FINANCIAL LITERACY REPRESENTATION OF

OKLAHOMA STATE UNIVERSITY STUDENTS

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Abstract: Financial literacy rates across the United States are in general considered low. The research question being addressed is whether or not the typical educational experience at OSU adequately addresses the financial literacy needs of OSU students. Low financial literacy is a serious problem that leads to poor choices regarding significant financial decisions. Numerous studies have evaluated financial literacy rates of undergraduate and high school students. This study builds on previous literature by determining the financial literacy of Oklahoma State University (OSU) graduate students, particular demographic groups, and determining the effectiveness of an undergraduate personal finance course at OSU.

To achieve the objectives the study used a t-test to determine if the Jump$tart coalition national average from the 2008 survey was statistically different from the average financial literacy rate of graduate and undergraduate students at OSU. Particular demographic groups were analyzed by using regression to determine if demographic groups affect the financial literacy score determined by the survey. A t-test was used to determine the effectiveness of an undergraduate personal finance course at OSU by comparing the pre-course average and the post-survey average to see if the course increases financial literacy based on the scores of the survey given.

The study found that OSU undergraduate students did not score significantly different from students that participated in the 2008 Jump$tart coalition college survey, but graduate students at OSU did score significantly different. According to the study classification of a student (part time versus full time), race, student's place of origin, and gender all have significant impacts on financial literacy. The study also found that the personal finance course evaluated at OSU did not improve student's average financial literacy score. Overall, the study concluded that there is a need for improvement in financial education at Oklahoma State University. The findings of this research will provide further insights into opportunities for the university to evaluate and improve the current personal finance initiative.

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INTRODUCTION

Financial literacy rates across the United States and around the world are generally considered

low (Borodich et al. 2010; Boyland and Warren 2013; Chen and Volpe 1998; Cude et al. 2006;

Cull and Whitton 2011; Bowen 2002; Hanna et al. 2010; Lusardi et al. 2010). Financial literacy is

a vital part of society. Financial behavior is directly related to financial literacy. According to

Mandell (2009), low financial literacy rates impact financial decisions such as buying a house,

saving for retirement, and investing money. Multiple financial decisions must be made over a

person's lifetime that will have a significant impact on that person for the remainder of their life.

The impact that low financial literacy can have on an individual's decisions and subsequently on

the economy and society as a whole justifies the importance of the overall topic of financial

literacy.

As an educational institution, Oklahoma State University (OSU) is committed to educating

students. The educational experience involves more than just technical skills. A broader definition

of education includes preparing students for a wide range of future decisions (often called "life

skills"), of which, financial decisions are a large part. OSU currently has several initiatives in

place to facilitate personal financial education such as the personal finance course for

undergraduates, brief personal finance modules in orientation classes, and availability of some

personal finance online resources. In order to continue to provide outstanding education to its

students, it is important that the current level of financial literacy among OSU students be

evaluated. It is also important to better understand the effectiveness of financial literacy educational efforts.

Problem Statement

College students in general have been shown to score low (average of 61%) on tests of broad measures of financial literacy (Mandell 2009). Low financial literacy is a serious long-term problem that affects students throughout their lives. Low financial literacy leads to poor choices regarding numerous financial decisions. For example, people with a poor basic understanding of personal finance are less likely to save adequately for retirement, less likely to make the most economically beneficial purchasing decisions, and are more likely to succumb to unwise financial schemes. Therefore, it is important to evaluate the financial literacy knowledge of students at Oklahoma State University (OSU) and to assess the effectiveness of current efforts intended to improve financial literacy.

A relevant question could be: is the typical educational experience at OSU adequately addressing the financial literacy needs of OSU students? Interested stakeholders including Oklahoma residents, Oklahoma decision makers (i.e. politicians), and OSU faculty, administrators, and staff need to know the benchmark financial literacy rates at OSU and whether or not current personal finance initiatives are adequate and effective. This increased awareness will allow Oklahoma stakeholders to decide whether additional efforts are needed to improve college students' financial literacy. This awareness will benefit college students' financial future by directing decision makers to take appropriate steps to increase financial knowledge (if needed).

Objectives

General Objective

The overall objective of this research is to assist universities in making more informed financial literacy education decisions.

Specific Objectives

1. We will determine the baseline level of financial literacy among samples of OSU Students (undergraduate and graduate).

2. We will determine differences in baseline financial literacy across demographic groups (International vs domestic, Native American vs others, Master's vs Ph.D, etc.)

3. We will determine whether one specific undergraduate personal finance course taught at OSU increases traditional measures of financial literacy among students.

Outline of Study

The thesis consists of five chapters, beginning with this broad introduction. The following chapter (chapter two) is a review of the literature detailing previous research on personal finance, specifically financial literacy among students. Chapter three explains the methodology of the research including the conceptual framework, hypotheses, explanation of the data, and the specific model used for the research. Chapter four details the results of the analysis and includes a discussion of the results. Chapter five provides a summary, conclusions, and examines limitations of the research.

CHAPTER II

REVIEW OF LITERATURE

Financial Literacy Defined

Financial literacy does not have a definition that is universally accepted. In a review of the

literature of youth financial education and policy, McCormick (2009) found that there was no

single definition for financial capability, financial literacy, or financial education. The research

also found that there was not currently a definitive standard of excellence for financial education.

A more extensive literature review by Huston (2010) analyzed 71 individual studies that used 52

different data sets covering the period from 1996 to 2008. This study only included studies

measuring financial literacy or financial knowledge, not studies that evaluated financial

educational programs. The study found that 72% of previous studies did not include a financial

literacy definition and 47% used financial literacy and financial knowledge interchangeably. Only

25% of the literature they reviewed incorporated all four common content areas (money basics,

borrowing, investing, and protecting resources). According to Huston (2010) the literature that

incorporated all four of these areas was likely to be more accurate. Self-administered surveys

were used to collect data in 62% of studies examined. Of those studies examined, 88% did not

have an explanation for measurement interpretation. The study concluded that there should be a

more standard approach to evaluating financial literacy.

Given that there is not a universally accepted definition, this paper will use the "Jump$tart" definition for financial literacy, because it is based on nationally endorsed standards. The Jump$tart Coalition follows the National Standards in K-12 Personal Finance Education definition for financial literacy, which is "the ability to use knowledge and skills to manage one's financial resources effectively for lifetime financial security" (Jump$tart Organization, 2018).

Why Financial Literacy Matters

Hayes (pg. 8, 2012) said, "There has been a paradigm shift in the nation with a major push toward financial literacy for consumers of all ages." In the 2012 paper, Hayes expanded on the issue of financial literacy especially with regard to young people and minorities. The article summarized what financial institutions, the government, and educational institutions are doing to increase financial literacy in the United States. Hayes emphasized the need for financial literacy education especially for young people and minorities based on amounts of debts, current financial behaviors, and society pressures.

In their literature review of financial literacy in the United States, Australia, and the United Kingdom, Marcolin and Abraham (2006) noted the need for enhanced financial literacy. Deregulation of markets, easy access to credit, the changing responsibility of retirement etc., were significantly influencing the economy in 2006 and continue to have an impact today. With these changes, financial literacy is imperative for conscientious decision-making that will affect individuals' futures and the economy.

