

**INTERNATIONAL JOURNAL OF
INNOVATIVE RESEARCH AND KNOWLEDGE**

ISSN-2213-1356

www.ijirk.com

**Senior High School Learners' Financial Literacy and
Numeracy: A Correlational Study****Aileen A. Mondejar, Eloisa Paris D. Alison, Joallen D. Batara**

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9506, Philippines**Abstract**

Financial literacy, despite its renowned importance, remains low worldwide, especially among Filipinos. Different literature and studies have been done to tackle the many ways to improve the state of financial literacy, however, no further studies have yet been published to address this problem in the context of senior high school. Thus, this study sought to determine the SHS learners' financial literacy and numeracy levels and the correlation between these two variables. A survey among 225 respondents was conducted through random stratified sampling, to gather the needed data for the study. The questionnaire used for data gathering was adapted from Chen and Volpe (1998), Balakrishna and Virmani (2019), DECA Inc. (2019), Mandell (2008), James et al. (2012), Jayaraman (2018), and Jorgensen, (2007). The study utilized a descriptive correlational design in which the data was subject to descriptive statistics specifically weighted mean - to determine learners' level of financial literacy and numeracy, and Pearson's R Correlation - to determine the correlation of learner's financial literacy and numeracy. It was then found out that the learners had low levels of financial literacy and a moderate level of numeracy. It was also revealed that a significant moderate positive correlation ($p < 0.5$) exists between the two variables.

Keywords: *Financial Literacy, Financial Knowledge, Numeracy, Financial Numeracy, Senior High School, Philippines*

Background of the Study

Financial literacy is broadly defined as one's ability to understand and manage its finances. The phrase can also refer to the knowledge of financial institutions, products, and concepts; financial skills, such as being able to compute compound interest payments; and, more generally, financial competence in terms of money management and financial planning, and these concepts and ideas may also coexist (Xu and Zia, 2012). This helps to orientate in financial services and make sensible judgments which is a vital skill in life that is necessary for people to improve their living standards and well-being. Being financially illiterate on the other hand is the lack of appropriate financial knowledge that may result in ill-advised financial decisions that are detrimental to each individual as well as their household, society, and the economy as a whole (Cole et al., 2011; Fenton et al., 2016; Hussain & Sajjad, 2016; Lusardi et al., 2010).

Despite its renowned importance, Filipinos still do lack financial literacy. Studies have shown adults in the Philippines have low levels of financial literacy. Villanueva (2021) cited the 2015 World Bank (WB) assessment on adult financial literacy stating that Filipinos have the lowest level of financial literacy among its neighboring countries. In the same survey, Filipino respondents correctly answered an average of three out of seven financial literacy questions and performed poorly on inflation, interest calculation, and basic division. In addition, a study conducted by Indefonso and Yazon (2020) presented data wherein more than half, which is at 52.40% of its high school respondents, have a low level of financial literacy. The same study has also cited the 2014 Standard and Poor's (S&P) Financial Literacy Survey, which showed that only 25% of Filipinos adults polled were judged to be financially literate.

This problem however is not experienced in the Philippines alone, low level of financial literacy is a worldwide issue. In fact, the same S&P survey revealed that only one out of three adults are financially literate. Jayaraman et al. (2018) also cited the results of the 2015 Program for International Student Assessment (PISA) survey among 15-year-old individuals stating that financial literacy is low among youth in 34 Organization for Economic Cooperation and Development (OECD) countries.

Another variable in this study is numeracy, which is defined as "the quality or state of being numerate; ability with or knowledge of numbers" but it is beyond just the ability to do calculations, it also involves analyzing calculations, comprehending how numbers relate to one another, and the manipulation of its essential components (Kus, 2018). Its importance to the learner's development of logical thinking and reasoning techniques in daily tasks is widely acknowledged. However, studies have cited the PISA 2018 National Report of the Philippines, which showed that high school students had a low mean score in terms of mathematics proficiency – which is below the level 1 proficiency score, ranking the nation as the second lowest overall in terms of mathematics proficiency among the 79 participating countries worldwide (Indefonso and Yazon, 2020; Layug et al., 2021). Thus, educators are urged to provide activities that emphasize numeracy which also integrates context from the real world into subjects other than mathematics (ACARA, 2019; Forgasz et al., 2017). Different studies measuring the levels of numeracy on different age brackets and grade levels were also found and revealed varying results, where college students in the Philippines exhibited average level of numeracy skills (Indefonso and Yazon, 2020). In contrast, Jayaraman et al. (2018) and Lusardi (2012) found low levels of numeracy among high school students in their respective populations.

