INVESTIGATION OF THE FINANCIAL LITERACY AMONG HIGH SCHOOL STUDENTS

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ABSTRACT. *This study designs for detecting the students' financial literacy in high schools. A self-designed questionnaire with three domains and 30 indicators was used to evaluate the students' financial literacy. The 432 samples of the study are selected from 8 schools of the 11 school attendance areas in New Taipei City. This study conducted group difference test, correlation, and regression analysis with the statistical package of social science (SPSS) and Minitab. This study found the intensive courses in schools have shown well for promoting the students' financial literacy based on the result of 9th grade students with better performance than that of 8th grade students. Gender differences have displayed significantly in the related statistical testing. Female students have better performance than that of male students do. The students from middle SES families have demonstrated with better financial literacy. Furthermore, the enhancing financial education for males should initiate in schools immediately. The design works well for dealing with this issue.*
Keywords: Financial literacy, Financial education, Financial management, High school students, Logistic regression

1. **Introduction.** The challenge for many is to provide specific education that equips young generation with the necessary skills for managing their money. The need for financial education has become increasingly important. This challenge is further compounded under current environment, as the parents and teachers do not well direct the kids in financial management [1]. This phenomenon also displays that the kids are lack of financial literacy to face their lives in future. The low level of financial literacy has been a worrisome topic in recent years. Facing markets' volatility and uncertainty, it requires better-prepared people with a broader knowledge that allows them to confront economic challenges. According to OECD PISA report, the financial literacy is the knowledge and understanding an individual has in the face of financial concepts and possible crises, and is defined as a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing [2,3].

Previous studies focused on the issues of adults' financial literacy, for example, Huston's meta-analysis for reviewing related contents in various studies [4]; Based on the findings of Huston's, Senevirathne et al. scrutinized four financial literacy measurement models with their construct and content [5]; Initiative assessment framework for financial literacy proposed by OECD has provided for extending contents which did not fit a specific country well [6,7]. This study believes that if people can acquire the concept of financial literacy as students, in the future, high school students with financial literacy can properly plan their expenditures in the next journey of learning or later career. Furthermore, OECD report

indicated that "financial education has thus become an important complement to market conduct and prudential regulation, and improving individuals' financial behavior(s) has become a long-term policy priority in many countries. This trend has notably led to the development of a wide range of financial education initiatives by governments, regulators and various other private and civil stakeholders, sometimes combined with financial consumer protection measures" [8]. For this regard, this study selected the students as a target to realize the current financial literacy education in high schools.

The Ministry of Education (MOE) published "Grade 1-9 Curriculum Integrative Activities" [9]. As one of the four main axes, life management includes financial planning, strategies, and actions as the core indicators of this axe. Therefore, the government and related educational authorities started to place emphasis on "financial education" and "financial literacy", and incorporated them into national compulsory education [10]. Perceiving the importance of financial education, this research was designed to help high school students understand how and why they should plan for living expenses to prevent potential financial crisis in the future. Furthermore, this study will examine high school students what they need to improve financial literacy in schools. Given these purposes, this study explores the following questions:

- What is the current situation of financial education in high schools?
- Did they have any grade, gender, and social economic status (SES) differences in current students' financial literacy?
- What kind of strategies can be used to promote the current financial education?

The rest part of the paper will be addressed as follows. First, the method section will display the design of survey, sampling, and statistical process. Then, the result section will address the grade, gender, and social economic status differences. The result of correlation and regression analysis will be reported. Finally, Section 4 concludes the work.

2. **Method.**

2.1. **Definition of the terms.** There are two major terms in this study, namely financial literacy and financial education. The "financial literacy" has been defined by the concepts of spending, saving, and financial planning. Generally, the concepts of financial literacy as Vit' definition: "The ability to read, analyze, manage and communicate about the conditions of personal finances that affect economic wellbeing. This includes the ability to differentiate between financial options, discuss in an educated way topics related to finances and money, being able to plan for the future and answer competently to daily events involving personal decisions of a financial nature" [11]. This study deals with the concepts as the financial literacy.