According to Hung et. al. (2009) "Financial literacy consistently predicts measures of people's planning behavior." The study found that people with lower financial literacy could be less likely to engage in commonly recommended financial practices. Hung et. al. emphasized the need for financial literacy as individuals were (and are) taking more responsibility for major financial

decisions such as investing for retirement and purchasing a house. Being more financially literate enables individuals to make better financial plans and decisions.

According to Lusardi and Mitchell (2007), "many households are unfamiliar with even the most basic economic concepts needed to make sensible saving and investment decisions." Lusardi and Mitchel found in a review of the literature that financial illiteracy was common among the young and old across the United States. The population did not have the knowledge to make informed financial decisions such as savings, investments, retirement planning, etc. Lusardi and Mitchell found that particular demographic groups (such as minorities, those with low income, those with low education, and women) tended to have less knowledge of financial matters. The paper concluded that financial programs are needed to better equip people for their financial decisions, but a one-size-fits-all approach would not be as effective as a targeted approach.

In several Hong Kong universities Chan et. al. (2012) conducted a web survey and then evaluated the 802 eligible respondent's financial literacy. The majority of the students, 85.8%, were undergraduate students with 11.9% masters' students and 2.2% doctorate students. The study found that 20.5% of students reported that their academic work was affected by financial problems. It also found that 73.39% of students reported between a 0 and 4 level of knowledge of financial management practices with 0 being no knowledge at all and 7 being extensive knowledge. This study confirmed generally low levels of financial knowledge, and raised concerns that students may be focusing on financial problems rather than on their academic career.

Jump$tart

The Jump$tart definition for financial literacy and the Jump$tart 2008 college survey questions were used for this study based on the wide use and references in previous literature. The Jump$tart Coalition for Personal Financial Literacy is a nonprofit company based in Washington, D.C. that focuses on improving financial literacy in youth. Jump$tart started conducting national

financial literacy surveys that focused on high school students in 1997 and the survey was completed biannually until 2008. The 2008 study included surveying college students along with high school students. At least three previous studies have used Jump$tart survey questions directly (Boyland and Warren 2013; Mandell and Klein 2009; Mandell 2009). Much of the literature on financial literacy has referenced the Jump$tart survey and/or results (Borodich et al. 2010; Chen and Volpe 1998; Cude et al. 2006; Cull and Whitton 2011; Bowen 2002; Hanna et al. 2010; Lusardi et al. 2010).

A study by Thomas A. Lucey (pg. 283, 2005) concluded that the Jump$tart survey had a "moderately high degree of consistency overall." Lucey (2005) assessed the Jump$tart survey for internal consistency using the commonly used Formula KR20 (Kuder-Richardson 20). The KR20 uses the sample size for the test and the proportion of people passing and failing the questions along with the variance of the test to evaluate the consistency of the survey. For survey reliability, the study compared 25 items from the 1997 and 2000 survey of a number of random cases from both survey periods. For survey validity the study relied on qualitative evaluations of things such as communication with Jump$tart, related literature, other financial literacy measures, etc. The study investigated social bias by surveying the opinions of social studies teachers at eight randomly selected high schools in a large southern city. The teachers were asked to analyze if students from different backgrounds would interpret the content differently, specifically based on race, wealth, family incomes, living circumstances etc. The study concluded that the Jump$tart surveys had moderately high internal consistency; however, Lucey recommended reconsideration of the subscales. Lucey also recommended that the questions in the survey be revised to cover issues relevant to all participants regardless of their background. The surveys have two of the five typical measures of validity (face and content), while the other three measures are lacking (construct, congruent, and predictive).

Previous Studies on Financial Literacy

The frequently cited study by Chen and Volpe (1998) surveyed 924 college students and analyzed their financial literacy and the factors affecting it. The average score was 53% with educational background, gender, ethnic backgrounds, work experience, and age found to be significant factors that affected financial literacy. Chen and Volpe found that women, students with less education, little work experience, non-business majors, and under the age of 30 had lower financial literacy levels than the referenced demographic group. The study concluded that financial literacy rates among college students were in general low and this would impede their financial decision-making.

Mandell (2009) analyzed the Jump$tart Coalition college survey from 2008. Interestingly, the paper found that participation in financial courses in high school and college had little effect on financial literacy, but there was evidence that these courses improved financial behavior. Mandell (2009) defined financial literacy as "the ability of consumers to make financial decisions in their own best interests in both the short and long term" (pg. 5). Financial behavior was evaluated by self-reported financial decisions that the student actually made (i.e. how often have you over-drafted your bank account?). The study found that financial literacy was positively related to financial behavior.

The paper analyzed results from five Jump$tart surveys and showed that family income and gender were not strong predictors of students financial literacy. Parents' level of education had a strong positive effect on students' financial literacy. Race had the most significant effect on financial literacy scores with white students doing best, African Americans, and Native Americans scoring the lowest. The study also found that students that anticipated attending college, becoming a professional, and having a high starting salary scored better on the survey.

Mandell and Klein (2009) studied students that graduated from 2001 to 2004 from three different high schools within the same school system. Each of these schools offered a personal financial management course. There were 400 students surveyed, half of the students took the personal finance course, while half did not take the course. Of the 400 students that were sent the survey, 79 completed the survey; of the completed surveys, 39 students had completed the course and 40 had not. The survey included 49 questions consisting of the entire 2004 Jump$tart questionnaire (along with questions about financial behavior, attitude toward risk, and demographics.

Based on the Jump$tart questions included, the average personal financial literacy score was 69.3%. Like Mandell (2009), the study found no significant difference in financial literacy scores of those who had taken the personal finance class, 68.7% average, and those who had not, 69.9% average. In addition, the study did not find that students who participated in the course were more savings-oriented than those that did not participate in the course. However, unlike Mandell (2009), this study did not find a significant difference in financial behavior between the students who took the course and those that did not. Graduating college or being a full-time student at the time of the survey had a positive significant impact on financial behavior.

Boyland and Warren (2013) used the 2008 Jump$tart Coalition survey to assess the financial literacy rates of 92 junior and senior students at a southern New England university. Gender was not found to be significant in this study, but whether the student was an international student or domestic student influenced the results significantly. The results of this study did not differ significantly from the results of the 2008 Jump$tart Coalition survey given to full-time undergraduate students across the United States. Both surveys reported alarmingly low financial literacy scores.

Cull and Whitton (2011) conducted a financial literacy survey of the students of the University of Western Sydney. These students were undergraduate and graduate students across a variety of

disciplines. There was a 94 percent response rate; of the 502 surveys sent out, 472 were completed. The survey questions were tailored to the Australian audience, but used some of the questions from the Chen and Volpe (1998) survey. The survey focused on financial knowledge specific to superannuation (pension payments), compound interest, tax benefits, bank fees, and HECS (student loan) debt.

The study found a significant relationship between students' discipline and students' knowledge of simple versus compound interest. While bank fee, tax offset, and HECS debt knowledge were impacted by income, superannuation knowledge was affected primarily by age. The study found that business students did not perform better than other disciplines in every category, however business students performed better about tax offsets. Students within the science discipline performed better on questions concerning compound interest. Tax offset and superannuation knowledge were significantly impacted by age. The study found no correlation between years of study at university and personal financial knowledge except with regard to HECS debts. In addition, gender was not a significant factor of personal financial knowledge except with regard to superannuation knowledge. Cull and Whitton recommended more financial education based on the study's findings.