Considering this variable in relation to the aforementioned issue, there were studies that have linked and discovered the relationship between numeracy and financial literacy (Drabekova et al., 2022; Indefonso and Yazon, 2020; Jayaraman et al., 2018). This discovery has then paved a way for possible solutions as to how numeracy can be utilized to integrate financial education in response to the low level of financial literacy among students.

As previously stated, numerous studies have attempted to investigate the connection between financial literacy and numeracy, but the numeracy that this study is interested in concentrates on is the mathematical skills essential for daily financial computations, and the financial literacy in this study will be measured on the learner's knowledge of the financial concepts related to earning, spending, saving and investing, borrowing, and protecting, which are considered to be the components of financial literacy according to Financial Literacy and Education Commission as cited by Bungalow (2022).

Furthermore, no studies have yet been conducted in the context of Senior High School learners here in the Philippines. Hence there is a need to explore the relationship between these variables in the said context to aid in employing solutions to problems that concern the level of financial literacy and numeracy of the students in the institution and the community it belongs, as well as to provide basis in the context for general policy-making and curriculum enhancement of Senior High School.

The following are the literatures regarding the components of financial literacy. These components were the basis of the questionnaire used to measure financial literacy.

Borrowing

According to Lusardi and Tufano (2009) individuals that consist of poor level of financial literacy tend to have inadequate borrowing knowledge and are prone to encountering borrowing problems such as having excessive debt loads, the inability to judge their debt position, transacting in high-cost matters, incurring higher fees, and high-cost borrowing. Furthermore, having a low level of financial literacy might lead to the establishment of negative borrower behavior and an increase of financial fragility that result in fraud and abuse.

As enunciated by Klapper et al. (2012) (financial literacy has a positive relationship with participation in financial markets and a negative relationship with the use of informal sources of borrowing. It is stated that individuals with higher levels of financial literacy are more likely to experience having greater availability of unspent income as well as higher spending capacity. In addition, people who have a low level of financial knowledge are more likely to end up borrowing more and accumulating lower amounts of wealth.

Earning

Earning as a noun, refers to the sum of money that a person or an organization receives over a period of time (Corporate Finance Institute, 2022), it may also be in the form of collections, real estate, and investments as any financial profit can be considered as earning (University of Wyoming, n.d.), and is deemed among the most important factors that affect a company's financial performance (Corporate Finance Institute, 2020) as it constitutes the profits or gains of an entity.

Insurance

Dalkilic and Kirkbesoglu (2015) states that the insurance system is a vital pillar of the financial system. Several nations focus on establishing great progress in the operation of the insurance system for it to keep the financial system running. The insurance system can be stabilized where society keeps on educating individuals to improve their insurance knowledge and awareness. In contrast, financial literacy is a factor in having a high level of insurance awareness. Having a high level of financial literacy results in an effective insurance system wherein financially educated people can contribute to the financial system of the economy by making good decisions when it comes to choosing insurance products and creating demands and interests in the insurance system. Meanwhile, having low financial literacy will result in the collapse of the financial system of the economy wherein people suffer in financial crisis due to poor and inadequate levels of financial knowledge and low level of insurance awareness and decision-making. As a result, there is a great need for financial education to be taught starting at home and be further developed in the institution-level education to increase one's preferences and awareness of financial matters.

Saving and Investing

Saving refers to the excess cash an individual is in possession of after expenses have been subtracted (Picardo, 2019), this action is done with the intention to utilize cash for future expenditures (University of Wyoming). Investment on the other hand, pertains to the allocation or payment of monetary resources with the expectation of yielding profit or returns (Picardo, 2022). In addition, various studies revealed that knowledge and behavior on investment (Agarwal and Kuchler, 2020) and savings (Britt and Grable, 2021; Hogan and Maniar, 2020; Kim and Chatterjee 2019) are positively associated with an individual's level of financial literacy.

Spending

Spending refers to the utilization of monetary resources in trading for products or services (Inocian, 2020). In this study, spending is a component of financial literacy as it is a necessity to make purchases that aligns with an appropriate spending plan and retain discipline to the plans created (Dwiastanti, 2015), this is supported by a statement made by Inocian (2020) stating that “spending of money comes with a purpose,” which she elaborates to be substantially observable and well- defined in order prevent underspending or overspending.

Statement of the Problem

The study sought to investigate the correlation of senior high school learners' financial literacy and numeracy. Specifically, it determined the: (1) level of student's financial literacy; (2) level of student's numeracy; and (3) the significant relationship between student's numeracy and financial literacy.

