

CLUSTER ANALYSIS OF FINANCIAL LITERACY AND FINANCIAL BEHAVIOR AMONG UNIVERSITY STUDENTS

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Abstract

This study aims to classify university students based on their financial literacy and financial behavior using cluster analysis. Financial literacy and behavior are essential competencies for students as they transition toward financial independence. This study employs a quantitative exploratory approach with data collected through a structured questionnaire from undergraduate students. The variables used in the clustering process consist of financial literacy and financial behavior indicators measured using a five-point Likert scale. Data were analyzed using hierarchical cluster analysis with Ward's method to determine the optimal number of clusters, followed by K-Means cluster analysis for final classification. The results reveal the existence of three distinct student clusters with different characteristics of financial literacy and financial behavior. These findings indicate that students are not homogeneous in managing their personal finances. The study contributes to the literature by providing a segmentation-based perspective and offers practical implications for designing targeted financial education programs for university students.

Keywords: Cluster Analysis, Financial Behavior, Financial Literacy

1. INTRODUCTION

The increasingly complex development of the financial system requires individuals to have the ability to understand and manage their finances wisely. Financial literacy is an important competency that plays a role in helping individuals make rational and responsible financial decisions. The (OECD, 2022) defines financial literacy as a combination of knowledge, skills, attitudes, and behaviors necessary to make sound financial decisions and achieve financial well-being.

Financial literacy is an individual's ability to understand financial concepts and apply them in making rational financial decisions. Financial literacy is important to ensure financial well-being, especially for young people such as students who are just entering the phase of independent financial management. The Financial Services Authority (OJK) defines financial literacy as the understanding, ability, and confidence to use knowledge, skills, attitudes, and behaviors in making appropriate and optimal financial decisions (Otoritas Jasa Keuangan, 2025).

Financial literacy refers to the knowledge needed to manage financial challenges and make financial decisions in daily life. Financial literacy is a term related to knowledge that is often applied in daily life, whether consciously or unconsciously (Ramadhan et al., 2023). Financial literacy offers significant benefits to individuals in managing their financial affairs. Individuals with a high level of financial literacy tend to be able to make more appropriate and rational financial decisions (Mireku et al., 2023).

In addition, financial literacy has also been shown to be a key factor influencing the quality of financial decision-making (Chen & Volpe, 1998). Furthermore, adequate financial understanding enables individuals to effectively manage household budgets, plan savings, and

make more strategic investment decisions. Financial literacy also plays a role in enhancing individuals' capacity through a broader mastery of financial knowledge, thereby enabling them to evaluate various financial products and make the right choices. In line with this, it is stated that the financial knowledge individuals possess can assist in fulfilling financial obligations through careful planning and optimal resource allocation, allowing for more efficient utilization in daily life (Phelps & Metzler, 2024).

Low financial literacy levels have the potential to increase unwise financial behavior, such as consumption, late debt payments, and poor budget management. Conversely, higher literacy tends to be associated with more responsible financial behavior, such as planning, budgeting, and good debt management. International studies have found that students with higher financial literacy are more likely to exhibit healthy financial behavior than those who are less literate.

Students are a group that is in a transitional phase towards financial independence, where they begin to manage their finances independently, such as managing pocket money, saving, using credit, and becoming familiar with investing. However, a number of studies have shown that the level of financial literacy among students remains relatively low and is not always reflected in healthy financial behavior (Chen & Volpe, 1998; Lusardi & Mitchell, 2014). Low financial literacy can lead to irresponsible financial behavior, such as excessive consumption, lack of financial planning, and suboptimal debt management. However, OJK SNLIK 2025 data shows that the 18-25 age group, which is the age range of students, has the second highest financial literacy rate at 73.26%. It is only surpassed by the 26-35 age group. The results of the OJK SNLIK 2025 can be seen in Table 1 below:

Table 1. Financial Literacy by Age Group in 2025

Age Group	Survey Results
15-17 years old	51,86%
18-25 years old	73,26%
26-35 years old	74,05%
36-50 years old	72,12%
51-79 years old	55,03%

Source: OJK (2025)

In Indonesia, a number of empirical studies show that financial literacy influences the financial behavior of students. Financial behavior refers to the set of actions and habits individuals exhibit in managing their financial resources. Each individual exhibits distinct financial behavior characteristics, which are influenced by various factors (both internal and external) that shape their preferences and decision-making patterns in financial matters (Ramadhan et al., 2025). Janah and Anindya (2026) found that an increase in financial literacy was positively and significantly associated with students' financial behavior. Meanwhile, Suyanto & Sada (2022) study found that the level of financial literacy has a positive significant effect on the financial behavior of students in accounting and management study programs.

