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Impact of the FutureSmart Online Financial Education Course on Financial Knowledge of Middle School Students

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Abstract

The increasing role of schools in promoting financial literacy underscores the need to investigate the effectiveness of school-based financial education programs. This study examined FutureSmart—a free, co-curricular, online financial education course—using a quasi-experimental design with a diverse sample of middle school students nationwide. The study assessed the impact of the course on students' financial knowledge, attitudes, and behaviors, and explored the association of program implementation factors with changes in student outcomes. Financial knowledge gains were significant, substantial, and consistent across student subgroups and implementation factors for FutureSmart participants. Gains in financial attitudes and behaviors—specifically, financial confidence, engagement with parents about financial issues, current engagement with financial products, and intended future engagement with financial products—were not significant. The fundamental implication of this research is that FutureSmart effectively conveys financial knowledge to middle school students, contributing to a foundation for their future financial well-being.

Keywords: financial attitudes, financial behavior, financial education, financial knowledge, financial literacy

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Recent global economic trends have reinforced the importance of financial education throughout an individual's life, leading to heightened interest in educational initiatives designed to enhance financial literacy (Amagir et al., 2018; U.S. Department of the Treasury, 2015). In response, various organizations have developed financial literacy education programs and standards for K–12 students. However, few of these interventions have been developed specifically for elementary and middle school students. This study focused on assessing one such program—FutureSmart—a web-based financial literacy course for middle school students launched by EVERFI, Inc., with support from the MassMutual Foundation, in the 2016–2017 academic year.

Despite the increased attention on financial education, there is no generally accepted definition of *financial literacy* (Huston, 2010; Kasman et al., 2018; McCormick, 2009). For this reason, it is important to establish a framework for understanding financial literacy (Amagir et al., 2018; Huston, 2010; McCormick, 2009). Huston (2010) suggested that financial literacy comprises two dimensions—understanding and application—reflecting not only whether an individual understands financial information, but also whether they are able to apply that knowledge. Huston's interpretation emphasizes the distinction between financial knowledge and financial literacy. Amagir et al. (2018) extended this notion by identifying three components of financial literacy: knowledge and understanding, skills and behavior, and attitudes and confidence. Though some studies have found that financial education does not always improve students' financial literacy (Amagir et al., 2018; Huston, 2010; Robb & Woodyard, 2011), there

is strong evidence linking financial education to improvements in future financial behavior (Bernheim et al., 2001; Bhattacharya et al., 2016; Mandell & Klein, 2009; McCormick, 2009).

The purpose of this study was to assess the impact of FutureSmart using a sample of middle school students from diverse socioeconomic and racial/ethnic backgrounds by addressing two research questions. First, does FutureSmart improve student outcomes (i.e., financial knowledge, financial confidence, engagement with parents about financial issues, current engagement with financial products, or intended future engagement with financial products)? Second, which factors under teacher or administrator control (i.e., teacher timing, teacher pacing, training level, teacher experience, course type, or grade level) affect student outcomes?

FutureSmart is an online, teacher-led, co-curricular financial education course implemented primarily in middle school classrooms of varying discipline and content. The course consists of seven modules: financial values and goal setting, budgeting and opportunity cost, saving and investing, payment types, banking, risk versus return, and planning for the future. Each FutureSmart module utilizes a "story-based narrative" in which students role play as the mayor of a fictional town and help local citizens make real-life financial decisions (EVERFI, 2018a). Individual modules take approximately 30 minutes to complete and include optional supplemental learning activities provided to the teacher. Five of the modules include pre- and post-assessments of student knowledge.

FutureSmart was designed to be administered flexibly, allowing students to progress through the modules at their own pace. Since the course is web-based, participants can access the modules from anywhere with a computer or tablet and an internet connection. Teachers are provided supplemental materials to integrate with the online modules as they see fit, including discussion guides, lesson plans, answer keys, and state-specific standards-alignment guides.

Teachers are also asked to complete an annual survey about their unique implementation of the course. EVERFI developed the course content to align with the Jump$tart Financial Education Standards, National Curriculum Standards for Social Studies, and state academic standards (EVERFI, 2018b).

Using data collected from FutureSmart's pre- and post-assessments, student pre- and post-course surveys, and teacher surveys for both treatment and control groups, this study estimated the impact of the intervention on students' financial knowledge, financial confidence, engagement with parents about financial issues, current engagement with financial products, and intended future engagement with financial products. The results of this study contribute to the literature on the effectiveness of financial education programs for middle school students in particular. More broadly, this study contributes to the knowledge available to teachers, financial educators, and financial practitioners regarding the implementation and impact of interventions designed to promote financial literacy.

Literature Review and Hypotheses

Financial Education in the United States

In recent years, increased consumption and spending among youth have underscored the importance of financial education for this population (VanFossen, 2017). Curriculum standards in many states now require school districts to provide some form of financial education (Council for Economic Education, 2018), and recent literature reviews have identified many financial literacy curricula and programs for youth. Most of these resources, however, have been developed for high school and college students, with fewer resources available for middle school students (Amagir et al., 2018).

Previous research has shown that applying financial concepts as part of a financial education program improves student learning and knowledge retention (Mandell & Klein, 2007, 2009; Varcoe et al., 2005; Wagner, 2019). According to Huston (2010), the terms *financial literacy* and *financial knowledge* are often used interchangeably; yet, while financial knowledge is a critical component of financial literacy, it is not the equivalent. Financial knowledge comprises what a person understands about financial literacy, whereas financial literacy relates to not only what a person knows about financial matters, but also their ability to apply that knowledge (Huston, 2010). Studies focusing on high school students have noted that financial education programs increase students' interest in financial matters and the likelihood that they will make sound, proactive financial choices (Dituri & Marley-Payne, 2019; Lührmann et al., 2014). Research has also shown that high school financial education requirements are associated with better credit scores and fewer credit defaults (Urban et al., 2018). Using the results of the 2015 National Financial Capability Study survey—which asked respondents about their exposure to financial education as well as their financial knowledge around interest accrual, inflation, bonds and interest rates, mortgages, and stocks—Wagner (2019) identified a positive correlation between financial education and financial literacy, especially among those with less education and lower income levels. Additionally, Varcoe et al. (2005), using difference of means tests, assessed whether financial knowledge changed significantly from pre- to posttest among high school students who participated in the "Money Talks" curriculum. They found an increase in both financial knowledge and financial behaviors such as shopping choices and attitudes toward saving (Varcoe et al., 2005).

