Research Article

Factors Influencing Dropout Students in Higher Education

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Dropout students are a severe problem in higher education (HE) in many countries. Student dropout has a tremendous negative impact not only on individuals but also on universities and socioeconomic. Consequently, preventing educational dropouts is a considerable challenge for HE's institutions. Therefore, knowing the factors influencing student dropout is an essential first step in preventing students from dropping out. This study uses a mix of qualitative and quantitative approaches. To determine what variables affect student dropout, we use a qualitative approach, after which the variables found will be validated by the public and stakeholders using a quantitative approach. Then, the next step is to classify variables using a quantitative approach. This study observes dropout students at private universities in Central Java, Indonesia. The findings reveal that personal economic factors, academic satisfaction, academic performance, and family economics are the most influential. The results of this paper are significant for universities in Indonesia, especially Central Java, to overcome the problem of student dropouts, so that they are more precise in making decisions. In addition, the results of this study are also helpful for further research as a basis for predicting students dropping out of university.

1. Introduction

Student dropout in higher education (HE) is a prominent topic in many countries, such as Spain [1, 2], United States [3], Germany [4, 5], as well as Indonesia. Based on data from Pangkalan Data Perguruan Tinggi (PDDIKTI) (Higher Education Database) (2018, 2019), the percentage of students dropping out within the last 2 years was getting higher in Indonesia. In 2018, the dropout rate for students was 3% of the total students, with 245,810 student dropouts, and in 2019 was 8%, with the number of dropout students 698,261. In 2019, the highest number of dropouts was found on the island of Java, with as many as 414,901 students. Central Java has the most significant growth in the number of dropout students, namely, 63,253 students. Based on the HE status, the dropout student rate of private higher education is more significant than public higher education. Figure 1 shows the students' ratio dropping out of students' total number for the last 2 years by higher education status.

Dropout is a critical indicator of an educational system's quality because it demonstrates the persistence of significant failures in direction, transition, adaptation, and student promotion [6]. Dropouts negatively impact individuals, universities, and socioeconomic status in Indonesia: (1) student dropout involves physical and psychological loss at the individual level. Students experience depression due to inadequacy and self-doubt, which are associated with dropouts. Besides, they will be aware of wasting time, money, effort, and personal resources: (2) dropouts at the university level have economic and educational consequences. From an economic perspective, the more dropouts, the worse university's financial condition. From an academic perspective, dropout students indicate a red signal to the education system to provide convenient services for students; and (3) the socioeconomic level, the dropout student's effect can never be overlooked because university graduates provide notable influences with both returns to education and the real economic growth. Therefore, preventing student dropout is a big challenge for private universities.

The first step in preventing student dropouts is understanding the elements contributing to it [7]. In Indonesia, just the number of dropout students is recorded; the reason for the dropout is not given any particular attention.
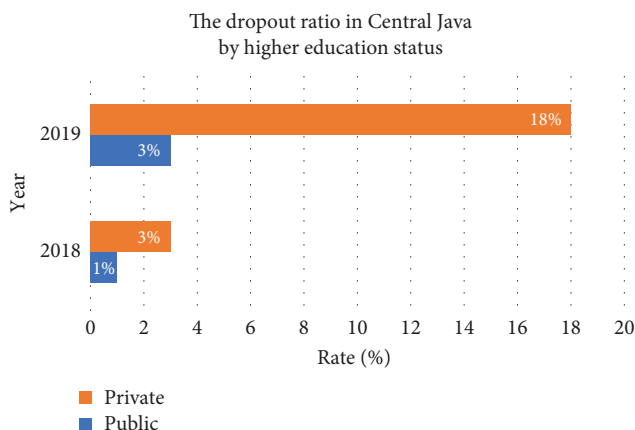
FIGURE 1: Student dropout based on higher education status.

FIGURE 2: Research stages.

Knowing the factors that influence student dropouts will be very helpful in preventing dropouts. Therefore, the research question in this study is "What factors influence students' decision to dropout of private universities in Central Java, Indonesia?" The results of this paper are significant for universities in Indonesia, especially Central Java, to overcome the problem of dropping out of university so that they are more precise in making decisions. In addition, the results of this study are also helpful for further research as a basis for predicting student dropouts.