Previous studies on literacy and student financial behavior generally use a regression analysis approach to test the relationship or influence between variables (Lusardi & Mitchell, 2014). This approach treats students as a homogeneous group, when in reality students have diverse financial literacy and behavior characteristics. Therefore, an alternative approach is needed that can group students into more homogeneous segments based on similarities in their financial characteristics.

Although many studies have examined the relationship between financial literacy and financial behavior, previous studies have been limited in their exploration of clustering student profiles based on literacy and behavior characteristics. This study differs from previous studies

in that it applies a cluster analysis approach to classify students based on a combination of financial literacy and financial behavior characteristics, rather than examining cause-and-effect relationships using regression analysis.

For students, financial literacy and behavior are important because this phase is the initial stage of independent financial decision-making (Chen & Volpe, 1998). Therefore, grouping students based on financial literacy and behavior through cluster analysis can provide a more comprehensive picture of segmentation.

Cluster analysis is a multivariate statistical method that aims to group objects based on the level of similarity of characteristics without setting a dependent variable (Hair et al., 2019). This approach allows researchers to identify types or profiles of students based on a combination of financial literacy and financial behavior simultaneously. The results of this grouping are expected to provide a more comprehensive picture of student segmentation in personal financial management.

Cluster analysis provides an exploratory approach that can reveal hidden patterns, for example: groups with high literacy–positive behavior vs. low literacy–consumptive behavior, thereby providing more targeted financial education intervention recommendations. Methodologically, cluster analysis is a statistical technique used to group objects that have certain similarities into one cluster so that intra-cluster similarity is high and inter-cluster similarity is low.

Various international studies have used cluster analysis techniques to examine financial behavior, for example in the Financial Well-Being survey by the National Institutes of Health in the US, which successfully identified different response groups based on financial behavior patterns. However, there are still few studies that combine the application of cluster analysis in the context of Indonesian students for financial literacy and behavior. Thus, this study attempts to fill this gap by conducting a cluster analysis of the financial literacy and financial behavior of students in Indonesia, as well as identifying the profiles of groups that emerge based on this data.

This study aims to group students based on their level of financial literacy and financial behavior using cluster analysis, as well as to identify the characteristics of each cluster formed. The findings of this study are expected to form the basis for the development of more targeted financial literacy education and intervention programs for students.

2. METHOD

This study is a quantitative study with an exploratory approach. The exploratory approach is used to identify patterns and segmentation of students based on financial literacy and financial behavior through cluster analysis. The population in this study are active students at universities in South Tangerang. The research sample was determined using purposive sampling, with the criteria being active students who have managed their personal finances independently. The minimum sample size refers to the multivariate analysis recommendation, which is 5–10 times the number of indicators used (Hair et al., 2019). With 9 indicators, the sample size is 90 students (10 x 9 indicators).

This study uses primary data obtained through the distribution of questionnaires to respondents. The questionnaire was compiled based on instruments that had been used in previous studies and adapted to the context of university students. This study does not use dependent and independent variables, but rather clustering variables, namely: financial literacy, which is measured based on indicators that refer to the OECD (2022) and Lusardi & Mitchell (2014), including: understanding of the concepts of interest and inflation; understanding of financial risk; knowledge of savings and investment; knowledge of personal financial management. Then financial behavior, which is measured based on indicators developed by

Hilgert et al. (2003) and (Xiao, 2008), including: financial planning and budgeting; saving behavior; expenditure control; debt management; investment behavior. All indicators are measured using a five-point Likert scale. Data analysis in this study used cluster analysis with the help of SPSS software. The stages of data analysis are as follows:

- **Validity and Reliability Tests.** The validity test was conducted using Pearson Product Moment correlation, while the reliability test used Cronbach's Alpha coefficient.
- **Data Standardization.** All financial literacy and financial behavior variables were standardized using Z-scores to avoid differences in measurement units between indicators before cluster analysis was performed.
- **Hierarchical Cluster Analysis.** Hierarchical cluster analysis was performed using Ward's Method and Euclidean Distance to determine the optimal number of clusters. The number of clusters was determined based on dendrograms and agglomeration schedules.
- **Non-Hierarchical Cluster Analysis (K-Means).** Based on the optimal number of clusters obtained from hierarchical cluster analysis, K-Means Cluster analysis was then performed to group respondents in a more stable and consistent manner.
- **Cluster Profiling.** The final stage involved analyzing the characteristics of each cluster by comparing the mean values of financial literacy and financial behavior in each cluster.

3. RESULT AND DISCUSSION

In this study, the researcher used SPSS 26 to perform K-Means Clustering analysis to determine the final number of clusters that form groups with a certain number of members. The initial stage of cluster analysis began with determining the optimal number of clusters. This determination was made through hierarchical cluster analysis using the Ward method, which is known to be effective in minimizing intra-cluster variation. Based on the agglomeration schedule results, there was a significant spike in the agglomeration coefficient at a certain stage, indicating a critical point in the data grouping process. This spike became the initial statistical basis for determining the representative number of clusters.