"Financial education", according to OECD, is defined as "the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" [12]. Financial education programs should be designed to meet the needs and the financial literacy level of their target audience, as well as reflect how their target audience prefers to receive financial information. In this study, the meaning of terms will focus on their applications in high school students.

2.2. **Sampling.** The target population is the 8th and 9th grade students in New Taipei City, Taiwan. The total number of the students is 13,053 in the two grades in 2018. In this study, the estimated samples are 373 following the 95% confident level. The fittest model to determine the samples is displayed as follows [13]:

$$n = \frac{N}{N\left(\frac{2d}{Z_{\alpha/2}}\right)^2 + 1} = \frac{13053}{13053\left(\frac{2 \times 0.05}{1.96}\right)^2 + 1} \approx 373$$

Following this formula, N refers the population, n represents the fittest samples, and d is the acceptable probability of error under .05 in terms of 95% of confidence level. The samples of the study are selected from 8 schools of the 11 school attendance areas in New Taipei City. The students in eighth and ninth grades are selected based on class-based participation. Basically, as the selected class as a cluster, for this sense, the cluster sampling is conducted in this stage. For 80% expected return rate, 450 copies of questionnaires have been distributed to the target students. Finally, there are 432 valid copies for analyzing in the study.

2.3. **Research tool.** The self-designed questionnaire contains three domains of indicators used to evaluate the students "financial literacy", namely literacy of spending, literacy of saving, and literacy of financial planning. Based on related studies, the studies reviewed the notions of financial literacy. At the first stage, the related notions of financial literacy have been collected. Then, this study invited 5 experts including 2 high school teachers to review which notion fits the financial literacy for high school students. Finally, there are 30 selected indicators in the three domains, and each domain contains 10 indicators to describe the related literacy. The total scores can be calculated by the 30 indicators in the 5-point Likert scale. To verify each domain with selected indicators can estimate the student's scores, this study conducted Cronbach test to determine the questionnaire's content reliability in different dimensions of financial literacy. In this study, the reliability of the main questionnaire of financial literacy is .92 calculated by Cronbach's coefficient alpha (α). The Cronbach's α in sub-scale of literacy of spending, literacy of saving, and literacy of financial planning are .852, .963, and .872, respectively. The high coefficient implies the tool for testing is reliable.

2.4. **Statistical methods.** This study conducted group difference test, correlation, and regression analysis with the statistical package of social science (SPSS) and Minitab. Minitab provides visualized formats for better presenting the results. In addition, the logistic regression is conducted in Minitab. The odds ratio will be calculated to reflect the effect of literacy education in high schools. In this study, the significant testing has set the critical value: $\alpha = .05$.

3. **Results.** In this section, the results display the current performance of financial education in the target high schools. The analyses of differences have been displayed by financial literacy among grade, gender and SES. The study demonstrates the relationships among the related variables conducted by correlation and regression analysis.

3.1. **Current financial education in schools.** The mean of financial literacy is 3.235. Specifically, there is 21.3% of students' average financial literacy over 4 in the 5-Likert scale and 14.6% of students' average financial literacy below 2 in current survey. The grade and gender differences are significant in different statistical tests, see Table 1.

The result reveals the ninth grade students with better financial literacy because of the effect of financial education in schools. Currently, only the ninth grade students have attended the financial education. This study demonstrates the female students with better financial literacy than that of their counterparts, see Figure 1.

3.2. **The effect of SES.** The result demonstrates the effect of SES, in general, students come from middle class families (SES 2.00) with better financial literacy (F_managemet), see Figure 2. Specifically, the different domains also display the similar results with the S-ES groups. The details of SES group differences with Turkey methods have been presented in Table 2.