In a multiple regression analysis of data from the National Financial Capability Study, Robb and Woodyard (2011) found that an individual's level of financial knowledge did

positively impact their financial behavior. This finding was similarly reported by Chambers, Asarta and Farley-Ripple (2019) and Deenanath, Danes and Jang (2019). Additionally, based on a review of research related to youth financial education and policy, McCormick (2009) identified three key findings. First, financial education should begin during elementary school; the earlier a student begins to learn financial concepts, the more likely it is that their future financial behavior will improve. Second, poor results from the studies of financial education programs imply that the current practice of introducing financial literacy in high school is too late. Third, the core concepts of financial literacy (i.e., goal setting, intertemporal choice, philanthropic giving, earning, saving, and spending) should also be reinforced prior to high school in order to increase the chances of students becoming financially literate consumers as adults (McCormick, 2009). Indeed, it is critical that students build a foundation of financial knowledge for future financial literacy throughout their K–12 education.

In response to the need for more systematic financial literacy education for youth, most states have either adopted or are in the process of adopting financial literacy mandates for high school students (Bernheim et al., 2001; Council for Economic Education, 2018; Kasman et al., 2018; Mandell & Klein, 2009). Yet, in a review of large-scale youth financial literacy programs, Kasman et al. (2018) found that, despite some progress, there are still many states that have not fully implemented financial literacy requirements.

Financial Education in Middle Schools

As noted, middle school students represent an age group for whom only a few classroom-based financial education programs have been evaluated (Amagir et al., 2018). This is surprising since previous research has identified the potential benefits of beginning financial education

earlier than high school (McCormick, 2009; Robb & Woodyard, 2011; Suiter & Meszaros, 2005).

The National Standards in K–12 Personal Finance Education (Jump$tart Coalition, 2017) further emphasize the importance of expanding younger students' financial knowledge by showing that financial knowledge and skills standards build on one another. Students should understand the foundational concepts of financial literacy in elementary and middle school before applying those skills in "real-world" settings (Jump$tart Coalition, 2017). This benchmark progression is exemplified by the various standards related to "personal funds" (i.e., funds available for one's own use). The initial personal-funds benchmark focuses on the student's ability to decide how to use personal funds in kindergarten, followed by their ability to assess their spending priorities in Grade 8, and finally their ability to apply that knowledge to a plan for managing, spending, and achieving financial goals in Grade 12 (Jump$tart Coalition, 2017).

Systematic Review of Financial Education Programs in Middle Schools

In a systematic review of financial education programs for children and adolescents, Amagir et al. (2018) found that school-based financial education programs could improve financial knowledge as well as self-reported attitudes and behaviors. Specifically, Amagir et al. reviewed 36 studies from 2004–2015 on the outcomes of financial literacy programs. Programs eligible for review needed to have (a) included a target audience of elementary, middle, high school, and/or college students; (b) measured financial literacy outcomes (i.e., financial knowledge, skills, attitudes, confidence, and/or behaviors); and (c) used experimental design and reviews (Amagir et al., 2018). Of these, 10 studies examined students in Grades 6–8, exploring the impacts of the following programs: Financial Fitness for Life (which consists of five weekly

classroom lessons of approximately 45 minutes); Banco de España Comisión Nacional del Mercado de Valores (a 10-hour Spanish financial education program); Milwaukee Urban League Academy of Business and Economics (a charter school implementing lessons focused on economics and personal finance); the Stock Market Game (a 10- to 15-week activity); and YEA! (a free 3-week program offered to income-eligible middle school students in Boston).

Most of the studies in Amagir et al.'s (2018) review did not explore factors contributing to variation in the programs' effects on student outcomes, nor did they describe the size of the effects. The studies used either randomized controlled trials or quasi-experimental designs, and, with only one exception, those that did report effect sizes found small to medium positive effects on financial knowledge, financial behavior, or financial attitudes. Some studies were inconsistent in demonstrating the educational meaningfulness of particular interventions due to variations in study design (Amagir et al., 2018). Schug and Hagedorn's (2004) quasi-experimental study, which assessed the financial knowledge gains of students in the Milwaukee Urban League Academy of Business and Economics (MULABE), showed increased financial knowledge in select middle school students. However, students attending MULABE schools receive a customized economic and personal finance curriculum that constitutes approximately one third of the school curriculum. Furthermore, the studies reviewed by Amagir et al. (2018) did not explore the impact that variation in program implementation may have had on the effectiveness of the interventions, such as the impact of using the program in classes of different course types or at different points in the school year, or the impact of teaching experience on program implementation.

Likewise, Hinojosa et al.'s (2010) randomized controlled trial found that participation in hands-on activities, such as the Stock Market Game, significantly increased the math

achievement of sixth- to 10th-grade students as well as their scores on financial literacy tests. In addition, low-income elementary school students who opened savings accounts as part of a financial literacy course had larger economic vocabularies, talked more about spending and savings, and expressed greater confidence in their financial abilities than students who did not participate in the course (Sherraden et al., 2011). Similarly, a quasi-experimental study of the Stocks in the Future program (designed specifically to provide underserved middle school students with a financial education curriculum that reinforces math, language arts, and social studies) showed statistically significant growth in financial vocabulary, math concepts, and financial calculations (e.g., profit margin) among underrepresented or socioeconomically disadvantaged students relative to students in comparison schools (Durham, 2016). Despite these increases, program format and implementation varied greatly, and, once again, these studies did not explore the impact that variation in implementation may have had on the effectiveness of the interventions.

Technology and Financial Education

FutureSmart is a computer-based, stand-alone program that can be integrated into various types of classes (e.g., economics, English, math). This approach is informed by research showing that the incorporation of technology and web-based programming into middle school curricula can promote high levels of engagement, enhance retention, and improve performance (Foss et al., 2013; Morgan, 2015; Winter, 2018). Foss et al. (2013) also found that incorporating technology in middle school classes can improve the academic outcomes of students with learning differences. Using ANOVA and paired t-test analysis, Kulo and Bodzin (2013) found a significant increase in content knowledge and large effect sizes for all ability levels for students who used web-enhanced science curricula in middle school classes. Similarly, Lynch et al.