2. Literature Review

The initial step in preventing student dropouts is comprehending the contributing factors [7]. The reason for student dropouts at HE is very complex and influenced by several variables. Based on Mouton et al.'s [8] report, many factors influence student dropouts in Germany. Often the reason is a combination of several factors. Mouton et al. used latent class analysis to identify dropout students. The results show why students dropout due to relationships with study programs or universities, socioeconomic factors, student performance, academic self-concept, and intention to dropout. Ortiz-Lozano et al. [2] observed the factors influencing student dropouts in Spain based on sociodemographic and academic variables. The reason for choosing this variable is not clearly explained, but the research results show that this variable has a significant effect.

Pérez et al. [9] discussed the prediction analysis of dropout students in Colombia. The variables that affect student dropouts in Colombia are student demographics and transcript records. These variables are used to predict dropout students, and the resulting variables significantly affect dropout students. Chen et al. [3] also researched the predictions of dropouts in the United States. In Chen's study, the variables used to predict dropout were high school information, demographics, college enrollment, and information per semester. It is not clearly explained reasons for taking these variables for predictions. However, based on the analysis results, the selected variables significantly predict student dropout rates. Troelsen and Laursen [10] observed the factors influencing dropout students in Denmark. According to them, two hypotheses influence
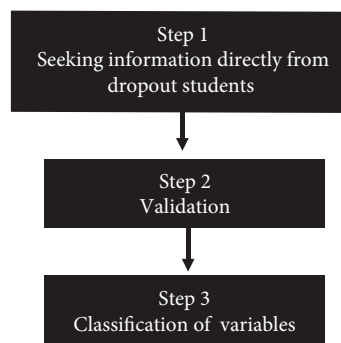
dropout students. The first hypothesis is that dropout students are affected by parental education and socioeconomics. The second hypothesis states that students dropout due to Danish government policies related to education, causing them to move to study programs, change universities, or not continue their studies.

In predicting dropout students, selecting variables is one of the most critical stages because the variable is the primary construct in a study. From the previous research described, the factors influencing dropout students from one country to another are different. This is supported by Troelsen and Laursen's [10] study, which indicates that countries with distinct cultures have varying perceptions of the value of education. Consequently, the factors influencing students' academic success or failure are diverse. Therefore, the variables influencing student dropout are adapted to the country's conditions. In addition, in existing research, the factor that influences dropout students does not come from direct information from dropout students, so the accuracy of the variables still needs to be determined. Considering how important it is to understand the variables that influence dropout students, this study aims to identify the factors that influence dropout students in Indonesia. In this research, the primary source for determining the reasons for dropping out of college is direct information from students who have dropped out, followed by validation from the public and stakeholders to strengthen these reasons.

3. Research Method

This research employs a combined qualitative and quantitative methodology [11]. The stages in this study are shown in Figure 2.

3.1. Step 1: Seeking Information Directly from Dropout Students. A proper step to finding out why students dropout of university is to seek information directly from dropout students. However, this is very difficult, considering dropout is a sensitive matter. Two steps are taken to find more in-depth information related to why students dropout, namely, using questionnaires and indirect interviews (Figure 3). The five bases used to find more in-depth information regarding why students dropout using questionnaires are academic programs, social and economic programs, institutional, academic performance, and personal, as in the previous research of
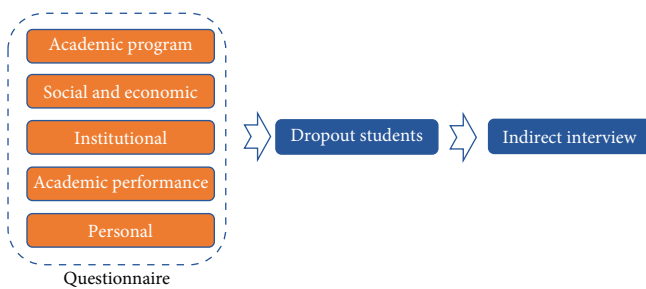
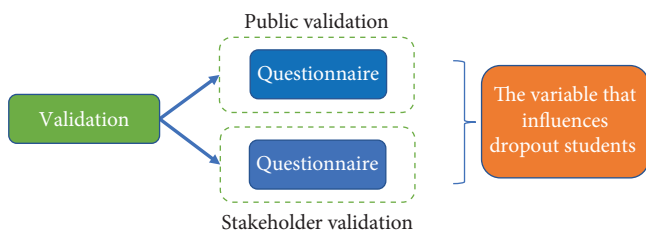FIGURE 3: The stage of seeking information directly from dropout students.