A study by Lusardi et. al (2010) utilized three questions from the National Longitudinal Survey of Youth 2007-2008 to assess financial literacy among young people in the United States. This study found that only 27% of the people surveyed could answer all three of the questions correctly. The questions involved risk diversification, inflation, and simple interest rate calculations. They found that there was a statistically significant difference based on gender and different demographic groups. The study also found that young people with financially knowledgeable parents and higher cognitive ability were more likely to be financially literate.

Cude et. al. (2006) studied college students at Louisiana State University (LSU), University of Georgia (UGA), University of Illinois at Urbana-Champaign, and University of Illinois at Chicago. The results analyzed are from an online financial management survey sent to 5,000 LSU undergraduates and 3,266 UGA undergraduates. Along with the survey, focus groups were conducted at UGA and LSU. The study found that students who had high GPA's and parents who were married were more likely to achieve a high score on this survey. Students who were a minority, a senior, or had a credit card were more likely to score lower. The results were consistent with previous literature that asserted that in general college students' financial behavior was not considered to be good and that family background characteristics significantly influence students' financial behavior. The author advised that future researchers should develop a scale of financial management responsibility that fits the financial management options available to college students (for example-balancing a checkbook is out of date so the question was adjusted in our study). Cude et. al. (2006) reiterated the need for on-campus financial education based on the study's results and previous literature.

Borodich et. al. (2010) used the Financial Fitness for Life High School Test (FFFL) to study financial literacy rates of high school and university students in Belarus. The results from the 790 students in Belarus were then compared to previous results of U.S. students and Japanese students given the same test. Japanese high school and Japanese university students had similar results (57.3% and 57.2% respectively) and did better than students in the United States and Belarus. Belarusian and U.S. high school students that did not have a prior financial course achieved about the same average score. Students with financial training in the U.S. scored significantly better than university students in Belarus, but still slightly worse than students in Japan. This conflicts with previous studies that showed students with financial training did not score significantly different than those that lacked financial training (Mandell 2009; Mandell and Klein 2009). The U.S. students scored better on application questions whereas the Japanese and Belarusian students

scored better on knowledge questions. Although Japanese students performed better on the test, they still received failing grades on average (below 60%). This study confirmed that financial literacy was generally considered to be low not only in the United States, but in other countries as well.

Bowen (2002) studied 64 high school students and 47 of their parents' financial literacy rate with a one-time survey. 84% of students said that money topics had not been discussed in their high school classes. The study concluded that teens were knowledgeable about net income and endorsing checks, but not most of the other areas. Parents were more knowledgeable with 70% of parents getting most questions correct. The study also found that there was correlation between teens and their specific parents' financial knowledge.

According to Lusardi and Mitchell (2007) it is imperative for households in the United States to have more resources for financial education. This study found that although people thought it was important to understand the economy, the overall financial literacy rates of the United States were alarmingly low. Lusardi and Mitchell (2007) found that Hispanic Americans, Black Americans, women, uneducated, and low income people were more likely to have lower financially literacy rates. The research also showed that people with a higher level of financial knowledge were more likely to be planning for retirement, which linked financial literacy with financial behavior. The study concluded that households in the United States need more financial education, especially targeted to particular population subgroups.

The study by Hanna, Hill, and Perdue (2010) surveyed undergraduate junior and senior level students at a metropolitan university. The survey was comprised of demographic questions along with 40 personal finance questions. After consideration, the international student responses were dropped from the final data set because of previous research expressing concern that international

students do not have the same financial background or future as students who are natives of the United States. The final analyzed data set consisted of 278 survey responses.

The overall average score on the survey was 40%, which was consistent with previous research. The study used Tukey's pairwise comparison to evaluate which areas of study were statistically significantly different. They concluded that business students do better on the overall survey with an average of 47% and education students have lower scores than liberal arts or business students. The study used analysis of variance tests to determine whether age, gender, and personal income have a statistically significant effect on personal financial literacy rates. Age and personal income were found to be statistically significant at the 0.01 significance level based on the p-values, while gender had mixed results depending on the area of personal finance tested. Hanna, Hill, and Perdue concluded that universities should require all students to take a personal finance course before graduating.

What is New in This Study

After reviewing the previous literature, Marcolin and Abraham (2006) concluded that gaps in the current literature that could be further researched were: financial literacy of students with different disciplines (other than business), years of study, what variables of higher education affect financial literacy, relating financial literacy to financial behavior, and what experiences have more impact on students financial literacy. This thesis research focuses on some of the issues that Maroclin and Abraham (2006) recommended such as exploring financial literacy across different disciplines and years of study. The research goes beyond what has been done by focusing on graduate students and evaluating an undergraduate personal finance course with a pre- and post-treatment survey. We also evaluate differences across a large number of demographic groups and across a large number of disciplines. We explore years of study, and unlike previous researchers, we specifically look at Master's vs Ph.D level graduate students.

While not the first study to do so, given the large number of Native American students, at OSU we intentionally compare that demographic group as well.

CHAPTER III

METHODOLOGY

Financial literacy rates in high school students, university students, and adults across the United States are low. Various studies confirm the low financial literacy rates (Borodich et al. 2010; Boyland and Warren 2013; Chen and Volpe 1998; Cude et al. 2006; Cull and Whitton 2011; Bowen2002; Hanna et al. 2010; Lusardi et al. 2010). These previous findings, supported by perceptions of finance industry professionals, lead to the following testable hypothesis:

    1) Financial literacy rates among students at OSU are in general low.

Particular demographic groups tend to have lower financial literacy rates than others, such as male vs female, business major vs non-business major, international student vs domestic student, etc. Previous literature expands on the division of financial literacy rates with regard to particular demographic groups (Boyland and Warren 2013; Chen and Volpe 1998; Cull and Whitton 2011; Hanna et al. 2010; Lusardi and Mitchell 2007; Marcolin and Abraham 2006). The previous literature findings lead to the following testable hypothesis:

    2) Demographic factors can have a significant effect on financial literacy rates among OSU

        students.

There is interest in improving the low financial literacy rates in the United States. According to Hayes (pg. 8, 2012) there has been "a paradigm shift in the nation with a major push toward financial literacy for consumers of all ages." The solution often takes the form of personal finance classes at the high school and/or university level. Some previous studies show that courses taken in money management or personal finance did not improve financial literacy (Mandell 2009).

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However another study found that personal finance training, specifically targeted training in personal finance, is necessary at secondary and higher levels of education (Borodich et al. 2010). The somewhat conflicting previous literature leads us to the following testable hypothesis:

   3) The undergraduate personal finance course taught at OSU increases financial literacy among students.

Hypothesis Testing

Basic statistical analysis will be used to accomplish the three objectives. The specific data used will be discussed in later sections. In addressing the first objective a t-test is employed to determine if the average financial literacy rate of graduate and undergraduate students at Oklahoma State University (OSU) is statistically different from a benchmark comparison. For the benchmark, we use the 2008 Jump$tart Coalition national average. The second objective is evaluated using regression to determine if affiliation with particular demographic groupings affect the financial literacy survey score. For the third objective, the paired difference t-test is used to compare the pre-course survey averages to post-course survey averages to determine if the personal finance class at OSU is increasing the level of financial literacy among students. While no formal statistical tests of normality were performed, the data were graphically examined and appeared to satisfy the normality assumption (see appendix C).