(2008) found that a web-based program utilizing video segments, quizzes, and interactive games and activities to increase food-safety knowledge among middle school students, had a statistically significant, moderate effect size between pre- and posttest. Moreover, they found that this type of application met the needs of students with varying learning styles and levels of ability (Lynch et al., 2008).

In an effort to further understand the impacts of financial literacy education on high school students, Mandell and Klein (2009) explored the types of teaching methods used in financial literacy education. They found no positive impacts on financial knowledge or behavior for students who took a standard financial literacy course (i.e., one using traditional forms of instruction, not interactive activities). However, students who participated in more interactive programs (e.g., the Stock Market Game) were consistently more financially literate than those who did not. This suggests that interactive activities, coupled with concepts introduced at a younger age, could have positive impacts on financial knowledge gains (Mandell & Klein, 2009; Suiter & Mezaros, 2005). This finding further suggests that incorporating interactive computer-based financial education programs could contribute to expanding students' financial knowledge. Huston (2010) emphasized that financial literacy education should not be a "one-size-fits-all" approach; rather, it should be tailored to reflect the needs of various demographics, ages, and learning styles.

Hypotheses

Our attention to the conceptual issues identified through a review of literature led us to examine the efficacy of FutureSmart with respect to its effect on five specific student outcomes (i.e., financial knowledge, financial confidence, engagement with parents about financial issues, current engagement with financial products, and intended future engagement with financial

products). Additionally, the literature pointed to the necessity of examining which factors under teacher or administrator control (i.e., teacher timing, teacher pacing, training level, teacher experience, course type, and grade level) effect student outcomes. Specifically, this study tested the following hypotheses:

H1: The FutureSmart intervention has an effect on financial knowledge.

H2: The FutureSmart intervention has an effect on financial confidence.

H3: The FutureSmart intervention has an effect on engagement with parents about financial issues.

H4: The FutureSmart intervention has an effect on current engagement with financial products.

H5: The FutureSmart intervention has an effect on future engagement with financial products.

H6: Factors under teacher or administrator control (i.e., teacher timing, teacher pacing, training level, teacher experience, course type, and grade level) affect student outcomes achieved with the FutureSmart intervention.

Methods

Data and Sample

We utilized several data collection methods to address the efficacy of the FutureSmart program. These included student pre- and post-module assessments to gauge financial knowledge, student pre- and post-course surveys capturing financial attitudes and behaviors, FutureSmart courseware data, and a teacher exit survey. All student pre- and post-module assessments and course surveys were administered through the FutureSmart courseware. The teacher exit survey was administered via Qualtrics Experience Management software. These

instruments were originally developed by EVERFI and subsequently revised in collaboration with the authors to improve their clarity, age appropriateness, reliability, and evaluability.

We recruited teacher participants from EVERFI's teacher participant database, identifying teachers with previous experience using the FutureSmart course. Teachers were offered several opportunities to attend a webinar explaining both the study and participant obligations. In total, 76 teachers—from 27 states in the United States—signed up to participate, and each was given a $100 Amazon gift card at the conclusion of the study, regardless of their completion of the study. Students were not provided with an incentive to participate in the study since their participation was part of their teachers' planned classroom learning activities. Each teacher registered two classes—each with at least 10 students—which were then randomized such that one was assigned to the treatment (i.e., FutureSmart) group and the other to the control group.

Students in the treatment group had access to the entire FutureSmart course (i.e., all activities, pre- and post-assessments, and surveys), while students in the control group completed only the assessments (pre and post) and surveys and did not have access to the FutureSmart module content (Figure 1). Five of the seven modules in FutureSmart include pre- and post-assessments of student knowledge related to budgets, payments types, banking and savings, revenue and expenses, and investing. Participants also completed pre- and post-course surveys that assessed financial attitudes and behaviors.

[Insert Figure 1]

For their control-group classes, teachers were instructed to administer a module pre-assessment at the beginning of the class period and a module post-assessment at the end of the period. Between the pre- and post-assessments, teachers were instructed to offer control-group

students an activity unrelated to FutureSmart or financial literacy. Teachers were informed that the purpose of this design was to minimize control-group students' ability to discuss the pre-assessment questions, which could reduce the validity of the study. The intention was for as many students as possible to have completed the following by the end of the study:

- FutureSmart (treatment) group: all seven modules, five pre-assessments and five post-assessments, and the pre- and post-course student surveys.
- Control group: five pre-assessments and five post-assessments, and the pre- and post-course student surveys.

Teachers were encouraged to offer make-up opportunities to any students who were absent in either group. Once both the treatment and control groups had completed their participation in the study, teachers were encouraged to offer the full FutureSmart course to students in the control group.

The study sample consisted of students in Grades 7 and 8 who had completed both student surveys and all 10 pre- and post-assessments from September 2018 through March 2019. In total, 68 of the original 76 teachers had their classes randomized into the study—eight teachers withdrew from the study for logistical reasons (e.g., schedule changes). Of these 68, 51 registered a total of 2,738 students into the assigned treatment or control groups. A total of 1,234 students completed all surveys and pre- and post-assessments. Only teachers who completed the teacher exit survey and had three or more students in each of the treatment and control groups who completed both student surveys and all assessments were included for analysis. The resulting sample consisted of 524 students—301 in the FutureSmart treatment group and 223 in the control group—distributed across 23 teachers in 16 states. Ninety student participants in the sample were in Grade 7, and 434 were in Grade 8.

Variables

Dependent Variables

This study considered five dependent variables: financial knowledge change score, financial confidence change score, parent communication change score, current financial product engagement change score, and future financial product engagement change score.

The first of five outcome indicators—change in financial knowledge—was measured using pre- and post-assessments included in five FutureSmart course modules. Each of these five modules had five multiple-choice questions that were repeated across both assessments. The outcome indicator for change in financial knowledge was the financial knowledge change score for these 25 questions from pre- to post-assessment.

