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The 2nd International Seminar on Innovation in Mathematics and Mathematics Education (ISIMMED 2018)

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**The 2nd International Seminar on Innovation
in Mathematics and Mathematics Education (ISIMMED 2018)**

Universitas Negeri Yogyakarta, Indonesia

20-24 November 2018

Editors:

Dr. Agus Maman Abadi

Fakultas Matematika dan Ilmu Pengetahuan Alam,
Universitas Negeri Yogyakarta, Indonesia
agusmaman@uny.ac.id

Dr. Ariyadi Wijaya

Fakultas Matematika dan Ilmu Pengetahuan Alam,
Universitas Negeri Yogyakarta, Indonesia
a.wijaya@uny.ac.id

José Antonio Vallejo, Ph. D.

Facultad de Ciencias,
Universidad Autónoma de San Luis Potosí, Mexico
jvallejo@fc.uaslp.mx



Preface: Proceedings of the 2nd International Seminar on Innovation in Mathematics and Mathematics Education 2018

A Wijaya¹, A M Abadi¹, and J A Vallejo²

¹Mathematics Education Department, Yogyakarta State University, Indonesia

²Facultad de Ciencias, Universidad Autónoma de San Luis Potosí, Mexico

We are honored to present a collection of articles from the 2nd International Seminar on Innovation in Mathematics and Mathematics Education (ISIMMED 2018) which was conducted in Universitas Negeri Yogyakarta, Indonesia from 20 to 24 November 2018.

The theme of the conference was '*innovative technology in mathematics: new ways for learning, teaching, and researching mathematics*'. In the era of Industrial Revolution 4.0, the use and integration of technology into various aspects of everyday life is rapidly increasing. The availability and development of advanced technology have a great impact on the practices of educational research and classroom activities in the fields of mathematics and mathematics education. This situation becomes a great challenge and motivation for researchers and educators. Various technological innovations have been invented and developed to improve the quality of research and education in the field of mathematics. The advanced technological tools such as computer algebra systems (CAS), interactive and dynamic geometry software, and hand-held devices, have been enabling the effectiveness of mathematics teaching and learning.

During the ISIMMED 2018, scholars, educators, and researchers in the field of mathematics and mathematics education from many countries gathered to share their expertise and works. After a series of review process, 108 articles are selected to be published in this Scopus-indexed proceeding. The remaining articles are published in the regular proceeding.

The editors and the committees of ISIMMED 2018 would to thank the participants who have contributed and shared their scientific works in this proceeding. We also would to to express our gratitude to every committee member for organizing the conference and to Universitas Negeri Yogyakarta for the financial support.

15 March 2019

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Analysis of students' financial literacy skills on mathematics teaching and learning

A Mahmudi¹ and D H Listiyani²

¹Department of Mathematics Education, Faculty of Mathematics and Natural Science, Universitas Negeri Yogyakarta, Indonesia

²SMP N 3 Tepus, Gunung Kidul, Yogyakarta, Indonesia

alimahmudi@uny.ac.id

Abstract. Life success requires a number of strategic skills, one of which is literacy skills, including financial literacy skills. Financial literacy skills is the possession of the set of skills and knowledge that allows an individual to make informed and effective decisions with all of their financial resources. Financial literacy skill is one of the basic skills to achieve a better life and avoid financial problems. Financial literacy consists of aspects of knowledge, skills and attitudes. This study describes the financial literacy of junior high school students in Gunung Kidul Regency Yogyakarta. The results of the study show that students' financial attitudes for each aspect, namely confidence in financial planning and the tendency to save and not consumptive are categorized as good. Meanwhile, financial knowledge and skills in mathematics learning are also categorized as good. Students who have good financial knowledge tend to have good financial attitudes too.

1. Introduction

Each era has its own challenges, such as the 21st century which requires a number of skills for individuals to succeed in life in this century. Some of these strategic skills are life and career skills, learning and innovation skills and information and technology skills. Young people now require skills transferrable between jobs, such as problem solving, communication skills, digital literacy, teamwork, presentation skills, critical thinking, creativity and financial literacy (as opposed to technical skills, considered to be specific to a particular task, role or industry) [1]

Financial literacy, which is one of the 21st century skills, is a core life skill for participating in modern society. One country's economic growth is supported by the level of public financial literacy. A well literate society is easier to understand about financial services, which can have implications for community skills in optimally utilizing financial products and services to improve welfare and can protect themselves from potential losses due to financial sector crime.