Objective 1 is to determine how the baseline financial literacy rate at OSU compares to a national standard. This is achieved by comparing the average score from the pre-course (undergraduates) and one-time survey (graduates) to a national Jump$tart coalition standard. The two-sample test is used, assuming the variance for the Jump$tart and the OSU samples are the same, because we do not have the variance for the Jump$tart data. Other studies have assumed this as well due to the lack of reported variance in the Jump$tart data. In order to evaluate if the survey averages are different, we use the following hypothesis's test to evaluate hypothesis 1:

The undergraduate survey hypothesis 1 tested for objective 1 is:

Ho: $\mu_u = \mu_j$

Ha: $\mu_u \neq \mu_j$

where $\bar{\mu}_u$ is the value of the population average score of OSU undergraduate pre-course scores and $\bar{\mu}_j$ is the value of the population average score of the 2008 Jump$tart coalition college survey.

The statistic used to evaluate the hypothesis is:

$$t_1 = \frac{\bar{x}_u - \bar{x}_j}{\sqrt{\frac{s_u^2}{n_1} + \frac{s_u^2}{n_2}}}$$

where $\bar{x}_u$ is the sample average score of OSU undergraduate pre-course scores, $\bar{x}_j$ is the sample average score of the 2008 Jump$tart coalition college survey, s_u^2 is the variance of the OSU undergraduate pre-course scores, n_1 is the number of observations for the OSU undergraduate pre-survey, and n_2 is the number of observations for the Jump$tart college survey.

The graduate student survey hypothesis 1 tested for objective 1 is:

Ho: $\mu_g = \mu_j$

Ha: $\mu_g \neq \mu_j$

where $\bar{\mu}_g$ is the population average score of OSU graduate survey scores and $\bar{\mu}_j$ is the population average score of the 2008 Jump$tart coalition college survey.

The statistic used to evaluate the hypothesis is:

$$t_2 = \frac{\bar{x}_g - \bar{x}_j}{\sqrt{\frac{s_g^2}{n_1} + \frac{s_g^2}{n_2}}}$$

where $\bar{x}_g$ is the sample value of the average score of OSU graduate survey scores, $\bar{\mu}_j$ is the

sample value of the average score of the 2008 Jump$tart coalition college survey, s_g^2 is the

variance of the OSU undergraduate pre-course scores (because the Jump$tart survey is

undergraduate only and we assume the variance is the same), n_1 is the number of observations for

the OSU graduate survey, and n_2 is the number of observations for the Jump$tart college survey.

Objective 2 determines whether demographic groups affect the average financial literacy score of

OSU students (undergraduate and graduate). This is done by using a linear regression of the

survey scores and the particular demographic groups to determine if the particular demographic

group affects the survey score in relation to the default demographic group, ceteris paribus. The

following equation is used to evaluate this:

$$Y_i = \beta_0 + \sum_{j=2}^{J} \beta_j D_{ij} + e_i$$

where i is the student, Y_i is the financial literacy survey score, D_{ij} is a dummy variable for

demographic groups (i.e. Native American, International, MS vs PhD, etc.,); β_j is the coefficient

associated with D_{ij} in the actual model estimation. White, domestic, female, full time, graduate,

business student represent the comparative, demographic group values.

The hypothesis tested will be:

Ho: $\beta_j = 0$

Ha: $\beta_j \neq 0$

The statistic used to evaluate the hypothesis is:

$$t_3 = \frac{b_j - 0}{se_j}$$

where b_j is the coefficient estimated associated with D_j (where j represents some particular demographic group other than default (i.e. Native American, International, MS vs PhD, etc.,), and se_j is the standard error of b_j .

Objective 3 determines if the undergraduate personal finance course taught at OSU is increasing the level of financial literacy as tested by this survey among students who take the only formal personal finance course offered at OSU (we surveyed Spring and Summer 2018 sections of FIN2123 taught by the same professor). This is evaluated by comparing the pre-course average survey score to the post-course average survey score using the following hypothesis:

Ho: $\mu_1 = \mu_2$

Ha: $\mu_1 \neq \mu_2$

where $\bar{\mu}_1$ is the sample average pre-course survey score and $\bar{\mu}_2$ is the sample average post-course score of the undergraduate students taking the class.

The statistic used to evaluate the hypothesis is:

$$t = \frac{\bar{d} - 0}{\frac{s_d}{\sqrt{n}}}$$

where $\bar{d}$ is the mean paired difference of pre- and post-course surveys, s_d is the sample standard deviation of paired differences, and n is the number of paired differences.

Data Sources and Considerations

Survey Instrument

The financial literacy survey used for this study (see appendix A) consisted of 17 questions taken from the Jump$tart Coalition 2008 college survey (Jump$tart Organization, 2018). Eight demographic questions and two financial behavioral questions were also included in the survey. The 17 financial literacy questions were chosen based on particular categories of financial literacy. These categories coincide with the categories taught in the personal finance course at Oklahoma State University. The categories used for the financial literacy questions were credit, loans, savings, compounding interest, investments, and identify theft. A few of the original behavioral questions included in the survey were altered slightly to address concerns of relevance such as replacing questions about checkbooks to referencing debit cards (Cude et. al. 2006). Specific changes made are documented in Appendix A. Previous studies have used Jump$tart survey questions directly (Boyland and Warren 2013; Mandell and Klein 2009; Mandell 2009). Furthermore, many have referenced the Jump$tart survey and/or results (Borodich et al. 2010; Chen and Volpe 1998; Cude et al. 2006; Cull and Whitton 2011; Bowen 2002; Hanna et al. 2010; Lusardi et al. 2010). Lucey (pg. 283, 2005) concluded that the Jump$tart survey has a "moderately high degree of consistency overall."

Survey Sample

The survey was distributed to undergraduate and graduate students at Oklahoma State University Stillwater Campus. The one-time survey was distributed to all 3,025 graduate students at the OSU-Stillwater Campus. The pre-post survey was distributed to 124 undergraduate students taking the personal finance course (FIN2123) during the spring 2018 and summer 2018 terms at OSU taught by the same professor. These were the only sections of this course offered during those times at OSU. 455 graduate students completed the survey, however only 437 were fully

completed and subsequently analyzed. The usable response rate for graduate students was approximately 14.45%. 28 undergraduate students completed both the pre and post survey. The usable response rate for undergraduate students was approximately 22.58%.

CHAPTER IV

FINDINGS

Results

Objective one was to determine the baseline level of financial literacy among samples of OSU

students (undergraduate and graduate). The average value of the OSU undergraduate pre-course

survey scores (64.19%) and the average value of OSU graduate survey scores (71.76%) were

compared separately to the sample average score of the 2008 Jump$tart coalition college survey

(62.20%) (see Table 1). There was one correct answer for each of the 17 questions that were used

to derive the average score. So, on average, undergraduates answered 64.19% of these questions

correctly, and graduate students answered, on average, 71.76% of the questions correctly.

According to these results, there is evidence that the sample average of the OSU graduate survey

scores are statistically significantly (at the .05 level) different than the average score of the 2008

Jump$tart coalition college survey. There is no evidence that there is a statistically significant

difference in the sample average score of the OSU undergraduate pre-course scores and the 2008

Jump$tart coalition college survey at the .05 level of significance.