The other four outcome indicators focused on changes in financial attitudes and behaviors—specifically, change in financial confidence, change in parent communication, change in current financial product engagement, and change in intended future financial product engagement—were measured using student pre- and post-surveys. Change scores from the pre- to post-survey were calculated for each of the above indicators. Change in financial confidence was calculated by summing student responses to six Likert-scale questions (maximum score = 24). Change in communication with parents about financial issues was calculated by summing a checklist of responses to questions about what financial topics students had discussed with their parents in the previous year (maximum score = 6). Change in current financial product engagement was calculated by summing a checklist of responses to questions about current financial product usage, and change in intended future financial product engagement was calculated by summing a checklist of responses to questions about intended financial product usage within one year of study participation (maximum score for each = 6). The instruments used

to assess financial confidence, communication with parents, and current and intended future engagement with financial products are available from the authors upon requests.

Independent Variables

This study included the following independent variables: training level, teaching experience, grade level, course type, pacing student, pacing teacher, timing teacher, free or reduced-price lunch (FRL), English language learner (ELL), state mandates, gender, race/ethnicity, and parent education. These factors were grouped into two categories: those related to program implementation and those related to participant demographics.

Program Implementation Factors. A total of 10 program implementation factors considered to be under the teachers' or administrators' control when either implementing the program or making administrative decisions affecting the class and program implementation, respectively, were included. Four implementation factors were based on the teachers' responses to an online survey administered at the end of the study: teacher training (training level), duration of teaching experience (teaching experience), grade level, and course type for each class randomized into the study. Training level indicated the highest level of education that teachers had completed: bachelor's, master's, or certificate of advanced graduate study (CAGS)/doctorate. Teaching experience indicated the number of years teachers had been a teacher in Grades K–12: 5 or less, 6–10, 11–20, or more than 20. Teachers indicated the course type for each of their classes in the study by choosing from a list of 13 options, and their responses were grouped into three main course types: quantitative (computers or technology, economics or personal finance, mathematics, and science), qualitative (civics or government, English or language arts, family and consumer science, history, homeroom, physical

education/health, social studies, afterschool program, or other—teachers were asked to specify), and career and technical education.

Three of the factors related to program implementation were based on data from the student assessments. Student pacing (pacing student) indicated the number of weeks a student took from the start of the first pre-assessment to the completion of the last post-assessment and was categorized as 2 weeks (14 days) or less, more than 2 weeks and 4 weeks (28 days) or less, and more than 4 weeks. We assumed that the category of pacing student with the largest number of students was indicative of a teacher's pacing. As such, teacher pacing (pacing teacher), in weeks, was calculated as the average (mode) student pacing for the class. Defined in this way, pacing was considered to be both under the teacher's control and responsive to the student's ability to complete the tasks flexibly and therefore necessitated the inclusion of two variables (i.e., pacing student and pacing teacher). Timing (timing teacher), a teacher-controlled factor, referred to the trimester (August–November, December–March) when a class completed the student pre-survey, which was the first study activity for both treatment and control groups.

The final three program implementation factors included the percentage of students reported by the school as being eligible for the FRL program, obtained from district websites and school personnel; the percentage of ELLs in the school, obtained from EVERFI; and the level of middle school financial literacy mandate(s) in the student's state (state mandate). In order to determine the status of state financial literacy mandates for middle school students, we reviewed mandates from each state. In reviewing the American Financial Services Association Education Foundation's (AFSAEF, 2018) state pages, the *Survey of the States* by the Council for Economic Education (2018), and summaries of each state's financial literacy legislation and department of education curriculum standards, we found that 45 states had some mandatory standards for

financial education as of 2016. However, because states vary in the extent and scope of their mandates, we assigned states to two categories: "no standard" or "some standard." States with "no standard" do not have middle school personal financial literacy standards. States with "some standard" either (a) have made deliberate steps to incorporate personal financial literacy into their standards at the middle school level and are currently using those standards, (b) are in the process of adopting standards, or (c) have voluntary personal financial literacy standards that can be used in middle school. As a result, of the 16 states represented in the study sample, four were in the "no standard" category (i.e., California, Connecticut, Delaware, and Mississippi), and 12 were in the "some standard" category (i.e., Florida, Georgia, Idaho, Indiana, Michigan, Minnesota, North Carolina, New York, Texas, Virginia, Washington, and Wisconsin). Eleven states had one teacher in the study, California had two teachers, and Mississippi, North Carolina, and Texas each had three teachers. No school had more than one teacher in the study.

Demographic Factors. Three student demographic factors were included in the analysis: gender (i.e., male, female, other), race/ethnicity (i.e., Black/African American [non-Hispanic], White/Caucasian [non-Hispanic], Hispanic/Latino, Asian/Pacific Islander, Native American Indian/Native Alaskan, other, prefer not to answer), and highest level of education of any parent/guardian (parent education; i.e., middle/junior high school, some high school, high school grad/GED, technical school, some college, college graduate, graduate/professional degree).

Data Analysis

Multi-level mixed-effect regression analyses were conducted to assess the impact of participation in FutureSmart on five student outcomes—financial knowledge, financial confidence, parent communication, current financial engagement, and future financial engagement—where students were nested within teachers. Multiple covariates were included to

minimize potential for bias, including student demographic factors, course type, teacher training level, teaching experience, financial literacy state mandates, grade level, FRL %, and ELL %. This approach allowed for the examination of (a) whether one or more of the teacher factors accounted for a significant portion of the variance in student growth, and (b) differences in changes from the pre- to post-assessment across student subgroups. While the intraclass correlation coefficients for all models were very small (ICC < .01), Huang (2018) advised that it is best practice not to ignore the clustering effect but, rather, to account for it using multi-level mixed-effect regression analysis. Doing so yields a better estimate of the probability of Type I error.