Financial literacy is an instrument for creating economic stability characterized by good financial management. Financial management imbalances, such as spending that is greater than income, can result in the financial crisis of individuals or families. A massive personal or family financial crisis can have implications for the country's economic instability. This is in line with the results of research that show that there is a very strong relationship between financial literacy and family welfare [2].



Financial literacy [as] having knowledge and skills needed to make economic and financial decisions with competence and confidence [3]. Financial literacy is the ability to understand finance. More specifically, it refers to the set of skills and knowledge that allow an individual to make informed and effective decisions through their understanding of finances [4]. Good financial literacy is not only characterized by the ownership of knowledge or information about finance, but also the skills to use knowledge and information to achieve financial prosperity.

Financial literacy includes two dimensions, namely the knowledge and application dimensions [5]. The dimension of knowledge includes the stock of knowledge acquired through education and/or experience specifically related to essential personal finance concepts and products. The dimensions of the application include applying and confidence to effectively use knowledge related to personal finance concepts and products. The knowledge dimension is a prerequisite for the application dimensions shown in Figure 1.

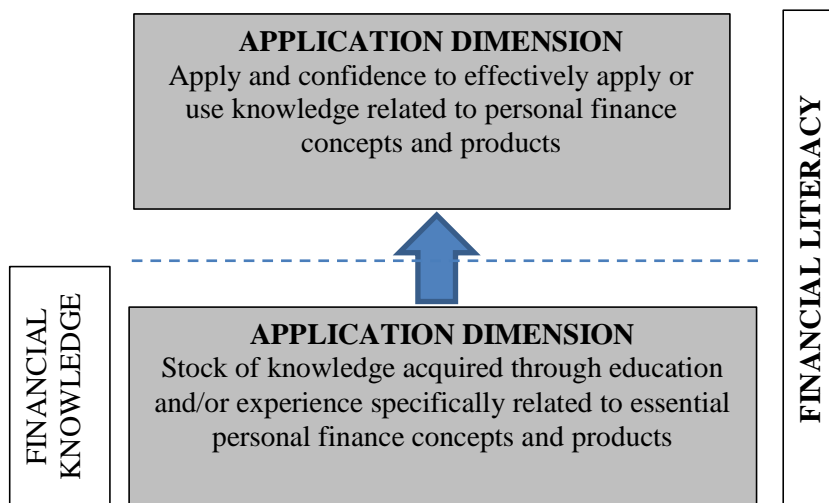


Figure 1. Diagram of Financial Literacy Concept

Financial literacy can be classified into two aspects, namely knowledge and skills [5]. Financial knowledge and skills are strongly influenced by financial attitudes [6]. Wise financial attitudes and skills are reflected in individual skills in determining financial goals, arranging financial planning, managing finances and making quality financial decisions. The results of the study show that financial knowledge and skills are positively correlated, as well as financial knowledge and financial attitude [7]. Referring to this opinion, financial literacy can be defined as "having appropriate knowledge, skills and attitude about daily and longer term financial maintenance or promoting financial wellbeing" [8]. Thus, financial literacy includes three components, namely knowledge, skills and attitudes. Financial literacy can also be defined as a combination of awareness, knowledge, skills, attitude and skills necessary to make sound financial decisions and ultimately achieve individual financial wellbeing [9].

In this study, financial literacy was classified into three aspects, which consisted of attitudes, knowledge and skills [8]. Basic financial knowledge includes financial management related to banking, finance, savings and credit [10]. Knowledge can also include areas of savings, spending, loans and investments. Financial skills related to problem solving, decision making and critical thinking related to financial problems [3]. Meanwhile, financial attitudes consist of beliefs in financial planning, saving trends and consumption trends [11]. Each aspect of financial literacy and its indicators along with the relevant context are presented in Table 1.