TABLE 1. Results of current financial literacy in schools

| Domains	Grade	n	Means	SD	t	p
Spending	8th	216	2.9542	1.03801		
	9th	216	3.6102	.91768	-6.959	.000
Saving	8th	216	2.9667	1.09561		
	9th	216	3.6977	.91349	-7.532	.000
Planning	8th	216	2.6431	1.02782		
	9th	216	3.5394	.91279	-9.583	.000
Financial literacy	8th	216	2.8546	.98256		
	9th	216	3.6157	.84217	-8.644	.000
Domains	**Gender**	**n**	**Means**	**SD**	**t**	**p**
Spending	Male	217	2.8714	1.05524		
	Female	215	3.6967	.82345	-9.057	.000
Saving	Male	217	3.0226	1.15181		
	Female	215	3.6447	.88299	-6.303	.000
Planning	Male	217	2.7479	1.10542		
	Female	215	3.4377	.91126	-7.073	.000
Financial literacy	Male	217	2.8806	1.04382		
	Female	215	3.5930	.78676	-8.015	.000
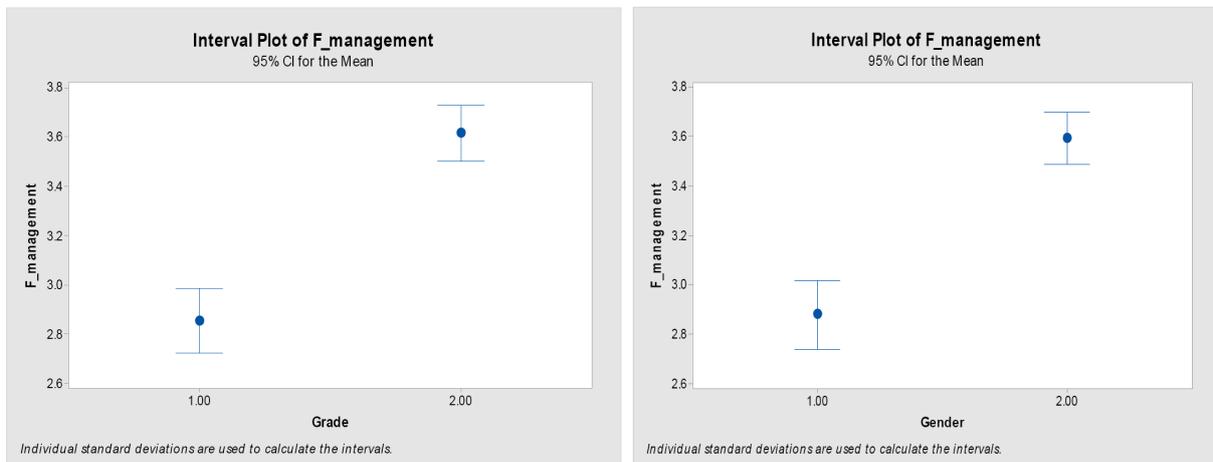
FIGURE 1. Grade and gender difference of financial literacy

3.3. The results of the relationship analysis.

First, display the relationship among the different domains of indicators. The spearman rho represents the correlation among the different domains. The results of correlation revel spending with savings are .708, spending with planning is .715, and saving with planning is .781. All the correlation coefficients are significant at .05.