Description of Modeling Procedures

For each of the five outcomes of interest, a mixed-effects regression model was developed to assess the impact of the intervention. The unit of analysis was students (Level 1); students were nested within teachers (Level 2). The following equation represents the general modeling procedure:

$$Y_{ij} = \beta_0 + \beta_1(treatment_{ij}) + \beta_2(timing\ teacher_{ij}) + \beta_3(pacing\ teacher_{ij}) + \beta_4(state\ mandates_{ij}) + \beta_5(training\ level_{ij}) + \beta_6(teaching\ experience_{ij}) + \beta_7(course\ type_{ij}) + \beta_8(grade\ level_{ij}) + \beta_9(FRL_{ij}) + \beta_{10}(ELL_{ij}) + \beta_{11}(Timing\ teacher_{ij} \times Pacing\ teacher_{ij}) + \beta_{12}(Timing\ teacher_{ij} \times Treatment_{ij}) + \beta_{13}(Pacing\ teacher_{ij} \times Treatment_{ij}) + \beta_{14}(State\ mandates_{ij} \times Treatment_{ij}) + \beta_{15}(Training\ level_{ij} \times Treatment_{ij}) + \beta_{16}(Teacher\ experience_{ij} \times Treatment_{ij}) + \beta_{17}(Course\ type_{ij} \times Treatment_{ij}) + \beta_{18}(FRL_{ij} \times Treatment_{ij}) + \beta_{19}(ELL_{ij} \times Treatment_{ij}) + \beta_{20}(pacing\ student_{ij}) + \beta_{21}(gender_{ij}) + \beta_{22}(race/ethnicity_{ij}) + \beta_{23}(parent\ education_{ij}) + u_{0j} + e_{ij}$$

For $i = 1, \ldots, n_j$ students, and $j = 1, \ldots, n$ teachers.

Random effects were included to account for teacher and individual student effects by adding a random error term for each teacher (u_i), and individual observations (e_{ij}). β_0 represents the intercept. The coefficients β_1 through β_{23} represent the fixed effects of a given covariate on the outcome (Y_{ij}). We included interaction terms to capture the treatment effects of the teacher-level program implementation factors. In addition, the interaction of teacher timing and teacher pacing is included because the different times that teachers began administering the course may have necessitated different pacing needs, which in turn may have had differential effects on the outcome variables. The preceding model was refined using the likelihood ratio test to ascertain the most appropriate model.

The coefficient of greatest interest in this study was β_1, which represented the estimated impact of the treatment on students' performance on the outcomes of interest (i.e., financial knowledge, financial confidence, parent communication, current financial engagement, and future financial engagement). All outcomes (i.e., values for Y_{ij}) were continuous change scores of pre- to post-assessments.

Results

Descriptive Statistics

Table 1 presents the characteristics of the students in the study. Approximately 43% and 44% of the students in the treatment and control groups were female, respectively. White students accounted for 52% of the treatment group and 43% of the control group. Hispanic/Latino students accounted for the second highest percentage of the total sample, for both treatment and control groups, with 14% and 24%, respectively. Asian students accounted for 9% of the treatment group but only 4% of the control group. Black/African American students accounted for 4% and 16% of the treatment and control groups, respectively. Thirty

percent of the overall study sample had at least one parent/guardian whose highest level of education was a high school degree. Of the students in the control group, 77% took 2 weeks or less from the time they started the first pre-assessment to the time of completion of the last post-assessment (i.e., pacing student). Students in the treatment group took longer overall; only 52% had a similar pacing of 2 weeks or less.

[Insert Table 1]

Table 2 presents teacher variables in the study. Seventy percent of teachers taught quantitative courses. Over 60% of teachers had attained at least a master's degree. Just under half had been teaching for 11–20 years, while just over one quarter had 6–10 years of teaching experience.

[Insert Table 2]

Schools in our sample reported a mean of 43% of students being eligible for FRL. One quarter of the students in the sample attended a school that served 59% or more FRL-eligible students, and one quarter of the students attended a school that served 16% or less FRL-eligible students. Additionally, schools in the sample reported a mean of 14% of students being ELLs. One quarter of students attended a school that served more than 17% ELL students, and one quarter attended a school that served less than 3% ELL students. Students from states with "no standard" for middle school financial literacy accounted for 28% of the sample.

FutureSmart students (i.e., those in the treatment group) exhibited an average financial knowledge gain of 21.8 percentage points (SD = 16.7, min = -28, max = 68). This gain was statistically significant ($p < .001$) and substantial. By contrast, students participating in the control group showed an average financial knowledge gain of 1.8 percentage points (SD = 10.6, min = -32, max = 32). The control group's gain was also statistically significant ($p = .01$) but was

not substantial. FutureSmart students demonstrated a mean pre-assessment score of 49% and a mean post-assessment score of 70.8%, while the control students demonstrated mean pre- and post-assessment scores of 44.3% and 46.1%, respectively. Overall, 89.7% of FutureSmart students exhibited a gain in financial knowledge, with 50% gaining 20 percentage points or more. Table 3 shows the financial knowledge change scores, as a percentage, for the teacher and student variables. All variables showed a lower average change score for the control group and higher average change score for the FutureSmart (treatment) group.

[Insert Table 3]

Multi-Level Mixed-Effect Regression Analyses

Multi-level mixed-effect regression analyses also showed that students who participated in FutureSmart demonstrated gains in financial knowledge (Table 4). From pre- to post-assessment, financial knowledge assessment scores for FutureSmart (treatment) students increased an estimated average of 14.1 percentage points more than the scores of those in the control group (p = .011). To determine whether a statistically significant result was educationally meaningful, our interpretation of effect sizes was consistent with Cohen's (1992) f^2 values greater than or equal to 0.02, 0.15, and 0.35, representing small, medium, and large effects, respectively. The effect size associated with gains in financial knowledge was large (Cohen's f^2 = 0.40). The regression analysis also showed that significant and educationally meaningful gains in financial knowledge occurred across all gender, racial/ethnic, and parent education-level groups.

[Insert Table 4]

Though students of parents/guardians from all education-level groups gained financial knowledge, changes in financial knowledge differed by group. Students with a parent/guardian

who had graduated from college gained less financial knowledge than students with a parent/guardian who had completed, at most, some high school (4.1 percentage points less, p = .033). However, those with a parent/guardian who had graduated from college scored 8.4 percentage points higher at pre-assessment than those with a parent/guardian with the lowest education achievement level ($p < .001$). Ultimately, the effect size associated with this difference in financial knowledge gains was small and not educationally meaningful (Cohen's f^2 = -0.004).

There were no significant differences between treatment and control groups for any factors considered to be under teacher or administrator control (i.e., teacher timing, teacher pacing, training level, teacher experience, course type, or grade level). Similarly, student pacing had no statistically significant impact on financial knowledge gain scores. These findings suggest that FutureSmart participants improved their financial knowledge across a range of teacher and student implementations.