This finding is then reinforced through dendrogram visualization. The dendrogram shows a relatively large agglomeration distance at a certain cut-off point, visually indicating that the most optimal cut-off occurs in the formation of three clusters. Thus, both quantitatively through the agglomeration schedule and visually through the dendrogram, the most appropriate number of clusters to represent the data structure is three clusters.

Next, non-hierarchical cluster analysis using the K-Means method was applied to confirm the grouping results. This analysis was conducted on 90 student respondent data, all of which were declared valid. The results showed that the data was divided evenly into three clusters, with each cluster consisting of 30 students. This relatively even distribution indicates that the characteristics of the respondents in each cluster have a good level of internal homogeneity and clear differences between clusters.

Before the cluster analysis process was carried out, all research variables underwent a standardization stage using Z-scores. This standardization aimed to eliminate differences in the measurement scales between indicators so that no variable dominated the cluster formation process. Thus, the clustering results obtained reflected the contribution of each indicator proportionally and objectively.

The complete results of cluster data processing are presented in Table 1. In addition, the K-Means Cases output shows that the total number of respondent data used in this study is 90 observations and no missing values were found. This condition indicates good data quality and supports the reliability of the cluster analysis results.

Table 2. K Means Cases

Number of Cases in each Cluster		
Cluster	1	30
	2	30
	3	30
Valid		90

Source: SPSS data analysis V.26 (2026)

The data analysis and categorization process in this study was conducted using SPSS software version 26 through the application of the K-Means Clustering method. The cluster analysis involved two main variables, namely financial literacy and financial management, which were selected because they represent aspects of financial knowledge and the actual behavior of respondents in managing their finances. The combination of these two variables enabled the formation of clusters that not only reflect the level of financial understanding but also its implementation in daily practice.

The K-Means analysis results show that respondents can be grouped into three clusters with different characteristics. These differences in characteristics between clusters reflect variations in the respondents' levels of financial literacy and quality of financial management. Thus, the formation of clusters is not merely descriptive, but also provides a more in-depth picture of respondent segmentation based on behavior patterns and financial capabilities.

The division of respondents into these three clusters indicates heterogeneity in literacy and financial management skills among respondents. Each cluster represents a group with certain characteristics, ranging from relatively low, moderate, to high levels of literacy and financial management skills. Therefore, the results of this clustering can be used as a basis for further analysis, both to understand the financial profiles of respondents more comprehensively and to formulate intervention strategies or financial education programs that are more targeted and tailored to the needs of each cluster.

Table 3. Final Cluster Centers

Indicator	Cluster 1	Cluster 2	Cluster 3
LK1	1.83	2.25	4.02
LK2	2.06	2.42	3.98
LK3	2	1.75	3.95
LK4	2.22	1.58	4.03
LK5	1.5	2.17	4.1
LK6	1.83	2.17	4.07
LK7	1.83	2	3.97
LK8	1.61	2.25	3.92
Mean	1.86	2.07	4
PK1	1.78	2.42	3.92
PK2	1.78	1.83	3.97
PK3	2.22	2.17	3.8
PK4	2.06	1.33	4.05
PK5	1.72	2.17	3.97
PK6	1.72	2.17	4.03
PK7	2	2.42	4.02
PK8	1.61	2.5	3.97
PK9	1.61	2.17	3.88
PK10	1.94	2.42	3.95
Mean	1.83	2.13	3.96

Source: SPSS data analysis V.26 (2026)

Table 4. Cluster ANOVA Test Results

Indicator	F	Sig.
LK1	136.759	0.000
LK2	124.592	0.000
LK3	125.29	0.000
LK4	115.26	0.000
LK5	145.333	0.000
LK6	141.615	0.000
LK7	155.073	0.000
LK8	110.414	0.000
PK1	104.003	0.000
PK2	146.923	0.000
PK3	95.305	0.000
PK4	166.072	0.000
PK5	129.882	0.000
PK6	132.505	0.000
PK7	96.606	0.000
PK8	119.657	0.000
PK9	122.36	0.000
PK10	110.896	0.000

Source: SPSS data analysis V.26 (2026)

Based on the results of the Analysis of Variance (ANOVA) test between clusters, a significance value below the critical limit of 0.05 was obtained. These results indicate that the differences in characteristics between clusters are statistically significant, so it can be concluded that the clustering process produced is valid. In other words, each cluster formed represents a group of respondents with distinctly different financial literacy and financial behavior characteristics.

The next step is to conduct cluster profiling to identify and interpret the characteristics of each cluster. The mapping results show that the first cluster consists of students with relatively low levels of financial literacy and financial behavior. The second cluster represents students with moderate levels of financial literacy and financial behavior. Meanwhile, the third cluster is a group of students with high levels of financial literacy and financial behavior. Students in this last cluster demonstrate a more comprehensive understanding of financial concepts and more responsible and planned financial management behavior.