FIGURE 4: The stage of validation.

Nurmalitasari et al. [12]. The questionnaire also includes crucial inquiries about why they dropped out and their satisfaction with learning. The survey was completed by 108 students who had dropped out of a private university in Central Java. After the respondent filled out the questionnaire, the next step was to interview the respondent. The interview aims to discover more in-depth reasons why the respondent experienced a dropout. Since dropout is a sensitive matter, interviews were conducted indirectly using messenger/chat. The interview method used is the unstructured interview. The critical point in the interview was why the respondent dropped out of the university. The interview guide is based on explaining why students dropout in the previous step.

3.2. Step 2: Validation. The next step is to validate the findings of step 1. There are two validations: validation by public opinion using questionnaires and stakeholders using questionnaires (Figure 4). The stakeholders referred to in this study are the rector, vice-rector, dean, and head of the study program. The purpose of this validation is that the variable's findings can be used in a general conclusion related to variables that affect student dropout. In this stage, the questionnaire's content is the respondents' agreement on the variables that affect student dropout findings from step 1. The questionnaire used in the validation stage of public opinion with stakeholders is the same. Validity and reliability questionnaire using the Rasch model [12–14]. The Rasch model is an analytical tool that can evaluate the validity and reliability of research instruments and the suitability of individuals and items, something that other analytical techniques have not matched [13, 15].

3.3. Step 3: Classifications of Variables. The third step of this study is to classify these variables into dimensions factors using the categorical principal component analysis (CATPCA) [15, 16]. CATPCA is a technique for reducing the number of
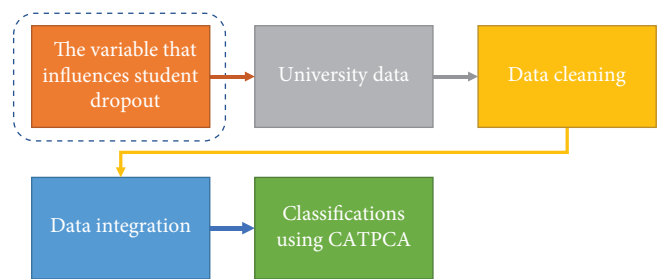

FIGURE 5: The stage of classifications of variables.

variables to make them more concise and uncorrelated with one another (principal components). Categorical variables were analyzed using the optimal scaling procedure, which converts categorical labels to numeric values [17]. Additionally, the variance accounted for (VAF) statistic is used to compare the maximization of the measured variables. The steps in the classification of variables are shown in Figure 5. In this step, we apply variables to university data. The university data used are unaffected by university affiliation, as the variable's selection has been subjected to public and stakeholder validation. The university data were gathered through the distribution of questionnaires to students who graduated from or dropped out of one of Central Java's private universities. The questionnaire contents in this stage are student data related to the findings of the variable from step 2 and the status of the student's exit (dropout or graduation).

4. Result

4.1. Seeking Information Directly from Dropout Students. There are two steps taken to find more in-depth information related to why students dropout, namely, using questionnaires and indirect interviews.

4.1.1. Step 1. Share Questionnaires to Dropout Students. In the academic program, there are two points to be asked, namely, the class program and the year of enrollment. The questionnaire results show that 55% of dropout students come from nonregular program classes and the rest from regular classes. Then, when viewed from the year of enrollment, in 56% of students, the year of admission is not the same as the year of graduating from high school, and in the rest are those students, the year of entry is the same as the year of graduating from high school.