Table 1. Aspects, Indicators and Financial Literacy Contexts

Aspects	Indicators	Contexts
Financial Knowledge	Saving Money and Transaction Borrowing	1. Individual 2. Home and family 3. School and work 4. Society
Financial Skills	Problem solving Decision making	
Financial Attitude	Confidence in planning finance The tendency to save for future needs Consumption tendency	

To determine the condition of the Indonesian financial literacy, the Indonesian Financial Services Authority held a National Survey on Financial Literacy and Inclusion in 2016 [12]. Indonesian Financial Services Authority is an Indonesian government institution whose job is to regulate and supervise the financial services industry while protecting the interests of the community in interacting with the financial services industry. In protecting the interests of the community there are aspects of financial literacy and inclusion that require a separate strategy in its implementation. The survey is to map the current state of financial literacy and inclusion of the Indonesian people. Based on the results of the survey, Indonesia's financial literacy rate increased from the previous of 21.8% in 2013 to 29.7% in 2016. The literacy covers the banking sector (28.94%), insurance (15.76%), pension funds (10.91%), financing institutions (13.05%), pawnshops (17.82%), capital markets (4.40%), health insurance (28.29%) and employment insurance (11.02%).

Regarding financial attitudes and skills, survey data shows that 96.81% of the people claimed to have financial goals, but these goals were still dominated by short-term goals, namely to fulfill daily life (49.11%), survive (17.68%) and children's education costs (8.00%). While the financial behavior of the community in achieving these financial goals tends to short-term efforts that are in line with the trend of financial goals, namely by saving (75.29%), arranging financial plans (42.13%) and working/looking for work (38.36%) [12].

The low level of attitudes and financial behavior of the Indonesian people corresponds to the low level of community numeracy skills related to financial products and services. Survey data shows that only 36.02% of the people stated that they have the ability to calculate interest, investment returns, product usage costs, fines and inflation. More detailed data shows that 92.55% of respondents can answer simple arithmetic questions correctly, 30.00% say they can calculate interest, but only 62.61% of respondents can provide the right answer regarding interest calculation. There are 10.98% who say they can calculate the value of the currency/inflation, but it turns out that those who can provide the correct answer regarding the concept of inflation are only 35.28%. Only 9.67% of the people claimed to be able to calculate investment returns.

Financial literacy is very important for students to be able to manage finances and obtain financial benefits from them [13]. Therefore teaching it is a necessity. Measuring financial literacy is very important to do as a basis for determining the best strategy in developing it, including through mathematics learning activities. Measuring the three components of financial literacy, namely knowledge, skills and financial attitudes can provide better information about financial literacy [11]. This study is intended to measure students' financial literacy in mathematics learning which includes aspects of students' knowledge and skills and financial attitudes.

2. Method

This study was conducted in a junior high school in Gunung Kidul Regency, Yogyakarta, Indonesia, in March - April 2017. The subjects of this study were 27 students and 20 math teachers in Gunungkidul Yogyakarta. The instruments of this study were tests of financial literacy knowledge and skills, student

financial attitude questionnaires and teacher experience questionnaires on financial literacy. Financial literacy tests consist of 10 multiple choice questions to measure financial knowledge and 6 questions to measure financial skills. The financial attitude questionnaire consists of 13 statements that are used to measure students' financial attitudes which consist of confidence in financial planning, saving trends and consumption trends. Financial attitude tests and questionnaires have been tested for validity and reliability. The questionnaire reliability index and the tests were 0.705 and 0.651 respectively.

The data was analyzed to describe students' financial literacy which included aspects of students' knowledge, skills and financial attitudes. After being converted on a scale of 100, the results of the test of financial knowledge and skills are categorized based on the minimum mark, which is 75, as follows.

Table 2. Category of Test Score and Financial Attitude

Interval	Category
$86 \leq \text{Test score} \leq 100$	Very good
$74 \leq \text{Test score} < 86$	Good
$60 \leq \text{Test score} < 74$	Medium
Test score < 60	Less

3. Results and Discussion

The results of the financial literacy test show that the average percentage of students' knowledge and financial skills are 79.27 and 78.61, respectively, which are categorized as good. Data on students' financial knowledge and skills according to successive aspects are presented in Table 3 and Table 4.