In addition to assessing changes in financial knowledge, multi-level mixed-effect regression analyses were conducted to assess changes in financial attitudes and behaviors—including students' financial confidence, communication with parents, and current and intended future engagement with financial systems and products. Analyses showed no statistically significant differences between treatment and control groups for any of the financial attitude or financial behavior outcomes. The analysis results are available from the authors upon requests.

Discussion, Limitations, and Implications

Building financial knowledge places youth on a path toward financial literacy. The results of this study support our hypothesis that the FutureSmart intervention has an effect on financial knowledge. Specifically, students who participated in FutureSmart exhibited increases in financial knowledge that were statistically significant and educationally meaningful. However,

the results of this study did not support our hypotheses that the FutureSmart intervention has an effect on the four financial attitude and behavior outcomes—financial confidence, communication with parents, and current and intended future engagement with financial products. Further, the results did not support our hypothesis that factors under teacher or administrator control effect student outcomes achieved with the FutureSmart intervention. Specifically, observed improvements in financial knowledge were similar for participants of different gender, race/ethnicity, and parent education level, as well as for variations in implementation that were within teacher or administrator control. As such, the applicability of FutureSmart to diverse students and varied educational environments offers notable promise for increasing foundational knowledge needed to support the financial literacy of middle school students.

Financial education is important, particularly for younger students. Knowledge and skills standards build on one another (Jump$tart Coalition, 2017), making it clear that it is important for students to develop a firm understanding of key financial concepts in elementary and middle school before they apply that learning in "real-world" settings (Batty et al., 2015; Huston, 2010; National Association of State Boards of Education, 2006). As McCormick (2009) noted, children's understanding of personal finance develops over time, and postponing financial education is unwise for several reasons. The ideas and information that children learn about personal finance from non-school sources may be incorrect or misleading. The longer schools wait to provide personal finance education, the more likely it is that teachers will need to spend time identifying and correcting misinformation. Also, many students drop out of school before graduating from high school, so earlier education ensures that students who drop out will receive some financial education.

FutureSmart integrates multiple evidence-based instructional techniques to impart financial knowledge, an integral component of financial literacy (Amagir et al., 2018; Jump$tart Coalition, 2017; Suiter & Meszaros, 2005). First, although FutureSmart is a standalone course, it is designed to be incorporated into students' classroom experiences. This is important because students who participate in financial education programs in classroom settings have been shown to increase financial knowledge more than students who did not have such exposure (Batty et al., 2015). Second, to encourage sustained interest and engagement, the FutureSmart curriculum moves students through a series of activities in which they are asked to apply their learning to help a fictional town make important financial decisions. Integrating financial knowledge with hands-on activities increases students' financial literacy more than programs focusing exclusively on financial knowledge (Sherraden et al., 2011). Third, FutureSmart participants are asked to apply their financial knowledge—a key component of financial literacy (Amagir et al., 2018; Huston, 2010; McCormick, 2009)—in order to practice making financial decisions that could impact their future success and well-being. For example, in the first module of FutureSmart, students must decide how to spend money to decorate their bedroom, which entails making decisions based on their needs and wants (e.g., deciding between purchasing an alarm clock or a poster). Mandell and Klein (2007) showed that programs emphasizing the ways financial literacy is important to students' lives are more effective than those that do not.

FutureSmart is not unique in its integration of multiple instructional strategies or in its ability to increase student financial knowledge. Middle school students who participated in Junior Achievement's hands-on Finance Park activities, for instance, understood more about personal finances and the importance of education to future opportunities than students who did not participate (Junior Achievement of Central Carolinas, 2016). Similarly, participation in the

Stock Market Game significantly increased the math achievement of sixth to 10th graders as well as their scores on financial literacy tests (Hinojosa et al., 2010). A unique contribution of FutureSmart among financial education programs that have been shown to increase middle school students' financial knowledge is its integration of classroom activities with online learning. Additionally, the programming and content are more accessible than many other programs since it is available for free.

Notably, FutureSmart participants in this study increased their financial knowledge but did not improve their financial attitudes or self-reported financial behaviors. While financial education may not always improve students' financial literacy, there is a growing body of evidence linking financial education to future financial behavior. Mandell and Klein (2009) found that young adults who had taken a high school course in money management were more likely to pay credit card bills on time and balance their checkbooks than those who had not taken such a course. The course takers also had less credit card debt and bounced fewer checks than non-course takers. Bernheim et al. (2001) found that adults who had taken a personal finance course in high school saved more money than adults who had not taken such a course. The current study did not assess the long-term effects of FutureSmart participation on financial knowledge, attitudes, or behaviors; that represents an opportunity for future research.

The results of this study contribute to the limited body of literature addressing the effectiveness of financial education programs for middle school students. Importantly, the study demonstrated that FutureSmart participants improved financial knowledge across a range of participant demographics and variations in program implementation. Moreover, the study evaluated a technology-based, low-cost financial literacy program that can be integrated into existing middle school curricula. Other interventions, described earlier, do not incorporate web-

based technology, concentrate on specific topics (e.g., stock trading), or are offered in environments that use specialized financial curricula (e.g., MULABE) (Amagir et al., 2018; Dituri & Marley-Payne, 2019; Foss et al., 2013; Mandell & Klein, 2009; Morgan, 2015; Schug & Hagedorn, 2004). Amagir et al. (2018) noted that middle schools receive fewer financial literacy resources (e.g., curricula, courses, targeted activities) than high schools and colleges, so it is notable that FutureSmart is available at no cost, requires only an Internet-connected device, and targets students in Grades 6–8. As interest in increasing financial knowledge continues to grow (Asarta et al., 2014; U.S. Department of the Treasury, 2015), these results could inform future research on access and equity in financial literacy interventions for middle school students.