In terms of social and economic factors, three points are discussed. The first is related to parental education; 44% of parents of dropout students have a high school diploma, 19% have an elementary school diploma, and the remainder have a junior high school diploma, a bachelor's degree, a master's degree, or are not enrolled in school. The second point is parents' income; 35% of the income of parents of dropout students is IDR 2,000,000–5,000,000, 53% of parents' income is below IDR 2,000,000, and the rest is above IDR 5,000,000. The third point is related to the parent's occupation. Thirty-five percent of the jobs parents of dropout students are entrepreneurs, 22% are civil servants, and the rest are others.

In institutional factors, the points asked are related to the study program or field of study; 79% of dropout students

come from the engineering field, and others come from the study of humanities, math and natural science, economics, social science, art, and education, which is a tiny percentage. In academic performance factor, the points asked are CGPA. Fifty-seven percent of dropout students have a CGPA of 2.76–3.50, 28% have a CGPA of 2.00–2.75, and the rest are others.

In personal factor, the first point is age; 49% of university dropouts aged 19–18 years, 40% of dropouts aged 29–38 years, and others older than that. The second point is gender; 82% of dropout students are male, and the rest are female. The third point is address; 50% of dropout students come from residency, 16% from the city, and the rest from others.

Along with the five points discussed, student satisfaction with learning is also examined in detail. The points observed are the quality of lecturers, learning facilities, learning climate, assessment system, and relationships with staff/lecturers/academic supervisors. The results of the questionnaire show that: (1) related to the quality of lecturers, the conclusion of the analysis is 75%, meaning that according to dropout students, the lecturers who teach during lectures are "competent"; (2) learning facilities, the conclusion of the analysis is 70%, meaning that students are satisfied with the learning facilities while undergoing lectures; (3) learning climate, the conclusion of the analysis is 71%, meaning that according to dropout students, the learning climate that he got during university "supports" learning; (4) assessment system, the conclusion of the analysis is 72%, which means that according to respondents, the assessment system when they study is transparent; (5) the relationship with staff/lecturers/academic supervisors, the conclusion of the analysis is 75%, meaning that the respondent's relationship with staff/lecturers/academic supervisors during learning is good.

Another important point discussed in the questionnaire is why the student dropped out. The results of the questionnaire show that: (1) 48% of students dropout due to busy work, (2) 19% due to difficulties in doing theses, (3) 5% due to problems in participating in learning, (4) 9% due to moving study programs to other universities, (5) 4% because study programs do not match their interests, (6) 5% due to marriage, (7) 3% because the campus environment is not supportive, and (8) others; the rest are sick or taking care of both parents. The reasons for these dropout students will be used as the basis for interviews to find their reasons in depth.

4.1.2. Step 2. Indirect Interviews. Interviews were conducted to find out more about the reasons for dropping out. Dropout is a sensitive issue. Therefore, it is not easy to interview them directly. As a result, indirect interviews were conducted via chat/messenger. This interview is based on an explanation of why students dropped out in step 1. Data from interviews are analyzed using thematic analysis. The results of interviews with respondents obtained dropout students because:

(1) Busy working: after conducting further interviews with respondents who dropped out because they were busy working, it was concluded that 31% of the respondents were busy working because of

financial difficulties, and 69% had trouble managing their time.

(2) Difficulty in doing thesis: the interview results showed that 52% of respondents had difficulty doing their thesis because they were busy working, 38% of respondents had trouble doing their thesis because of the problem of research material, and 10% because of their stormy relationship with the supervisor.

(3) Move study program to another university: interview results show that 90% of respondents move to other study programs at other universities because the study program does not match the respondent's interests, and 10% is due to campus accreditation that is not in line with expectations.

(4) Difficulty in the following lesson: interview results show that 83% of respondents have difficulty following learning due to wrong taking the study program, and 17% due to family problems.

(5) Married: after respondents got married, they were too busy taking care of the household, so they did not have time to go to university. Of the 108 respondents, 69% were married, and 31% were single.

(6) The study program does not match their interest: the results of the interviews showed that the study program taken was the parent's choice and not their interest.