Second, build regression models. In the regression analysis, the dependent variable is students' financial literacy, stepwise selection criteria follow α to enter equal to 0.15, α to remove equal to 0.15. The results reveal students' financial literacy can explain 31.10% of variances (R-square adjusted) with grade, gender and SES in the model. The result of ANOVA in the regression model has been displayed in Table 3. The fittest residual plots
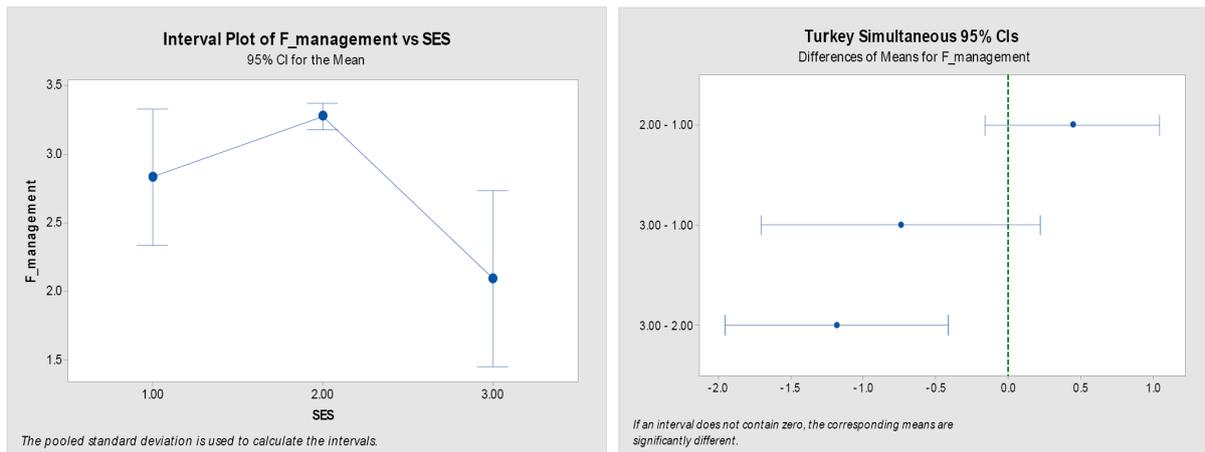
FIGURE 2. Comparison of the students' financial literacy with SES

TABLE 2. SES group differences with Tukey HSD

Domains	(I) SES	(J) SES	I-J	SE	p
Spending	Low	Middle	−.33471	.26893	.428
		High	.66889	.43131	.268
	Middle	Low	.33471	.26893	.428
		High	1.00359*	.34472	.011
	High	Low	−.66889	.43131	.268
		Middle	−1.00359*	.34472	.011
Saving	Low	Middle	−.61049	.27563	.070
		High	.85111	.44205	.133
	Middle	Low	.61049	.27563	.070
		High	1.46160*	.35330	.000
	High	Low	−.85111	.44205	.133
		Middle	−1.46160*	.35330	.000
Planning	Low	Middle	−.38029	.27834	.360
		High	.70222	.44640	.258
	Middle	Low	.38029	.27834	.360
		High	1.08252*	.35678	.007
	High	Low	−.70222	.44640	.258
		Middle	−1.08252*	.35678	.007
Financial literacy	Low	Middle	−.44183	.25632	.197
		High	.74074	.41108	.170
	Middle	Low	.44183	.25632	.197
		High	1.18257*	.32855	.001
	High	Low	−.74074	.41108	.170
		Middle	−1.18257*	.32855	.001

* Average difference with the .05 significance level

have been shown in Figure 3. The interpreted regression equation is listed as follows:

$$\text{Financial literacy} = 2.139 + 0.0\,\text{Grade\_8}^{\text{th}} + 0.7803\,\text{Grade\_9}^{\text{th}} + 0.0\,\text{Gender\_male}$$
$$+ 0.7086\,\text{Gender\_female} + 0.0\,\text{SES\_low} + 0.394\,\text{SES\_middle}$$
$$- 0.881\,\text{SES\_high}$$

Third, display the result of conducting logistic regression. The logistic regression demonstrates that the odds ratios have shown in saving domain as 1.2870, planning domain as