Table 3. Data on Students' Financial Knowledge

No	Aspects/Indicators	Average	Category
1	Saving	80,09	Good
2	Transaction	75	Good
3	Borrowing	82,72	Good

Table 3 informs that each aspect of financial knowledge, namely savings, transactions and loans, are each categorized as well which corresponds to the average overall financial knowledge. However, from these three aspects, the transaction aspect score is the lowest (75). The aspect of the transaction is precisely related to transactions involving percentages, such as the following question which can only be done correctly by 15 out of 27 students (55.55%).

Problem Example 1

Mr. Tulus will give clothes to the orphanage. He went to the store which gave a 10% discount for purchasing 1-3 clothes and 15% for purchasing more than 4 clothes. Mr. Tulus bought 7 clothes, each with a price of Rp90,000.00. Determine the amount of money Mr. Tulus must pay to purchase the clothes.

Table 4. Data on Students' Financial Skills

No	Aspects/Indicators	Average	Category
1	Problem solving	82,96	Good
2	Decision making	74,25	Good

Table 4 informs that the score of each aspect of financial skills, namely problem solving and decision making, are each categorized as good. However, the score for the decision-making aspect is much lower. Predictably, students rarely interact with financial activities that require the ability to make decisions. The following questions are related to decision making.

Problem Example 2

The school will buy t-shirts and pants for students' uniforms. There are four stores, each of which sells these shirts and pants. The following is a list of prices and large discounts from each of the four stores.

Type	Price	Discount			
		Store A	Store B	Store C	Store D
T-shirt	Rp80.000,00	25%	20%	15%	10%
Pants	Rp100.000,00	10%	15%	20%	25%

The average score of students for this question is 71.11 on a scale of 100. Only 8 out of 27 students (29.63%) can answer completely and correctly. The relatively low ability of students to make decisions in accordance with the results of the Indonesian Financial Services Authority survey that identifies the behavior and financial attitudes of Indonesian people [11]. The results of the survey, for example, were only 28.4% of the people who were prepared to risk losing money when saving or investing. Accordingly, there are only 63.1% of students who will consider carefully when going buying something.

The average score of students' financial attitudes is 4.03 (80.53%) which is categorized as good. Data on students' financial attitudes according to their aspects are presented in Table 5.

Table 5. Data on Students' Financial Attitudes

Aspects	Average	Category
Confidence in financial planning	4.05 (81%)	Good
The tendency to save	4.36 (87.2%)	Good
The tendency not to be consumptive	3.67 (73.4%)	Medium

Table 5. informs that although the average score of students' financial attitudes is categorized as good, but it does not always correspond to the scores of each aspect, namely confidence in financial planning, the tendency to save and the tendency not to consume. The score for the non-consumptive tendency of students is the lowest, namely 73.4%, which is categorized as sufficient. This shows that student behavior tends to be consumptive. This result corresponds to the statement of students who stated that there were 25.93% who stated that their pocket money was indeed spent. This result also corresponds to the results of the Indonesian Financial Services Authority survey which showed that there were 9.8% of people who stated that money was spent [12].

The results of the students' financial attitude questionnaire showed that related to saving activities showed that there were 96.2% of students who stated that they were more comfortable when they had savings, as much as 88.83% of students stated that they would save if they still had pocket money the importance of saving. The results of this questionnaire correspond to the students' knowledge scores related to saving activities which are categorized as good. The attitude of students related to saving activities is also in line with the results of a national survey of the Indonesian Financial Services Authority which showed that only 34% of students are more focused today than tomorrow and only 10.4% of students feel more comfortable spending money than saving it for a long time [12].

Table 7 explains the relationship between attitudes, knowledge and financial skills. From the pattern of data it can be seen that there is a relationship between attitudes and knowledge and financial skills of students. This shows that good financial behavior or skills can be built by building good financial attitudes. This fact is in line with study that financial education is needed for children, including education regarding good financial attitudes that can provide a basis for having good financial skills [9].