Table 1-Objective 1 Graduate and Undergraduate Comparison to National Standard					
	Average	Count	T Value	T Critical Value (α=0.05)	Results
Graduate Student	71.76%	437	12.64442	1.962	Reject null
Undergraduate Student Pre-course	64.19%	34	0.631485	2.042	Fail to reject null
Jump$tart 2008 College Survey	62.20%	1030			

Objective 2 was to determine differences in baseline financial literacy across demographic groups using regression analysis. The reader is reminded that regression analysis assesses the impact of each individual variable included in the regression independently of the other variables; in essence, all other variables are held constant when interpreting the estimated coefficient of a given variable in the analysis (this is known as the *ceteris paribus* condition). The statistical package R was used for the regression analysis (see Table 2). The data used for the regression combined the OSU pre-course undergraduate survey data and the OSU graduate student survey data. The independent variables included in the model were based on the last 10 questions of the survey, see Appendix A for the survey. The variables used included: gender, race, place of origin, status as a student, college within the overall university, class standing, behavior regarding credit card payments, number of times students account has been over-drafted, and which, if any, financial related courses the student had in high school or college (see Appendix D for summary statistics table).

Table 2 includes all of the variables and significance levels for each variable of the regression model. These results indicate that male students at OSU scored on average 2.61 percent higher than female students at OSU. Results also show that African American students at OSU scored

5.36 percent lower than Caucasian students at OSU. OSU students that defined themselves as

"Other" in the race category scored 5.03 percent lower than Caucasian students at OSU. No other

race variables included in the model were statistically different than the Caucasian category.

Domestic students at OSU scored on average 6.00 percent higher than international students at

OSU. Part-time graduate students scored 3.09 percent higher than full-time graduate students at

OSU, though part-time undergraduate students scored 27.88 percent lower than full-time graduate

students at OSU. No other classification variables included in the model were statistically

different than the full-time graduate student category. OSU students in the CASNR (College of

Agricultural Sciences and Natural Resources) scored 4.60 percent lower than OSU students in the

Spears School of Business. OSU students that are in multiple colleges scored 8.74 percent lower

than students in the Spears School of Business. No other college variables included in the model

were statistically different than the Spears School of Business. All other variables in the

regression analysis were not significant at the 0.1 level and are identified as NA in Table 2.

Table 2 – Objective 2 Regression Analysis Results (Gender, Race, and Place of Origin)				
R^2=12.94%				
Category	Compared to Default	Estimate	P Value	Significance Level
Intercept		0.697878	< 2e-16	0.001
Male	Female	0.026147	0.05033	0.1
Black or African American	White or Caucasian	-0.053569	0.09271	0.1
Hispanic American	White or Caucasian	-0.025667	0.42720	N/A
Asian American	White or Caucasian	-0.039493	0.23457	N/A
American Indian	White or Caucasian	-0.025361	0.49088	N/A
Alaska Native, or Native Hawaiian	White or Caucasian	-0.051047	0.51665	N/A
Other	White or Caucasian	-0.050331	0.08203	0.1
Domestic	International	0.059996	0.02562	0.05

Table 2 (continued) – Objective 2 Regression Analysis Results (Classification, College, and Level of Education)				
R^2=12.94%				
Full-time Undergraduate Student	Full-time Graduate Student	-0.047096	0.19168	N/A
Part-time Undergraduate Student	Full-time Graduate Student	-0.27877	0.00353	0.01
Part-time Graduate Student	Full-time Graduate Student	0.030933	0.07701	0.1
College of Agricultural Sciences & Natural Resources	Spears School of Business	-0.045973	0.03126	0.05
Arts and Sciences	Spears School of Business	-0.023916	0.31074	N/A
Education, Health and Aviation	Spears School of Business	-0.021361	0.40056	N/A
Human Sciences	Spears School of Business	-0.028468	0.33854	N/A
Engineering, Architecture and Technology	Spears School of Business	-0.032607	0.23233	N/A
Other	Spears School of Business	0.002789	0.95460	N/A
Multiple Colleges	Spears School of Business	-0.087362	0.03423	0.05
Freshman	Senior	0.072618	0.40122	N/A
Sophomore	Senior	0.076269	0.28654	N/A
Junior	Senior	-0.070163	0.19725	N/A
PhD Student	Master's Student	0.022535	0.11776	N/A
Other designation	Master's Student	0.065103	0.22484	N/A

Table 2 (continued) – Objective 2 Regression Analysis Results (Credit Card and Banking Behavior)				
R^2=12.94%				
Occasionally do not pay off the total balance of credit card each month	Always payoff the total balance of credit card each month	0.018137	0.32391	N/A
Generally have an outstanding balance but occasionally pay it off	Always payoff the total balance of credit card each month	0.005921	0.78529	N/A
Seldom, if ever, pay off all my balances, but try to pay them down when I can	Always payoff the total balance of credit card each month	-0.024366	0.29458	N/A
Generally pay only the minimum required payment each month	Always payoff the total balance of credit card each month	-0.033175	0.29642	N/A
Once or twice in my lifetime I have had an overdraft on a bank account or had a debit card declined	Never had an overdraft on a bank account or had a debit card declined	-0.001532	0.91169	N/A
Once or twice per year I have had an overdraft on a bank account or had a debit card declined	Never had an overdraft on a bank account or had a debit card declined	-0.018180	0.43291	N/A
More than twice per year I have had an overdraft on a bank account or had a debit card declined	Never had an overdraft on a bank account or had a debit card declined	-0.008041	0.86057	N/A

Table 2 (continued) – Objective 2 Regression Analysis Results (High School and College Courses Related to Finance)				
R^2=12.94%				
1 high school class related to finance	0 high school classes related to finance	-0.007778	0.59979	N/A
2 high school classes related to finance	0 high school classes related to finance	-0.014619	0.46617	N/A
3 high school classes related to finance	0 high school classes related to finance	0.026192	0.36762	N/A
4 high school classes related to finance	0 high school classes related to finance	0.020996	0.66801	N/A
5 high school classes related to finance	0 high school classes related to finance	-0.032134	0.57240	N/A
1 college class related to finance	0 college classes related to finance	-0.022650	0.17191	N/A
2 college classes related to finance	0 college classes related to finance	-0.022803	0.31025	N/A
3 college classes related to finance	0 college classes related to finance	-0.022233	0.33408	N/A
4 college classes related to finance	0 college classes related to finance	0.025100	0.41082	N/A
5 college classes related to finance	0 college classes related to finance	0.029900	0.38624	N/A

Objective 3 was to determine if the undergraduate personal finance course taught at OSU

increases financial literacy among students. The sample average pre-course survey score and the

sample average post- course survey score of OSU undergraduate students taking the personal

finance course were compared using a paired t-test, Table 3 summarizes the results. These results

show that there is no evidence of a statistically significant difference in the OSU undergraduate

pre-course scores and the post-survey scores.

Table 3 – Objective 3 Undergraduate Pre-Post Survey Comparison					
	Average	Count	T Value	T Critical	Results
Pre Survey	63.66%	28	-0.551	2.052	Fail to reject null
Post Survey	61.34%	28			

Discussion

According to these results, graduate students at OSU scored significantly different than students that participated in the 2008 Jump$tart coalition college survey, but OSU undergraduate students did not score statistically different. The Jump$tart survey results included 1,030 usable surveys whereas the OSU graduate survey included 437 usable surveys and the pre-course undergraduate survey included 34 usable surveys. The Jump$tart college survey consisted of only undergraduate students across the United States. The smaller sample size and higher level of education could be significant factors in the resulting increase in the difference in scores for the OSU graduate students.