Limitations and Directions for Future Research

This study was subject to limitations common to many quasi-experimental studies. Since teachers volunteered to participate, the sample obtained for this study may not have been fully representative of the population from which the sample was drawn. However, randomizing class assignment to treatment or control conditions reduced bias within teachers. Similarly, teachers were made aware of students' random assignment to the control or treatment group in order to actualize the appropriate protocol within each of their classrooms. As such, it is not possible to rule out the potential bias of teachers favoring students in either the treatment or the control group. Though we collected data on students' attitudes using self-reported surveys, there was no incentive for "better" attitudes, suggesting that exaggerated self-reporting was possible but unlikely. Also, there could have been variations in program implementation by teacher beyond those accounted for in the analysis (e.g., course pacing); therefore, our inability to describe these variations—to fully assess fidelity of implementation—was a limitation. Similarly, factors such as teachers' confidence and knowledge related to financial literacy were not assessed and may

have influenced student outcomes. Finally, the number of teachers and students included in this study was relatively modest. While the sample size was sufficient to detect moderate to large effects, small effects on student outcomes—if they existed—may not have been detected.

Reflecting on the study findings, we present four potential areas for future research. First, collecting measures of financial knowledge, attitudes, and behaviors over a longer period of time may offer insight into the long-term effects of FutureSmart. We did not detect changes in students' attitudes or behaviors during the relatively short period of time during which this study was conducted. Lengthening the period of study would make it possible to detect potential long-term impacts of participation on students' attitudes or behaviors. Additional research in this area could benefit stakeholders by improving the salience of financial literacy education programs. Second, although we explored a relevant set of implementation factors, future research efforts could consider additional factors (e.g., ratio of students to computers) or explore the factors in different ways (e.g., level of teacher experience teaching financial literacy). Third, by conducting a detailed investigation of school characteristics (e.g., percentage of ELLs and students from families with low income, percentage of new teachers, access to technology), future studies could investigate the impact of FutureSmart within specific contexts, like Title I schools. Finally, further research is needed to understand if and how FutureSmart could be combined with other interventions to serve as an effective long-term approach to financial education in the service of achieving financial literacy.

Implications

The findings from this study offer additional evidence that financial education programs can positively impact financial knowledge for middle school students—an important step in developing financial literacy. Equally important, the results showed that FutureSmart effectively

increased financial knowledge for a broad array of students and that reasonable variations in the implementation of the intervention did not negatively impact those results. While previous studies primarily explored the efficacy of interventions that are offered offline, the findings of this study demonstrate that financial education programs offered online can improve financial knowledge.

The results of this research complement those of previous studies in suggesting that financial education can have positive effects on financial knowledge (Bernheim et al., 2001; Bhattacharya et al., 2016; Mandell & Klein, 2009). Because this study did not include a third point of measurement, it is not possible to determine if FutureSmart participants maintained post-intervention knowledge gains over time, or if the intervention had any effect on their future financial attitudes or behaviors. As Ammerman and Stueve (2019) noted, the path to financial well-being begins in childhood, with effective financial education. The fundamental implication of this research is that FutureSmart effectively conveys financial knowledge to middle school students, contributing to a foundation for future financial well-being.

These findings have broader implications for the field of financial education. There is evidence that middle school teachers may incorporate FutureSmart into their courses cost-effectively, without undue consideration for variations in implementation or class composition. The findings from this study may also inform the activities of financial educators and practitioners, providing additional evidence that early financial education can: (a) improve financial knowledge; (b) provide a foundation for future financial literacy; and (c) increase awareness that a free, online, co-curricular resource—FutureSmart—is available to help meet that need.

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Table 1

Student Characteristics

Variable	Treatment (N_t = 301)		Control (N_c = 223)		Total (N_{tot} = 524)	
	Number	Percent	Number	Percent	Number	Percent
Gender						
Male	161	53.5	118	52.9	279	53.2
Female	128	42.5	97	43.5	225	42.9
Other	12	4.0	8	3.6	20	3.8
Race/ethnicity						
White	157	52.2	96	43.1	253	48.3
Black/African American	28	9.3	36	16.1	64	12.2
Hispanic/Latino	41	13.6	54	24.2	95	18.1
Asian/Pacific Islander	26	8.6	9	4.0	35	6.7
Other	22	7.3	16	7.2	38	7.3
Unknown/Prefer not to answer	27	9.0	12	5.4	39	7.4
Parent education						
Middle/Junior/Some high school	51	16.9	57	25.6	108	20.6
High/Technical school	21	7.0	28	12.6	49	9.4
Some college	32	10.6	20	9.0	52	9.9
College graduate	76	25.3	50	22.4	126	24.0
Graduate or professional degree	109	36.2	65	29.2	174	33.2
Unknown	12	4.0	3	1.4	15	2.9
Pacing student						
2 weeks (14 days) or less	155	51.5	172	77.1	327	62.4
More than 2 weeks (14 days) and 4 weeks (28 days) or less	62	20.6	28	12.6	90	17.2
More than 4 weeks (28 days)	84	27.9	23	10.3	107	20.4

Table 2

Teacher Characteristics

Variable	Total (N_{teach} = 23)	
	Number	Percent
Course type		
Quantitative	16	69.6
Qualitative	5	21.7
Career and technical education	2	8.7
Training level		
Bachelor's degree	9	39.1
Master's degree	12	52.2
Certificate of advanced graduate study/doctorate	2	8.7
Teaching experience (years)		
5 or less	2	8.7
6–10	6	26.1
11–20	11	47.8
More than 20	4	17.4
Timing teacher		
Aug, Sept, Oct, Nov	13	56.5
Dec, Jan, Feb, Mar	10	43.5
Pacing teacher		
2 weeks (14 days) or less	15	65.2
More than 2 weeks (14 days) and 4 weeks (28 days) or less	4	17.4
More than 4 weeks (28 days)	4	17.4
State mandates		
No standard	7	30.4
Some standard	16	69.6
Grade level		
Grade 7	4	17.4
Grade 8	19	82.6

Variables	Mean	SD	Min	Max
FRL (%)	46.3	24.8	0	86.0
ELL (%)	12.6	12.7	0	42.7

Table 3

Financial Knowledge Change Scores (%)