Table 6. Data on Students' Financial Attitudes

No	Statements	Strongly Disagree	Disagree	Doubt	Agree	Strongly Agree
1	Planning to use pocket money is something important to do	0 (0%)	0 (0%)	0 (0%)	12 (44.44%)	15 (55.56%)
2	I feel more comfortable when I have savings	0 (0%)	0 (0%)	1 (3.70%)	10 (37%)	16 (59.20%)
3	If I still have leftover pocket money, I will save it	0 (0%)	1 (3.70%)	2 (7.41%)	9 (33.33%)	15 (55.5%)
4	Record spending is not important	3 (11.11%)	3 (11.11%)	9 (33.33%)	6 (22.22%)	6 (22.22%)
5	It is important for me to find as much information as possible about the items I will buy	0 (0%)	3 (11.11%)	7 (25.93%)	11 (40.74%)	6 (22.22%)
6	I will consider my finances before shopping	0 (0%)	0 (0%)	1 (3.70%)	16 (59.26%)	10 (37.00%)
7	For me saving is not important	1 (3.70%)	0 (0%)	1 (3.70%)	10 (37.04%)	15 (55.56%)
8	I prefer to save a little more than nothing	0	0	0	7 (25.93%)	20 (74.07%)
9	I will consider the price of shopping	0 (0%)	0 (0%)	5 (18.52%)	11 (40.74%)	11 (40.74%)
10	Finding information about items that I will buy will only waste time	3 (11.11%)	13 (48.15%)	8 (29.63%)	1 (3.70%)	2 (7.41%)
11	I am sure my savings will be useful later	0 (0%)	0 (0%)	0 (0%)	2 (7.41%)	25 (92.59%)
12	A pocket money is indeed to be spent	3 (11.11%)	3 (11.11%)	14 (51.85%)	7 (25.93%)	0 (0%)
13	It is important for me to manage so that spending does not exceed pocket money	0 (0%)	3 (11.11%)	9 (33.33%)	8 (29.63%)	7 (25.93%)

Table 7. Relationship between Financial Attitudes, Knowledge and Skills

Attitude Category	Knowledge and Skill Category		
	Good	Medium	Less
Good	5 (18.52%)	4(14.81%)	2(7.41%)
Medium	10(37.04%)	2(7.41%)	1(3.7%)
Less	0	1((3.7%)	2(7.41%)

Early development of financial literacy needs to be done to equip students as early as possible because they will soon be faced with financial decisions [9]. Strategic places to develop it are schools through learning activities, including learning mathematics. In fact, the potential of schools to teach financial literacy has not been well optimized. The survey results of the Indonesian Financial Services Authority show that information sources that influence financial decisions are from TV advertisements (51.74%), suggestions from friends (31.69%) and information from financial service institutions (23.43%) [11]. The survey results show how the community has not seen the role of schools in learning financial literacy. One of these facts can be explained from a survey conducted on 20 mathematics teachers in Gunung Kidul District regarding their understanding of financial literacy and its role in developing it. The results of the survey showed that only 25% of teachers were involved in the concept of financial literacy, only 35% of teachers tried to develop financial literacy and 35% of teachers who linked their learning to financial literacy.

Most think that we should be financially literate and view it as an unmitigated good that financial

literacy will be taught in elementary and secondary schools [14]. Mathematics learning has strategic potential to teach efficient strategic skills for students, especially thinking skills, including thinking skills related to financial literacy. This is in line with the view that "mathematics is union of two sets: the first is the collection, or the structure of structures consists of particular axioms, definitions, theorems, proofs, problems, and solutions. The first set of products that are characteristic of mental acts that comprise the first set [15]. This view also corresponds to that in line with the view that "in this changing world, those who understand enhanced opportunities and options for shaping their futures." Mathematical competence opens doors to productive futures [16].

4. Conclusion

Financial literacy, which consists of attitudes, knowledge and financial skill is a strategic skill for students to live a successful life in the future. The results of the study show that students' financial attitudes for each aspect, namely confidence in financial planning and the tendency to save and not consumptive are categorized as good. Meanwhile, financial knowledge and skills in mathematics learning are also categorized as good. Students who have good financial knowledge tend to have good financial attitudes too. Learning mathematics has a strategic role to integrate the development of financial literacy.

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