These results show that gender, student's place of origin, race, college, and classification of a student (part time versus full time) have a significant impact on the average survey score in our sample. Previous studies have mixed results on the effect of gender on financial literacy. Some studies found that gender was not a significant factor regarding financial literacy (Cull and Whitton 2011; Hanna et al. 2010; Boyland and Warren 2013). However, other studies, including this one, found that male students tend to score higher than female students (Chen and Volpe 1998; Lusardi et al. 2010; Lusardi and Mitchell 2007). Our findings that domestic students score higher than international students is consistent with other previous studies (Boyland and Warren 2013). The results that African American students scored lower than Caucasian students is also consistent with previous studies, but Hispanic students scores were not significantly different than Caucasian students contradicts other studies findings (Boyland and Warren 2013; Lusardi et al. 2010; Lusardi and Mitchell 2007; Lyons 2007). Part-time graduate students scoring higher than

their full time counterparts have not been recorded in previous studies that were reviewed. Part time undergraduate students scoring lower than full time graduate students is consistent with the assumption that a higher level of education results in a higher level of knowledge (Lusardi and Mitchell 2007). Previous studies have shown a significant difference in non-business major versus business majors financial literacy scores (Chen and Volpe 1998; Hanna et al. 2010;Marcolin and Abraham 2006). However, the only significant differences shown in the OSU data sample was for CASNR College and students selecting multiple colleges, both having negative effects on their average score relative to students within the business college.

Undergraduate students at OSU were given a pre-course survey in the beginning of the personal finance course and a post-course survey was given at the end of the personal finance course. The pre-post survey scores were not significantly different. According to these findings, the materials in the personal finance course at OSU did not improve student's average financial literacy score which is consistent with other studies (Mandell 2009; Mandell and Klein 2009). However, 28 usable surveys were analyzed and this small sample size could negatively affect the results of this analysis. Also extra credit was given for completing the survey. Under one possible scenario, this could bias the data if the majority of the students that responded were students that needed extra credit in the class. Since there was no control group of students not taking the course to compare the results to, one cannot make conclusions regarding causality associated with taking the personal finance course at OSU.

CHAPTER V

CONCLUSION

A financial literacy survey based on the 2008 Jump$tart coalition college survey was given to the entire graduate student population at Oklahoma State University (OSU) and to undergraduate students taking the personal finance course at OSU. The results show that the OSU graduate student average (71.76%) was statistically different than the 2008 Jump$tart coalition college survey average (62.20%), while the pre-course average (64.19%) for OSU undergraduate students was not statistically different. The combined undergraduate pre-course and graduate student results showed that gender, student's place of origin, race, specific college within the overall university, and classification of a student (part time versus full time) have significant impacts on average financial literacy scores. The pre-post survey comparison shows that there was not a significant difference in survey scores and survey scores before and after completing the personal finance course at OSU.

This analysis supports the need for improved financial education at Oklahoma State University for undergraduate students. Although the undergraduate score was not lower than the national standard used, an almost failing average of financial literacy (based on a traditional grading scale) cannot be interpreted as satisfactory. The results showed that the current personal finance course at OSU did not improve the average score of students taking the course. Although the graduate student sample showed a higher average than the national standard, there is room for improvement among graduate students as well. Financial literacy will impact the student for the

rest of his or her life. As an institution dedicated to educating people, OSU should strive to improve the financial literacy of students. The university should evaluate and improve the current personal finance curriculum and amplify other efforts focused on financial literacy.

Given our and previous researchers findings regarding the limited success of existing personal finance educational efforts clearly alternative strategies are needed. One possible thought is that we are not exposing students to personal finance in enough settings or in ways that they find relevant at the time. Therefore, universities like Oklahoma State University could strive to incorporate financial literacy education into every aspect of the students' time at OSU, from coming in as a freshman to senior year. For example, in some way incorporating financial education into every class, orientation, registration, financial aid etc. Universities also could make the personal finance knowledge being presented relevant to the students' life in the moment. Focusing on areas such as student loans, banking, paychecks, and budgeting that are much more relevant to a student's life than buying a house or compound interest. This information could be presented in multiple ways such as having an accessible online financial literacy platform, professional speakers in classes (such as a representative from the financial aid office), and professors requiring relevant assignments (such as constructing a budget). The repetition, relevance, and a variety of presentation of personal financial literacy will improve students' retention of personal finance knowledge and hopefully impact students' financial behavior.

Limitations

This study examined a small sample of undergradute and graduate students at Oklahoma State University. The survey questions are based on a previously conducted national survey, but given there is no standard definition for financial literacy, the results can be interpreted widely. Also this study compares the OSU results to the Jump$tart results from 2008, the students taking the survey for this research have experienced a different world than the students in 2008 (such as

living through the great recession, full emersion into technology for every aspect of life including personal finance, etc.). Potentially the groups being compared could have different knowledge bases based on previous experiences that would affect their scores on this survey. Future research could conduct a broader survey (like the previous Jump$tart survey) to provide a better comparison benchmark. Future research should further explore the reasons behind our (and other previous researchers) somewhat surprising result that fails to identify increased financial literacy as a result of taking the personal finance course. To do this further research could examine a larger sample of undergraduate students taking the financial literacy course at OSU and include a control group of students that are not and have not taken the course. Further research could also extend the regression analysis results and look at reasons behind the significant factors affecting financial literacy scores.

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APPENDICES

APPENDIX A – SURVEY QUESTIONS

1. Don and Bill work together in the finance department of the same company and earn
the same pay. Bill spends his free time taking work-related classes to improve his computer skills;
while Don spends his free time socializing with friends and working out at a fitness center. After
five years, what is likely to be true?
   a) Don will make more because he is more social.
   b) Don will make more because Bill is likely to be laid off.
   c) Bill will make more money because he is more valuable to his company.*
   d) Don and Bill will continue to make the same money.

2. Which of the following statements is true?
   a) Banks and other lenders share the credit history of their borrowers with each other
      and are likely to know of any loan payments that you have missed.*
   b) People have so many loans it is very unlikely that one bank will know your history
      with another bank
   c) Your bad loan payment record with one bank will not be considered if you apply to
      another bank for a loan.
   d) If you missed a payment more than 2 years ago, it cannot be considered in a loan
      decision.

3. Which of the following instruments is NOT typically associated with spending?
   a) Debit card.
   b) Certificate of deposit.*
   c) Cash.
   d) Credit card.

4. David just found a job with a take-home pay of $2,000 per month. He must pay $900 for
rent and $150 for groceries each month. He also spends $250 per month on transportation. If
he budgets $100 each month for clothing, $200 for restaurants and $250 for everything else,
how long will it take him to accumulate savings of $600.
   a) 3 months.
   b) 4 months.*
   c) 1 month.
   d) 2 months.