Variable	Control		FutureSmart (Treatment)	
	Mean	SD	Mean	SD
Teacher-Level Independent Variable				
Timing teacher				
Aug–Nov	1.2	10.5	20.2	16.1
Dec–Mar	3.1	10.6	24.7	17.5
Pacing teacher				
2 weeks or less	1.9	11.1	23.5	16.1
More than 2 weeks and 4 weeks or less	1.3	10.5	21.6	15.9
More than 4 weeks	2.1	8.0	16.3	18.4
State mandates				
No standard	1.1	10.0	24.8	17.2
Some standard	2.2	10.8	20.8	16.5
Training level				
Bachelor's degree	1.5	11.9	22.3	15.9
Master's degree	1.6	8.6	21.9	17.3
Certificate of advanced graduate study/doctorate	6.2	14.0	17.9	17.0
Teaching experience				
5 years or less	1.2	12.2	18.1	11.1
6–10 years	1.3	11.8	23.1	19.1
11–20 years	1.7	9.4	20.3	15.6
More than 20 years	5.1	10.1	26.5	18.4
Course type				
Quantitative	1.2	10.1	21.5	16.1
Qualitative	2.4	11.5	23.4	18.4
Career and Technical Education	9.3	10.8	18.9	17.0
Grade level				
Grade 7	0.1	10.9	27.4	18.2
Grade 8	2.3	10.4	21.0	16.4
Student-Level Independent Variable				
Pacing student				

Variable	Control		FutureSmart (Treatment)	
	Mean	SD	Mean	SD
2 weeks or less	1.4	11.1	24.7	16.7
More than 2 weeks and 4 weeks or less	4.6	9.5	19.9	16.7
More than 4 weeks	1.4	7.1	18.0	16.1
Gender				
Male	2.2	10.3	21.3	17.3
Female	1.4	11.1	21.9	15.6
Other	2.0	8.6	27.0	20.6
Race/ethnicity				
White/Caucasian	2.5	9.5	21.1	16.7
Black/African American	-0.6	9.6	19.9	13.6
Hispanic/Latino	2.3	11.5	19.1	15.8
Asian/Pacific Islander	0.0	8.0	22.9	18.9
Other	1.8	13.7	26.2	15.4
Unknown/Prefer not to answer	2.7	14.5	27.3	19.2
Parent education				
Middle/Junior/Some high school	1.5	11.0	25.8	18.4
High/Technical school	4.6	10.5	20.8	18.1
Some college	3.4	10.4	23.0	16.2
College grad	0.3	10.4	19.6	15.3
Graduate or professional degree	1.4	10.6	20.7	16.4
Unknown	6.7	2.3	27.0	18.6

Table 4

Financial Knowledge Results (N_{tot} = 524)

Variable	Regression Coefficient	Standard Error	Significance (*p* value)
Constant	6.95	4.95	.160
Treatment (reference group Control)			
FutureSmart	14.06	5.50	.011
Teacher-Level Independent Variable			
Timing teacher (reference group Aug–Nov)			
Dec–Mar	4.86	3.50	.165
Pacing teacher (weeks)(reference group 2 or less)			
More than 2 and 4 or less	-1.73	4.98	.728
More than 4	1.63	4.22	.699
State mandates (reference group No standard)			
Some standard	2.96	3.52	.400
Training level (degree)(reference group Bachelor's)			
Master's	2.73	3.66	.455
Certificate of advanced graduate study/doctorate	7.61	7.36	.301
Teaching experience (years)(reference group 5 or less)			
6–10	-5.72	5.44	.294
11–20	-3.86	4.89	.430
More than 20	-3.05	8.06	.705
Course type (reference group Quantitative)			
Qualitative	0.85	6.10	.890
Career and Technical Education	2.17	7.94	.785
Grade level (reference group Grade 7)			
Grade 8	-3.54	3.31	.286
FRL	0.01	0.09	.944
ELL	-0.02	0.17	.889
Timing teacher x Pacing teacher			
Dec–Mar x More than 2 and 4 or less	-4.37	4.70	.353
Dec–Mar x More than 4	0.00	(empty)	
Timing teacher x Treatment			
Dec–Mar x FutureSmart	-1.73	4.41	.695

Variable	Regression Coefficient	Standard Error	Significance (*p* value)
Pacing teacher x Treatment			
More than 2 and 4 or less x FutureSmart	8.10	5.47	.139
More than 4 x FutureSmart	-5.89	4.80	.220
State mandates x Treatment			
Some standard x FutureSmart	-1.46	4.26	.731
Training level (degree) x Treatment			
Master's x FutureSmart	-3.13	4.45	.483
Certificate of advanced graduate study/doctorate x FutureSmart	-11.12	8.62	.197
Teacher experience (years) x Treatment			
6–10 x FutureSmart	6.78	6.95	.329
11–20 x FutureSmart	10.46	6.48	.107
More than 20 x FutureSmart	18.24	9.54	.056
Course type x Treatment			
Qualitative x FutureSmart	4.22	7.04	.549
Career and Technical Education x FutureSmart	-18.02	9.45	.057
FRL x Treatment			
FutureSmart	0.09	0.11	.441
ELL x Treatment			
FutureSmart	0.19	0.20	.338
Student-Level Independent variable			
Pacing student (weeks)(reference group 2 or less)			
More than 2 and 4 or less	-1.13	2.49	.651
More than 4	-1.21	2.62	.643
Gender (reference group Male)			
Female	-0.59	1.28	.645
Other	-1.98	3.71	.593
Race/ethnicity (reference group White)			
Black/African American	-2.24	2.18	.305
Hispanic/Latino	-4.09	2.23	.067
Asian/Pacific Islander	-4.85	3.03	.110
Other	0.88	2.50	.724
Unknown/Prefer not to answer	1.64	2.65	.537

Variable	Regression Coefficient	Standard Error	Significance (*p* value)
Parent education (reference group Middle/Junior/some high school)			
High/Technical school	1.18	2.44	.629
Some college	-0.06	2.36	.980
College graduate	-4.07	1.91	.033
Graduate or professional degree	-3.18	1.85	.085
Unknown	2.34	4.35	.590

Figure 1

Treatment and Control Group Activities

<table>
<tr><td></td><td colspan="7">FutureSmart Module</td></tr>
<tr><td>Activity</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Pre-Course Survey</td><td>Both</td><td colspan="6"></td></tr>
<tr><td>Pre-Module Assessment</td><td></td><td colspan="5">Both Groups</td><td></td></tr>
<tr><td>Module</td><td colspan="7">Treatment Group Only</td></tr>
<tr><td>Post-Module Assessment</td><td rowspan="2"></td><td colspan="5">Both Groups</td><td></td></tr>
<tr><td>Post-Course Survey</td><td colspan="6"></td><td>Both</td></tr>
</table>