(7) The campus environment is not supportive: after further interviews, 33% of respondents felt that the quality of the lecturers was unsatisfactory, and 67% of other respondents thought the campus bureaucracy was very convoluted.

(8) Others: respondents dropped out because they were sick, taking care of their parents, and moving domicile.

Based on steps 1 and 2, several outline points can be concluded regarding the variables that affected student dropouts, including:

(1) Students dropout because they are busy working, so they do not have time to go to the university to take care of their studies. So, it can be concluded that employment status is an essential variable affecting student dropouts. Apart from not dividing their time, another finding was that the students were busy working due to a lack of finances. This is closely related to parent income. Another possibility that affects students with financial deficiencies is individual income. Parent income if the student is not married and individual income if the student is married.

(2) The second biggest reason students leave the university before getting a degree are the difficulty of working on a thesis. There are several reasons why students find it difficult to do their thesis. First, they are busy working, so they do not have time to do their thesis. This strengthens the conclusion of the first point, which states that employment status is one of the most influential variables to predict student dropout.

The second reason, students have difficulty working on their thesis is that the thesis material is difficult. If it is seen from the questionnaires of students who dropped out for difficulty in working on their thesis, they have a low CGPA of 2.00–2.75. So, it can be concluded that CGPA is one of the important variables that affected student dropouts. The third reason is a bad relationship with the supervisor/lecturer. Although based on a questionnaire on student satisfaction with learning, it was shown that their relationship with their supervisor/staff/lecturer/academic supervisor was good, there were still students who explained that they had dropped out for reasons that their relationship with their supervisor was not good. Therefore, the variable relationship between students and supervisors and lecturers is still considered one of the variables that are used to predict students dropping out of university.

(3) The third reason students dropout is due to move their study program to another university. This happens because the study program taken is not by their interests. From this point, it can be concluded that the study program interest is a critical variable affecting dropout students.

(4) Difficulty in the following lesson: respondents have difficulty participating in learning due to the wrong study program. The study program they take is not in their interests. This strengthens point 3 that the study program of interest is an important variable in predicting student dropouts.

(5) The fifth reason students dropout is getting married. After they got married, they had difficulty in dividing their time for the university. In addition, after marriage, most of the respondents prioritize their finances for their family rather than for college. From this point, it can be concluded that marital status is one of the important variables to predict student dropout.

(6) The reason the six students dropped out was that the study program did not match their interests because the study program they took was their parents' choice. This point strengthens points 3 and 4, which conclude that the study program interest variable is an important factor in predicting student dropout.

(7) The reason for the seven students dropping out is that academic satisfaction is not supportive. There are two points underlined in this reasoning: the first respondent felt that the quality of the lecturers was unsatisfactory. Although based on the questionnaire, results related to student satisfaction with learning show that the quality of the lecturers is satisfactory, and there are still students who dropout for this reason. Therefore, it is concluded that the variable lecture quality satisfaction is one of the variables that affect dropout students. The second point is the lack of good communication with staff/lecturers/supervisors. This supports the point that the relationship with the staff/
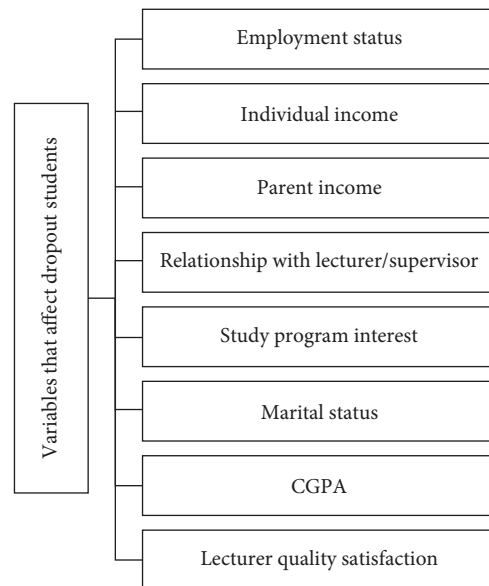

FIGURE 6: Variables that affect dropout students.

lecture variable is an important variable that affects student dropouts.

From these points, it can be concluded that several important points cause students to dropout, which are shown in Figure 6.