5. Rob and Mary are the same age. At age 25 Mary began saving $2,000 a year while Rob saved nothing. At age 50, Rob realized that he needed money for retirement and started saving $4,000 per year while Mary kept saving her $2,000. Now they are both 75 years old. Who has the most money in his or her retirement account?
    a) They would each have the same amount because they put away exactly the same
    b) Rob, because he saved more each year
    c) Mary, because she has put away more money
    d) Mary, because her money has grown for a longer time at compound interest*

6. Dan must borrow $12,000 to complete his college education. Which of the following would NOT be likely to reduce the finance charge rate?
    a) If he went to a state college rather than a private college. *
    b) If his parents cosigned the loan.
    c) If his parents took out an additional mortgage on their house for the loan.
    d) If the loan was insured by the Federal Government.

7. Under which of the following circumstances would it be financially beneficial to you to borrow money to buy something now and repay it with future income?
    a) When you need to buy a car to get a much better paying job.*
    b) When you really need a week vacation.
    c) When some clothes you like go on sale.
    d) When the interest on the loan is greater than the interest you get on your savings.

8. Which of the following statements is NOT correct about most ATM (Automated Teller Machine) cards?
    a) You can generally get cash 24 hours-a-day.
    b) You can generally obtain information concerning your bank balance at an ATM machine.
    c) You can get cash anywhere in the world with no fee.*
    d) You must have a bank account to have an ATM Card.

9. If you had a savings account at a bank, which of the following would be correct concerning the interest that you would earn on this account?
    a) Earnings from savings account interest may not be taxed.
    b) Income tax may be charged on the interest if your income is high enough.*
    c) Sales tax may be charged on the interest that you earn.
    d) You cannot earn interest until you pass your 18th birthday.

10. Barbara has just applied for a credit card. She is an 18-year-old high school graduate with few valuable possessions and no credit history. If Barbara is granted a credit card, which of the following is the most likely way that the credit card company will reduce ITS risk?
    a) It will make Barbara's parents pledge their home to repay Karen's credit card debt.
    b) It will require Barbara to have both parents co-sign for the card.
    c) It will charge Barbara twice the finance charge rate it charges older cardholders.
    d) It will start Barbara out with a small line of credit to see how she handles the account.*

11. Which of the following credit card users is likely to pay the GREATEST dollar amount in finance charges per year, if they all charge the same amount per year on their cards?
   a) Jessica, who pays at least the minimum amount each month and more, when she has the money.
   b) Vera, who generally pays off her credit card in full but, occasionally, will pay the minimum when she is short of cash
   c) Megan, who always pays off her credit card bill in full shortly after she receives it
   d) Erin, who only pays the minimum amount each month.*

12. Which of the following statements best describes your right to check your credit history for accuracy?
   a) Your credit record can be checked once a year for free.*
   b) You cannot see your credit record.
   c) All credit records are the property of the U.S. Government and access is only available to the FBI and Lenders.
   d) You can only check your record for free if you are turned down for credit based on a credit report

13. If your credit card is stolen and the thief runs up a total debt of $1,000, but you notify the issuer of the card as soon as you discover it is missing, what is the maximum amount that you can be forced to pay according to Federal law?
   a) $500
   b) $1000
   c) Nothing.
   d) $50*

14. Your take home pay from your job is less than the total amount you earn. Which of the following best describes what is taken out of your total pay?
   a) Social security and Medicare contributions.
   b) Federal income tax, property tax, and Medicare and social security Contributions.
   c) Federal income tax, social security and Medicare contributions.*
   d) Federal income tax, sales tax, and social security contribution

15. Chelsea worked her way through college earning $15,000 per year. After graduation, her first job pays $30,000. The total dollar amount Chelsea will have to pay in Federal Income taxes in her new job will:
   a) Double, at least, from when she was in college.*
   b) Go up a little from when she was in college.
   c) Stay the same as when she was in college.
   d) Be lower than when she was in college.

16. Rebecca has saved $12,000 for her college expenses by working part-time. Her plan is to start college next year and she needs all of the money she saved. Which of the following is the safest place for her college money?
   a) Locked in her closet at home.
   b) Stocks.
   c) Corporate bonds.
   d) A bank savings account.*

17. Sara and Joshua just had a baby. They received money as baby gifts and want to put it away for the baby's education. Which of the following tends to have the highest growth over periods of time as long as 18 years?
    a) A checking account.
    b) Stocks.*
    c) A U.S. Govt. savings bond.
    d) A savings account.

18. What is your gender?
    a) Male
    b) Female

19. How do you describe yourself?
    a) White or Caucasian.
    b) Black or African-American.
    c) Hispanic American.
    d) Asian-American.
    e) American Indian[1]
    f) Alaska Native, or Native Hawaiian
    g) Other

20. How do you describe yourself?
    a) Domestic Student
    b) International Student

21. Which of the following statements best describes the way in which you make payments on your credit cards?
    a) I always pay off the total balance each month.
    b) I occasionally do not pay off the balance for a month or so when I am short on funds.
    c) I generally have an outstanding balance but occasionally am able to pay it off.
    d) I seldom, if ever, pay off all my balances, but try to pay them down when I can.
    e) I generally pay only the minimum required payment each month.

22. How often have you had your debit card declined or had an overdraft on your bank account?[2]
    a) Never
    b) Once or twice in my lifetime
    c) Once or twice per year
    d) More than twice per year

23. Which of the following classes did you have in high school? (Check ALL that apply)
    a) An entire course in personal money management or personal finance.
    b) A portion of a course where at least a week was focused on personal money management or personal finance.
    c) An entire course in economics.
    d) A portion of a course where at least a week was focused on economics.
    e) A course in which we played a stock market game.

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[1] Jump$tart Coalition 2008 College Survey "American Indian, Alaska Native, or Native Hawaiian"
[2] Jump$tart Coalition 2008 College Survey "How often have you bounced a check (had it returned for insufficient funds)?"

24. Which of the following classes have you had in college? (Check ALL that apply)
    a) A semester-length course in personal money management or personal finance
    b) Coverage of money management or personal finance (including part of freshman orientation)
    c) Economics
    d) Finance
    e) Accounting

25. Which of the following best describes your status as a student?
    a) I am a full time undergraduate student
    b) I am a part time undergraduate student
    c) I am a full time graduate student
    d) I am a part time graduate student

26. Which of the following colleges are you pursuing a degree in? (Check ALL that apply)
    a) Agricultural Sciences and Natural Resources
    b) Arts and Sciences
    c) Education, Health and Aviation
    d) Human Sciences
    e) Engineering, Architecture and Technology
    f) Spears School of Business
    g) University College
    h) Other

27. What is your class standing?
    a) Freshman
    b) Sophomore
    c) Junior
    d) Senior
    e) Master's student
    f) PhD student

Oklahoma State University Institutional Review Board

Date:	03/09/2018
Application Number:	AG-18-9
Proposal Title:	Financial Literacy Survey
Principal Investigator:	Hannah McReynolds
Co-Investigator(s):	
Faculty Adviser:	Bailey Norwood
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 223 Scott Hall (phone: 405-744-3377, irb@okstate.edu).