Based from the research objectives, the researchers had derived on the hypothesis:

Ho: There is no significant relationship that exists between the senior high school learners' level of financial literacy and numeracy.

Theoretical Framework

The study is bounded on the theory of the role of cognitive abilities on financial literacy by Munoz et al. (2019), which claims that cognitive abilities such as numeracy, memory, and processing speed are crucial in developing financial literacy. This theory argues that higher cognitive abilities are associated with greater financial literacy and also stated that improving the aforementioned cognitive abilities may lead to better financial literacy, which in turn can lead to better financial outcomes.

Conceptual Framework

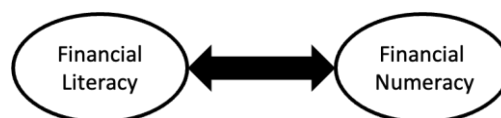


Figure 1: Relationship Between Financial Literacy and Numeracy

A conceptual framework was created to show the focus of the study. Presented in Figure 1 is the goal of the research which is to discover and assess whether there is a relationship between two variables; (1) Financial Literacy and (2) Numeracy.

Methodology

Research Design

A quantitative research design with a descriptive-correlational approach was used for this study. According to Seeram (2019) correlational research design is used to measure relationships between two or more variables. One of the kinds of correlational research design, also cited from Seeram, is the descriptive method which in

the case of this study emphasized on describing and analyzing the relationship of financial literacy and numeracy among senior high school students.

Respondents of the Study

The respondents of the study were the senior high school learners who are taking or have taken up the Entrepreneurship subject, specifically those from the Grade 12 HUMSS, STEM, and ABM strands. Entrepreneurial knowledge has a direct impact on financial literacy (Suparno & Saptono, 2018), for this reason the classes that are taking or have taken up the Entrepreneurship subject were selected as they were the most appropriate respondents for the study.

Sampling Technique

The study required 225 respondents which was solved using the Slovin's formula. These respondents were chosen through stratified random sampling technique wherein only a specific number of students will serve as representatives from each class. This is to ensure proper representation of the total population for each strand and section. Moreover, the number of respondents required to participate for each strand and class was solved using the proportional allocation formula.

Research Instrument

The research questionnaire adapted from Chen and Volpe (1998), Balakrishna and Virmani (2019), DECA Inc. (2019), Mandell (2008), James et al. (2012), Jayaraman et al. (2018), and Jorgensen, (2007) was used in this study to determine the level of financial literacy and numeracy of the SHS learners. The questionnaire consisted of two sections: (1) Financial Literacy, and (2) Numeracy. The Financial Literacy section of the questionnaire was divided into five sub-sections namely; (1) Earning, (2) Spending, (3) Saving and Investing, (4) Borrowing, and (5) Insurance with two questions per sub-section that will determine the level of Financial Literacy of learners based on the given components. On the other hand, the Numeracy section consisted of ten questions related to the following concepts; (1) Basic Mathematical Operations, (2) Expenditure Computation, (3) Investment Return Computation, and (4) Income computations. Overall, the research questionnaire was composed of 20 questions and it was subjected to content and face validation before the gathering of data.

Data Gathering Procedure

A letter of approval was submitted to the school administrators of the identified locale requesting the permission to be allowed in conducting the data collection. Once approved the researchers then proceeded to collection of data which will be done face-to-face with use of validated survey questionnaires. Prior to the collection of data, the participants were informed about the study and procedures that will be taken by the researchers and may choose not to participate, as this is a voluntary survey. After gathering the data, the questionnaires were checked, scores were computed, and was then analyzed. It was ensured that the data recorded during the collection were kept with utmost confidentiality and will only be used for research purposes.

Ethical Consideration

The following ethical guidelines were followed by the researchers when carrying out their study, especially when gathering data. The researchers made sure that the respondents were given adequate knowledge about the study and the steps that will be followed in the study. A consent form describing their options to accept or reject the processes for gathering data was also provided. It was also stated that their identity and any information they provided would be kept at utmost confidentiality and used only for this research study. In addition the researchers had also requested the Senior High School Department Principal's approval to conduct the study through a formal letter.

