differences in mean scores and found that they are all highly statistically significant at the 1 percent level, indicating that the use of the *Keys to Financial Success* curriculum by trained teachers is more effective in changing the personal finance knowledge of students than the *FFFL* curriculum alone.

While it could be argued that the student sample used to norm the *FFFL-HS Test* is different than the sample of students participating in our study, the posttest results from the norming of the *FFFL-HS Test* reported in Table 4 are only from students whose teachers had been trained in and used the *FFFL* curriculum in the classroom. Since the results presented in the *FFFL-HS Examiner's Manual* are offered so that users can "*compare them to the scores of their students when they administer the FFFL-HS Test*," and the data in the manual is "*probably indicative of the results that would be obtained if a teacher trained in the use of FFFL materials provided personal finance instruction to students*" (Walstad and Rebeck, 2005, p. 15), we feel confident that our comparison is valid and provides important information regarding the effectiveness of the *Keys to Financial Success* curriculum.

Table 4
Posttest performance: *FFFL* norming vs. *Keys* assessment.

	FFFL norming (N=524)	*Keys* assessment (N=967)	Difference % points	Difference % change
Total	56.04	66.84	10.80[a]	19.27%
A. Income	64.33	75.09	10.76[a]	16.73%
B. Money management	55.93	66.89	10.96[a]	19.60%
C. Spending and credit	52.64	61.71	9.07[a]	17.23%
D. Saving and investing	52.82	65.15	12.33[a]	23.34%

[a] Difference of means is statistically significant at the 1% level.

6. Conclusion

The objectives of this study were to share the features of the *Keys to Financial Success* curriculum with an international audience, and investigate its effectiveness on the personal finance knowledge of students. The *Keys* curriculum is unique because it combines personal finance lessons from a variety of sources, approaches the teaching of personal finance using materials grounded in the economic way of thinking, and is flexible enough to be taught by instructors from different departments. A PDF copy of the *Keys* teacher's manual and additional information about how to implement a *Keys* course is available free of charge via email from the Federal Reserve Bank of Philadelphia[1].

The results from the pre- and posttests show that students whose teachers are trained in the *Keys* curriculum, and who participate in a one-semester *Keys* course, exhibit a statistically significant increase in their overall personal finance knowledge. This finding is also true at the standard and concept specific levels. The largest knowledge improvements took place in the areas dealing with *Credit history and records* and the *Rights and responsibilities of buyers, sellers, and creditors*. Coincidentally, these two areas were identified as the most challenging for students in the pretest. These findings are consistent with previous research findings in personal finance, but the magnitude of the knowledge improvements experienced by the students in the *Keys* program is significantly larger than that of other studies.

While no single curriculum can be expected to meet the requirements of financial educators around the world, due in part to differences in education systems, labor and credit markets, and regulatory systems, there are some important lessons learned from the development of the *Keys* curriculum that can guide others who want to design their own personal finance semester courses. First, the curriculum designers must determine the appropriate financial education content to be taught in their specific countries. Many countries now have, or are in the process of developing, personal finance frameworks that can guide that content selection process. Second, every curriculum designer must specify the desired knowledge, attitudinal, or capabilities outcomes for the resulting curriculum. Third, the designers must select lessons that align with the identified content and desired outcomes, and meet any criteria laid out in country-specific frameworks or curriculum guidelines. Fourth, any successful personal finance program must have a carefully designed and delineated plan for assessing its effectiveness on the personal finance knowledge of students. Finally, designing and offering professional development opportunities for teachers is essential to ensuring that the students receive the highest quality personal financial education possible.

There are some limitations associated with our *Keys* data but also several opportunities for future research. The data used in this study were limited by student specific privacy laws in the United States. As a result, the students' ethnicities and general academic performance measures were not available to us. Also, while this specific study only examines results from semester-long *Keys* courses, a number of teachers and schools are starting to offer the same *Keys* materials but over an entire school year. In our future research, we would like to study whether the additional time-on-task in these longer duration courses has a statistically significant effect on student personal finance knowledge. Furthermore, and following the work by Pang (2010), we would like to posttest students six weeks and six months after instruction to measure the human capital decay that occurs with time when using the *Keys* curriculum. Finally, it is apparent from our results that *Keys* teachers need additional support for teaching students difficult content areas such as *Opportunity cost*, *Inflation and investing*, and *Rate of Return on Investments*. This additional support will likely come in the form of follow-up professional development training and supplemental lessons on these topics. To that extent, the use of online technology would provide for a quick and efficient medium to distribute those resources to teachers. A *Keys* website is currently not available to teachers, but it is one addition to the program that would make *Keys* more accessible to teachers in the United States and across the world.

Given the few opportunities afforded researchers to collect pre- and posttest student data from semester-long personal finance courses, our findings, based on test results from nearly 1000 students, lend support for the growing body of research that shows that a well-designed personal finance

[1] A PDF copy of the *Keys to Financial Success Teacher's Manual*, and additional information about how to implement a *Keys* course, can be obtained by emailing andrew.hill@phil.frb.org.

curriculum, properly implemented by trained teachers, can increase students' achievement in personal finance. Based on the interest worldwide in helping today's youth understand financial issues, the *Keys* curriculum offers one effective alternative for changing student personal finance outcomes.

Acknowledgements

The authors wish to thank Rebecca Chambers, Susheela Patwari, Brian Tyson, Erin Yetter, and Todd Zartman for valuable research assistance on this project.