Overall, the cluster analysis results indicate that students are not homogeneous in terms of financial literacy and financial behavior. These findings confirm that a segmentation approach is more relevant than a simple causal approach in understanding students' financial management patterns. The existence of several clusters with different levels of financial literacy and behavior reflects variations in students' abilities, attitudes, and habits in managing personal finances.

The first cluster consists of students with low levels of financial literacy and financial behavior. Students in this cluster tend to have limitations in understanding basic financial concepts and exhibit unstructured financial behavior, such as low savings habits, minimal financial planning, and weak expenditure control. This condition is in line with the findings of Chen & Volpe (1998), who stated that some students still face limitations in financial literacy, which ultimately has a negative impact on the quality of personal financial management.

The second cluster reflects students with moderate levels of financial literacy and financial behavior. This group shows a gap between financial understanding and its application

in daily behavior. Although students in this cluster have a relatively good understanding of basic financial concepts, their application in practice is still inconsistent, especially in terms of consumption control and long-term financial planning. This phenomenon reinforces Xiao (2008) view that financial literacy alone is not always sufficient to encourage healthy financial behavior without the support of adequate habits, discipline, and self-control.

Meanwhile, the third cluster consists of students with high levels of financial literacy and financial behavior. Students in this cluster have a strong understanding of key financial concepts, such as interest, inflation, risk, and investment. This understanding is reflected in more responsible financial management behaviors, including systematic financial planning, consistent saving habits, and more rational and long-term oriented financial decision-making. These findings are in line with Lusardi & Mitchell (2014), who state that individuals with high levels of financial literacy tend to be able to make more optimal and sustainable financial decisions.

Implicitly, these clustering results provide a strong basis for designing more segmented financial education programs. A uniform approach is potentially less effective, given that the needs and characteristics of each cluster are different. Therefore, strategies to improve students' financial literacy and behavior need to be tailored to the profile of each cluster so that interventions are more targeted and have a long-term impact.

Overall, the results of this study support the definition of financial literacy put forward by the OECD (2022), which emphasizes that financial literacy is not only related to knowledge but is also reflected in financial attitudes and behaviors. The findings of the clusters formed show that improving financial literacy needs to be accompanied by efforts to shape sustainable financial behaviors so that students can achieve financial well-being in the future.

From a practical perspective, the results of this segmentation have important implications for universities and relevant stakeholders. Financial education programs for students should be designed differently according to the characteristics of each cluster. Students in the low financial literacy and behavior cluster require basic interventions that focus on understanding fundamental financial concepts, while students in the middle cluster need programs that emphasize the formation of financial habits and discipline. Meanwhile, students in the high cluster can be directed towards advanced financial education, such as long-term financial planning and investment.

4. CONCLUSION

This study aims to group students based on their level of financial literacy and financial behavior using a cluster analysis approach. The results show that students are not a homogeneous group in terms of personal financial management. Through cluster analysis, several clusters of students with different characteristics of financial literacy and financial behavior were formed.

The findings indicate that there are groups of students with low levels of financial literacy and behavior, groups with moderate levels, and groups with relatively high levels of financial literacy and behavior. The differences in characteristics between clusters show that students' level of financial understanding does not always correspond to their financial behavior, making a segmentation approach relevant in understanding students' financial management patterns.

Theoretically, these research results support the view that financial literacy is a multidimensional concept that encompasses aspects of knowledge and behavior, as emphasized by the OECD. The cluster analysis approach provides an alternative perspective in the study of student financial literacy by emphasizing the mapping of characteristics rather than causal relationships between variables.

This study contributes to the literature on financial literacy and behavior by applying a cluster analysis approach in the context of university students. Unlike previous studies, which generally use regression analysis to test cause-and-effect relationships, this study shows that segmenting students based on a combination of financial literacy and behavior can produce a more comprehensive understanding of student heterogeneity in personal financial management. Thus, this study enriches the methodological approach in financial literacy studies.

The results of this study have practical implications for universities and relevant stakeholders in designing financial education programs for students. Financial literacy programs should be developed in stages and tailored to the characteristics of each cluster. Students with low financial literacy and behavior require basic interventions that focus on understanding fundamental financial concepts. Meanwhile, students in the middle cluster need an approach that emphasizes the formation of financial habits and discipline. Students in the cluster with high financial literacy and behavior can be directed towards strengthening long-term financial planning and investment decision-making.

For policymakers in the field of education, the results of this study can be used as a basis for formulating policies to strengthen student financial literacy through the curriculum or non-academic support programs. The cluster-based approach enables more targeted and efficient policies, so that interventions can be tailored to the specific needs of each student segment.

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