Data Analysis

This study made use of descriptive statistics specifically weighted mean and Pearson r correlation to analyze the data gathered for this study. Descriptive statistics according to Holcomb (2016) is often used to organize and summarize data for easier analysis and interpretation. For SOP 1 and 2 weighted mean will first be used to describe both the level of learner's financial literacy and numeracy. Since the data from the questionnaire come in different weights, weighted mean is the most appropriate mean to be measured as Ganti (2022) have stated that the weighted mean is much more accurate than the simple mean in the case of studies similar to this. For SOP 3 on the other hand, the same data underwent a Pearson correlation to examine if there is indeed a relationship that exists between financial literacy and numeracy particularly in the context of the Senior High School learners in the Philippines. This Pearson r correlation is the appropriate test as the variables being studied are normally distributed (Mukaka, 2012). The tables below were used to interpret the level of financial literacy and numeracy of the learners, as well as the strength of the relationship in two variables. It was adapted from Dancey and Reidy (2007), a Pearson Correlation Interpretation Table used for psychology studies as cited by Akoglu (2018).

Table 1: Rating Scale for the Financial Literacy and Numeracy

Mean Scores	Interpretation
9.00-10.99	Very High
7.00-8.99	High
5.00-6.99	Moderate
3.00-4.99	Low
0.00-2.99	Very Low

Table 2: Dancey & Reidy Interpretation Table

Correlational Size	Interpretation
± 1	Perfect Correlation
± 0.7 to ± 0.9	Strong Positive/Negative Correlation
± 0.4 to ± 0.6	Moderate Positive/Negative Correlation
± 0.1 to ± 0.3	Weak Positive/Negative Correlation
0	Zero Correlation

Results and Discussions

Level of SHS Learners' Financial Literacy

This section sought to describe the level of financial literacy among SHS learners through their scores on the first section of quiz type questionnaires. The results of the analysis and interpretation of the questionnaire data are displayed in the table below. The sum of all the scores in the financial literacy section divided by the total number of study participants yielded the mean scores for each item. The weighted mean was then calculated using the respective mean scores to determine the overall financial literacy of SHS learners.

Table 3

<i>Level of Financial Literacy of SHS Learners</i>		
Questions	Mean	Interpretation
F1, F2 Earning	7.65	High
F3, F4 Spending	4.78	Low
F5, F6 Saving and Investing	3.09	Low
F7, F8 Borrowing	3.23	Low
F9, F10 Insurance	2.76	Very Low
Overall	4.30	Low

Note: 9.00-10.99 = Very High
7.00-8.99 = High
5.00-6.99 = Moderate
3.00-4.99 = Low
0.00-2.99 = Very Low

As presented in Table 3, with a weighted mean score of 4.30 on a 10-point scale utilized by the researchers, it was found that the learners have a “Low” level of financial literacy. However, the students exhibited “High” level of knowledge for questions F1 and F2, which are connected to the earning aspect of financial literacy, obtaining a mean score of 7.65. Meanwhile, attaining a mean score of 2.76, the learners portrayed “Very Low” levels of understanding on topics regarding insurance.

The results aligned coherently with the 2015 World Bank (WB) assessment of adult financial literacy’s result wherein it was found that Filipinos have a low level of financial literacy at only 25% (Villanueva, 2021). In addition, as stated in the study of Idenfonso and Yazon (2020), only 25% of the Filipino respondents who participated in the 2014 Standard & Poor's Financial Literacy survey were concluded to be financially literate. Also, in a study conducted by Jayaraman (2018), questions that are associated with borrowing were likewise shown to have the lowest accumulated scores since the component required more complex computation. Furthermore, in the same study, the author has also cited the results of the 2015 Program for International Student Assessment.

(PISA) survey which presents a low level of financial literacy among youth which is also consistent with the findings of this study.

Level of SHS Learner's Numeracy

This section aimed to describe the level of numeracy among SHS learners through quiz type questionnaires. The data from the said questionnaires were then analyzed and interpreted as the table _ shows. The mean scores for each item were the sum of all the scores from the numeracy questions divided by the total respondents of this study. The respective mean scores were then the basis for weighted mean used to determine the level of financial literacy of the SHS learners in general.

Table 4*Level of Numeracy of SHS Learners*

Questions	Mean	Interpretation
N1, N3, N5 Basic Mathematical Operations	8.22	High
N2, N10 Expenditure Computation	5.43	Moderate
N4, N6, N7 Investment Return Computation	5.31	Moderate
N8, N9 Income Computations	4.02	Low
Overall	5.75	Moderate

Note: 9.00-10.99 = Very High
 7.00-8.99 = High
 5.00-6.99 = Moderate
 3.00-4.99 = Low
 0.00-2.99 = Very Low

Table 4 indicates that the learners demonstrated “Moderate” level numeracy skills, with a weighted mean score of 5.75. The table also showed the mean scores for problems N1, N3, and N5, which can be solved using basic mathematical operations, had mean scores of 8.22 which are deemed to be at the "High" level. The mean score for question N8 and N9 on the other hand, which requires knowledge of income computations, was at 4.02 which is considered to be "Low."