References

Atkinson, A., Messy, F., 2012. Measuring financial literacy: results of the OECD/International Network on Financial Education (INFE) pilot study. OECD Working Papers on Finance, Insurance and Private Pensions. Available from: http://www.oecd-ilibrary.org/finance-and-investment/measuring-financial-literacy_5k9csfs90fr4-en (accessed 5.04.14).

Boyce, L., Danes, S., 1998. Evaluation of the NEFE High School Financial Planning Program 1997–1998. National Endowment for Financial Education, Boulder, CO. Available from: http://www.hsfpp.org/Portals/0/Documents/NEFE%20HSFPP%20Impact%20Study%201997-1998.pdf (accessed 10.10.13).

Borodich, S., Deplazes, S., Kardash, N., Kovzik, A., 2010. Comparative analysis of the levels of financial literacy among students in the U.S., Belarus, and Japan. J. Econ. Econ. Educ. Res. 11, 71–86.

Butters, R.B., Asarta, C.J., McCoy, S., 2012. Financial literacy and gender in U.S. high schools. J. Econ. Financ. Educ. 11, 142–149.

Caldwell, J., Davis, J., Gallagher, S., Lopus, J., Morton, J., Schug, M., Suiter, M., VanFossen, P., Wentworth, D., Wood, W., 2004. Learning Earning and Investing: High School. National Council on Economic Education, New York.

Cameron, M.P., Calderwood, R., Cox, A., Lim, S., Yamaoka, M., 2013. Personal financial literacy among high school students in New Zealand, Japan and the USA. Citizsh. Soc. Econ. Educ. 12, 200–215.

Child and Youth Finance International. Available from: http://www.childfinanceinternational.org/ (accessed 10.10.13).

Emery, B., Suiter, M., 2007. Financing Your Future. National Council on Economic Education, New York.

Filatova, I., 2013. Rising financial literacy among Russians is a state priority. The Moscow Times, July 10, 2013. Available from: http://www.themoscowtimes.com/business/article/rising-financial-literacy-among-russians-is-a-state-priority/482956.html (accessed 10.10.13).

Flowers, B., Laux, S., 2010. Financial Fitness for Life. Council for Economic Education, New York.

Fox, J., Bartholomae, S., Lee, J., 2005. Building the case for financial education. J. Consum. Aff. 39, 195–214.

Gellman, S., Laux, S., 2011. Financial Fitness for Life (Grades 9–12), 2nd ed. Council for Economic Education, New York.

Harter, C., Harter, J., 2009. Assessing the effectiveness of Financial Fitness for Life in eastern Kentucky. J. Appl. Econ. Policy 28, 20–33.

Hathaway, I., Khatiwada, S., 2008. Do financial education programs work? Federal Reserve Bank of Cleveland Working Paper No. 08-03. . Available from: http://www.clevelandfed.org/research/workpaper/2008/wp0803.pdf (accessed 30.10.13).

Jacobs, F., 1988. The five-tiered approach to evaluation: context and implementation. In: Weiss, H., Jacobs, F. (Eds.), Evaluating Family Programs. Aldine DeGruyter, New York, pp. 36–68.

Jump$tart Coalition, 2002. National Standards in K-12 Personal Finance Education. Available from: http://www.jumpstart-coalition.org/assets/files/State_Requirements/KS_04-PER_FIN_STANDARDS.pdf (accessed 31.08.13).

Lopus, J.S., Morton, J.S., Reinke, R., Schug, M.C., Wentworth, D.R., 2003. Capstone: Exemplary Lessons for High School Economics. National Council on Economic Education, New York.

Lusardi, A., Mitchell, O.S., Curto, V., 2009. Financial literacy among the young: evidence and implications for consumer policy. National Bureau of Economic Research (NBER) Working Paper. Available from: http://www.nber.org/papers/w15352.

Mandell, L., 2008. The financial literacy of young American adults: results of the 2008 National Jump$tart Coalition Survey of high school and college students. DC: Jump$tart Coalition. Available from: http://www.jumpstart.org/assets/files/2008SurveyBook.pdf (accessed 31.08.13).

Money as You Learn. Available from: http://www.moneyasyoulearn.org/ (accessed 04.04.14).

Morton, J., Schug, M., 2001. Financial Fitness for Life: Bringing Home the Gold (Grades 9–12). National Council on Economic Education, New York.

Pang, M., 2010. Boosting financial literacy: benefits from learning study. Instr. Sci. 38, 659–677.

Practical Money Skills for Life, 2000. VISA, U.S.A., Inc., San Francisco.

Swinton, J., DeBerry, T., Scafidi, B., Woodard, H., 2007. The impact of financial education workshops for teachers on students' economic achievement. J. Consum. Educ. 24, 63–77.

Todd, R., 2002. Financial literacy education: a potential tool for reducing predatory lending? The Region (Federal Reserve Bank of Minneapolis) (December), 6–13.

University of California Cooperative Extension, 2011. Money talks: should I be listening? Available from: http://money-talks4teens.ucdavis.edu (accessed 10.10.13).

Varcoe, K., Martin, A., Devitto, Z., Go, C., 2005. Using a financial education curriculum for teens. J. Financ. Couns. Plan. 16, 63–71.

Virtual Economics 4.0, 2011. Council for Economic Education, New York.

Walstad, W., Rebeck, K., 2005. Financial Fitness for Life: High School Test Examiner's Manual (Grades 9–12). Council for Economic Education, New York.

Walstad, W., Rebeck, K., MacDonald, R., 2010. The effects of financial education on the financial knowledge of high school students. J. Consum. Aff. 44, 3.