4.2. Validation. From Section 4.1, several variables were obtained that affect student dropouts. The next step is to validate the findings of the first stage, as shown in Figure 6.

4.2.1. Public Opinion Validation. In the public validation questionnaire, there are five questions related to the characteristics of the respondents and nine statements of respondents' approval regarding the findings of variables that affect dropout students. Respondents are citizens of Central Java who have graduated from college/university at least with a diploma. Questions related to the characteristics of respondents include age, education level, profession, marital status, and previous education courses. The following are the conclusions from stage 4.1 regarding variable approval and its effect on student dropout rates: parent income (N1), individual income (N2), difficulty in doing a thesis (N3), low CGPA (N4), marital status (N5), study interest program (N6), employment status (N7), satisfaction with lecture quality (N8), and relationship with lecture/staff/supervisor (N9). N3's statement states that some students dropout because of difficulty in doing a thesis due to low CGPA and is reinforced by N4's statement that low CGPA is one of the causes of students dropping out. Statements N3 and N4 confirm that the CGPA variable is one of the important variables used to predict student dropouts. The results of the analysis with Winsteps from 737 respondents obtained results, as shown in Table 1.

Bond and Fox [14] and Rachman and Napitupulu [15] defined high reliability as a Cronbach's alpha value greater

TABLE 1: Summary of 737 measured person and item public opinion validation.

	Total score	Count	Measure	Model error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Summary of 737 measured person								
Mean	28.1	9.00	0.43	0.55	0.95	−0.1	0.93	−0.1
Standard deviation	4.6	0.0	1.46	0.10	0.41	1.0	0.42	1.0
Maximum	41.00	9.00	5.74	0.90	1.86	1.9	2.12	1.7
Minimum	11.0	9.00	−7.21	0.48	0.06	−2.8	0.06	−2.3
Real RMSE	0.59	True standard deviation	1.34	Separation	2.26	Person reliability		0.84
Model RMSE	0.56	True standard deviation	1.36	Separation	2.44	Person reliability		0.86
Standard error of person mean = 0.05.								
Summary of nine measured item								
Mean	2,298.9	737.0	0.00	0.06	0.99	−0.3	0.93	−1.2
Standard deviation	221.9	0.0	0.71	0.00	0.08	1.7	0.09	1.6
Maximum	2,569.0	737.0	0.89	0.06	1.16	3.2	1.08	1.4
Minimum	2,020.0	737.0	−0.89	0.06	0.85	−3.3	0.79	−3.9
Real RMSE	0.06	True standard deviation	0.71	Separation	12.05	Item reliability		0.99
Model RMSE	0.06	True standard deviation	0.71	Separation	12.22	Item reliability		0.99
Standard error of person mean = 0.25.								

Person raw score-to-measure correlation = 0.98. Cronbach's alpha (KR-20) person raw score "test" reliability = 0.81.

than 0.7. As a result, the current device, with a weight of 0.81, is extremely reliable. The reliability and separation items in Table 1 are 0.99 and 12.05, respectively. According to Table 1, the reliability of the items is 0.99, which is considered acceptable. While the separation of item 12.05, in which the instrument's items can be classified into 16 levels based on the respondent's level of difficulty, is approved. According to Bond and Fox [14] and Sumintono and Widhiarso [13], the separation index is greater than two, implying that it has a positive value. While the person generated has a reliability of 0.84, and the respondent separation is 2.26. As a result, the reliability test results obtained indicate that the respondents are also extremely reliable. Meanwhile, the respondent separation index of 2.26 is quite good, as it meets the minimum requirement (>2.0) for dividing respondents into three large groups.