In the study of Indefonso and Yazon (2020), it was shown that the learners who participated exhibited an average level in terms of numeracy skills which compliments the findings of this study. Meanwhile, the study of Jayaraman et al. (2018) and Lusardi (2012) differs from the results of the aforementioned studies and indicates that there is low level of numeracy among high school students in their respective population. Moreover, the result of the PISA 2018 National Report of the Philippines was also cited in different literature which demonstrates low mean scores in mathematics proficiency for high school learners in the Philippines (Indefonso and Yazon, 2020; Layug et al., 2021).

Relationship of Financial Literacy and Numeracy among SHS learners

This study sought to determine the extent of relationship of the 225 SHS learner’s financial literacy and numeracy. The data gathered by the researchers were known as continuous and were normally distributed thus, Pearson r correlation was used to measure the strength of the relationship between variables. The results of this test are presented in the table below.

Table 5: Significant Relationship Between SHS Learners’ Financial Literacy and Numeracy

Variable	Numeracy		Remarks
	r	p-value	
Financial Literacy	.488 ^{^^}	0.000 ^{**}	Significant

**Correlation is significant at 0.05 level of significance

^{^^}Moderate positive level of relationships

Legend:	
± 1	Perfect Correlation
± 0.7 to ± 0.9	Strong Positive/Negative Correlation
± 0.4 to ± 0.6	Moderate Positive/Negative Correlation
± 0.1 to ± 0.3	Weak Positive/Negative Correlation
0	Zero Correlation

The table above exhibits a statistically significant relationship ($p < 0.5$) between the SHS students' financial literacy and numeracy. It also revealed the findings of the Pearson correlation analysis, which indicate a moderate positive correlation between the two variables with a correlation coefficient 0.4880.

Studies conducted by Drabekova et al. (2022), Indefonso and Yazon (2020), and Jayaraman et al. (2018) also were able to find correlation between the level of financial literacy and numeracy of their respondents. However, only the study of Indefonso and Yazon (2020) was able to complement the findings of the study that there is a moderate positive relationship between numeracy and financial knowledge – which was utilized in this study as the measurement of the learner's financial literacy. Furthermore, the studies of Drabekova et al. (2022) and Jayaraman et al. (2018) indicate that there is a strong positive correlation between the level of financial literacy and numeracy of their respondents.

Conclusion

The results of this study, reveals a low level of financial literacy and moderate level of numeracy among senior high school learners. Given the findings, it was also concluded that there is a significant positive correlation between financial literacy and numeracy of the SHS learners. This indicates that the learners' level of numeracy has a significant influence on their financial literacy. Thus, as the learners' numeracy improves, their financial literacy may change accordingly.

Recommendations

Based on findings and conclusions drawn in this study as well restrictions and constraints that were encountered during the its conduct, the researchers would like to suggest the following to help improve the current state of financial literacy; (1) Include the learner's financial behavior and attitude in measuring their financial literacy to widen the scope of the study as financial literacy is a broad topic to be discussed. They may also opt to discover how other aspects of financial literacy such as budgeting, taxation, and financial management can correlate to numeracy in order to expand the information related to the study. To address the issue of low levels of financial literacy among the youth, the researchers would also like to suggest the (2) assessment and enhancement of the curriculum programs, and activities that cater the SHS learners to improve the learners' numeracy in the context of financial literacy, such as interest computations. Furthermore, the lack of questions catering to senior high school levels particularly in financial literacy was observed by the researchers thus they encourage the (3) development of financial literacy questionnaires that are appropriate for a specific grade level and country curriculum in order to obtain the most accurate data possible.

Conflicts of Interest

The authors have no conflict of interest in the conduct and preparation of this paper.

Acknowledgements

The researchers of this study would like to convey their gratitude and acknowledge the institution's Director, Bro. Noel T. Fernandez, FMS and SHS Principal, Mrs. Jeann Lester D. Rosali, MSc, for allowing this study to be conducted; to their subject teacher and research adviser, Mr. Carlos Friaes Gaygay Jr., LPT; to their validators, Mr. Eric A. Gatmaitan, Mrs. Jennelyn F. Debildos, Mr. Karl Evan R. Pama, and Ms. Racel N. Pilloso, LPT, MST; to their statistician, Ms. Dejell Anne M. Satur, for contributing their time, insights, guidance, and knowledge; to Mr. Xaviery Arvy Pilipil for his assistance in the mass printing of survey questionnaires; to their friends and families for their immense support; and lastly, to the Almighty God, for providing them the strength, wisdom, and opportunity to conduct, progress, and complete their study.

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