Sincerely,

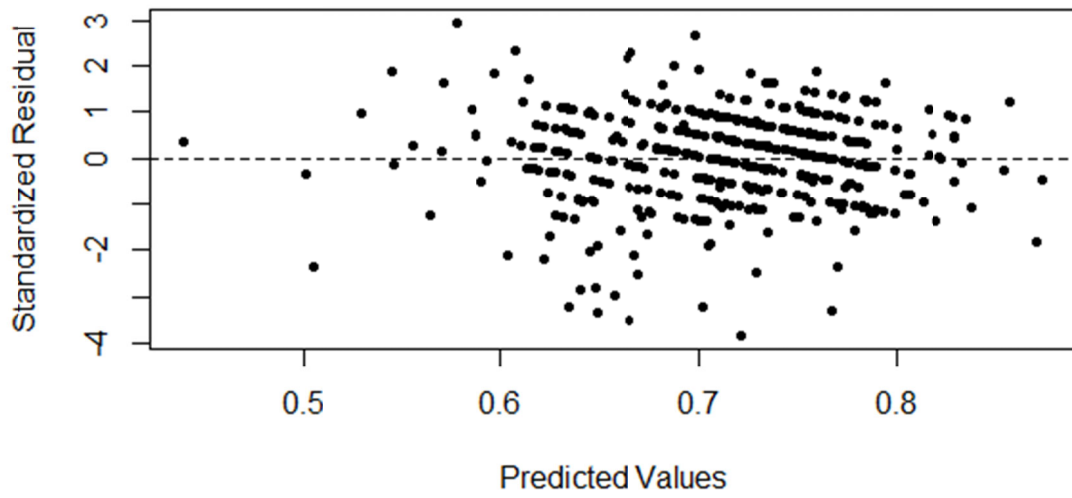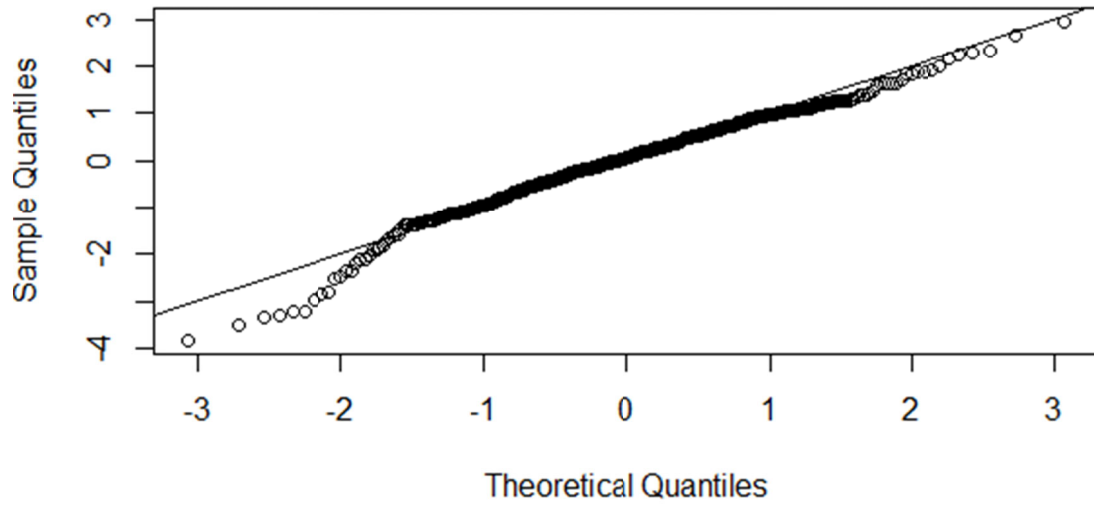Hugh Crethar, Chair Institutional
Review Board

APPENDIX C – NORMALITY ASSUMPTIONS

Figure 1. Standardized Residual

Figure 2. Normal Q-Q

APPENDIX D-SUMMARY STATISTICS

Summary Statistics A (Gender, Race, Place of Origin, High School and College Courses Related to Finance)					
R^2=12.94%					
Variable	Number of Observations	Min	Max	Mean	Standard Deviation
Survey Score	472	0.24	1	0.71	0.14
Female	258	0	1	0.55	0.50
Male	214	0	1	0.45	0.50
Caucasion	337	0	1	0.72	0.45
Asian American	20	0	1	0.04	0.20
Black or African American	22	0	1	0.05	0.21
Alaska Native, or Native Hawaiian	3	0	1	0.01	0.08
Hispanic American	21	0	1	0.04	0.21
American Indian	14	0	1	0.03	0.17
Other	54	0	1	0.11	0.32
Domestic	392	0	1	0.83	0.37
International	79	0	1	0.17	0.37
High school classes related to finance	323	0	5	1.04	1.02
College class related to finance	320	0	5	1.43	1.43

Summary Statistics B (Classification, College, and Level of Education)					
R^2=12.94%					
Variable	Number of Observations	Min	Max	Mean	Standard Deviation
Full-time Graduate Student	353	0	1	0.75	0.43
Part-time Graduate Student	84	0	1	0.18	0.38
Full-time Undergraduate Student	33	0	1	0.07	0.26
Part-time Undergraduate Student	2	0	1	0.00	0.07
Arts and Sciences	114	0	1	0.24	0.43
College of Agricultural Sciences & Natural Resources	110	0	1	0.23	0.42
Spears School of Business	74	0	1	0.16	0.36
Human Sciences	32	0	1	0.07	0.25
Engineering, Architecture and Technology	45	0	1	0.10	0.29
Education, Health and Aviation	74	0	1	0.16	0.36
Other	10	0	1	0.02	0.14
Multiple Colleges	13	0	1	0.03	0.16

Summary Statistics C (Credit Card and Banking Behavior)					
R^2=12.94%					
Variable	Number of Observations	Min	Max	Mean	Standard Deviation
Seldom, if ever, pay off all my balances, but try to pay them down when I can	42	0	1	0.09	0.29
Occasionally do not pay off the total balance of credit card each month	67	0	1	0.14	0.35
Generally have an outstanding balance but occasionally pay it off	51	0	1	0.11	0.31
Generally pay only the minimum required payment each month	22	0	1	0.05	0.21
Once or twice in my lifetime I have had an overdraft on a bank account or had a debit card declined	197	0	1	0.42	0.49
Never had an overdraft on a bank account or had a debit card declined	215	0	1	0.46	0.50
More than twice per year I have had an overdraft on a bank account or had a debit card declined	11	0	1	0.02	0.15
Once or twice per year I have had an overdraft on a bank account or had a debit card declined	47	0	1	0.10	0.30

VITA

Elizabeth Hannah Marie McReynolds

Candidate for the Degree of

Master of Science

Thesis: FINANCIAL LITERACY REPRESENTATION OF OKLAHOMA STATE UNIVERISTY STUDENTS

Major Field: Agricultural Economics

Biographical:

Education:

Completed the requirements for the Master of Science in Agricultural Economics at Oklahoma State University, Stillwater, Oklahoma in December, 2018.

Completed the requirements for the Bachelor of Science in Agricultural Economics at Oklahoma State University, Stillwater, Oklahoma in 2016.

Experience:

Analyst at Crow Holdings Capital in Dallas, Texas from July 2018 to Present.

Oklahoma State University Graduate Research Assistant in Stillwater, Oklahoma from August 2017 to June 2018.

Grain Merchandiser Intern at The Scoular Company in Minneapolis, Minnesota from May 2016 to August 2016.

Student mentor at Oklahoma State University for exchange students from China Agriculture University in Stillwater, Oklahoma from July 2015 to May 2016.

International Program Assistant at China Agriculture University in Beijing, China from September 2014 to July 2015.