TABLE 3. Analysis of variance in regression models

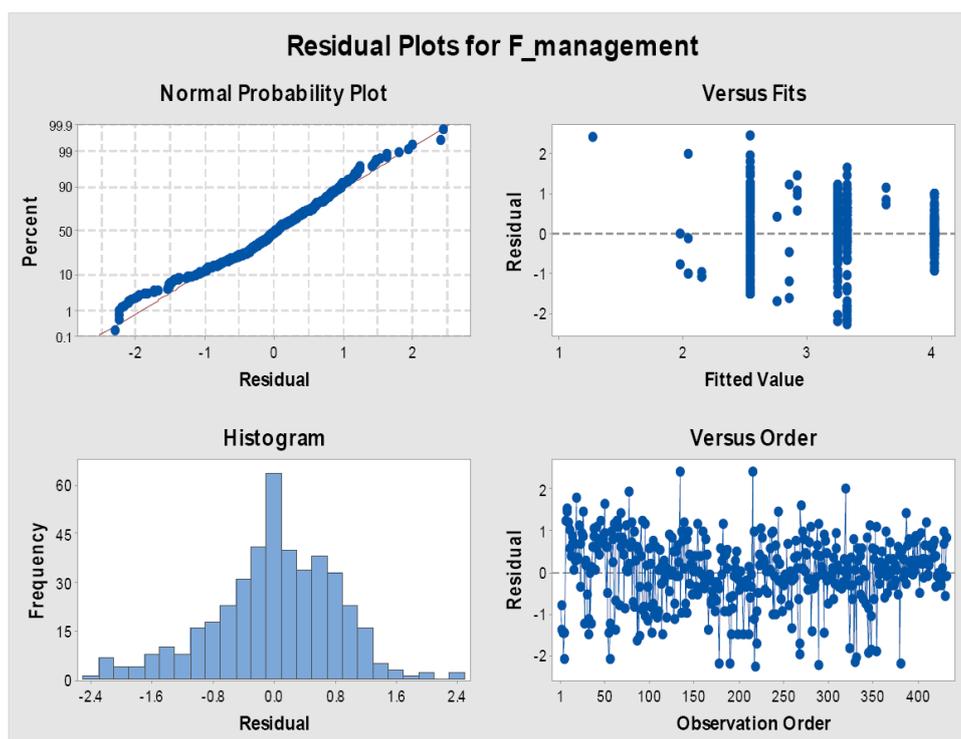| Source	DF	Adj SS	Adj MS	F-value	p-value
Regression	4	134.15	33.5366	49.64	0.000
Grade	1	65.59	65.5891	97.09	0.000
Gender	1	54.21	54.2105	80.24	0.000
SES	2	16.23	8.1157	12.01	0.000
Error	427	288.47	0.6756		
Lack-of-Fit	7	19.91	2.8446	4.45	0.000
Pure Error	420	268.56	0.6394		
Total	431	422.62			

FIGURE 3. Residual plots for students' financial literacy

0.6789 and spending domain as 0.3849. Furthermore, the odds ratio for 9th grade relative to 8th grade is 2.2669. According to the odds ratio, the study expects the students' financial literacy in 9th grade is better than that of 8th grade. The regression equation can be addressed as follows:

$$P(\text{grade}) = \exp(Y')/(1 + \exp(Y'));$$

$$Y' = 3.134 - 0.9549\,\text{Spending} + 0.2523\,\text{Saving} - 0.3872\,\text{Planning};$$

$$Y' = 3.952 - 0.9549\,\text{Spending} + 0.2523\,\text{Saving} - 0.3872\,\text{Planning}.$$

4. **Conclusions.** This study demonstrates how the financial literacy can be detected a-mong young generation. Following the research design, this study found the intensive courses in schools have shown workable. The results reveal the 9th grade students with better performance in their financial literacy than that of 8th grade students. The life management related courses for students, proposed by MOE, including financial planning, strategies, and actions have shown workable in high schools. Gender differences have displayed significantly in the related statistical testing. Female students have better performance than that of male students do. With this concern, how to enhance males'

financial education should initiate in high schools. Furthermore, the students from middle SES families have demonstrated with better financial literacy. It implies the enhancing financial education for students from low and high SES groups is necessary in high schools.

For further studies, the questionnaire can be modified to fit the students in upper secondary schools or college students. The related statistical techniques can be linked to the meaningful topics in the schools. In addition, this study can be integrated with related topics to tackle more complicated issues in educational or other settings.

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