Additionally, the validity of the items is determined using the point correlation measure (PT-MEASURE CORR). This is the polarity of the item. The polarization item check is used to determine whether the constructed structure can achieve its objectives. If the PT-MEASURE CORR value is positive, the item can accurately measure what it is supposed to measure [14, 15]. If, on the other hand, the value is negative, it indicates that the item was not developed to measure the construct being measured and, thus, must be revised or discarded. Once again, this is because the item is unfocused or difficult for the respondent to answer. According to Table 2, each item (N1–N9) has a positive PT-MEASURE CORR value. As a result, no item in the instrument was discarded simply because it met the bare minimum requirements. Additionally, as shown in Table 2, the item 5 measure (N5) has a value of +0.89, indicating that it is the most difficult item for respondents to answer. While item 6 (N6), with a value of −0.89, indicates the item that the respondent finds the easiest

to answer. Additionally, as shown in Table 2, all items have a high PT-MEASURE CORR value, indicating that they can discriminate between respondents' abilities. Suitability (item fit) is determined by the infit and outfit mean square values (MNSQ), as shown in Table 2. As a result, MNSQ value observations are required to ascertain whether the items developed are effective in measuring the construct latent variable. As a result, MNSQ value observations are required to ascertain whether the items developed effectively measure the constructed latent variable.

According to Rachman and Napitupulu [15], the infit and outfit MNSQ parameters should be between 0.6 and 1.4 for data polytomy and between 0.7 and 1.3 for data dichotomy, respectively, to determine the suitability of the constructed item. As a result, outfit MNSQ should be prioritized over infit MNSQ when assessing the suitability of measurement constructs. Additionally, the ZSTD (z standard) values for the infit and outfit received are in the range from −2.0 to 2.0. The ZSTD index, on the other hand, can be ignored if the infit and outfit MNSQ values are obtained. According to Table 2, all items fall within the range of the infit and outfit MNSQ limits for both dichotomy and polytomy items. Thus, according to the Rasch model, the instrument has a total of nine valid and reliable measurement items.

Sumintono and Widhiarso [13] stated that if the person measure is greater than logit 0.0, it indicates a tendency for respondents who responded more frequently to agree on statements about various items. According to Table 1, the person measure has a value of 0.43. As a result, the average value exceeds logit 0.0. As a result, the respondents agree with the N1–N9 statements. According to the overall interpretation of the Rasch model analysis, the public agrees that the variables affecting dropout students are the same as those identified in Section 4.1 (Figure 6).

TABLE 2: Misfit order public opinion validation.

Entry number	Total score	Total count	Measure	Model standard error	Infit		Outfit		PT measure		Exact	Match	Item
					MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	0BS %	EXP %	
3	2438	737	−0.43	0.06	1.16	3.2	1.08	1.4	A 0.60	0.62	49.5	54.9	N3
6	2569	737	−0.89	0.06	1.09	1.6	1.03	0.5	B 0.61	0.62	60.1	61.3	N6
2	2477	737	−0.56	0.06	1.00	0.0	0.97	−0.5	C 0.61	0.62	55.0	57.6	N2
4	2040	737	0.83	0.06	0.99	−0.1	0.91	−1.7	D 0.59	0.61	57.3	54.6	N4
8	2096	737	0.65	0.06	0.98	−0.5	0.99	−0.2	E 0.60	0.61	50.7	52.8	N8
7	2073	737	0.73	0.06	0.96	−0.9	0.87	−2.3	d 0.63	0.61	54.7	52.8	N7
9	2417	737	−0.36	0.06	0.95	−1.0	0.90	−1.7	c 0.62	0.62	54.0	54.8	N9
1	2560	737	−0.86	0.06	0.92	−1.5	0.85	−2.5	b 0.63	0.62	58.3	61.2	N1
5	2020	737	0.89	0.06	0.85	−3.3	0.79	−3.9	a 0.63	0.61	62.0	54.6	N5
Mean	2298.9	737.0	0.00	0.06	0.99	−0.3	0.93	−1.2					
Standard deviation	221.9	0.0	0.71	0.00	0.08	1.7	0.09	1.6					

4.2.2. Stakeholders Validation. Dropout student data are sensitive data for a university. This is because dropout is one factor that affects the accreditation value of a university. Therefore, to claim that the variables found from Section 4.1 also affect student dropouts at universities in Central Java, stakeholder validation was carried out. The stakeholders in question are 17 rector or vice-rector for academics, 10 deans, and 23 heads of study programs from several private universities in Central Java. The stakeholder validation questionnaire is the same as the public opinion validation questionnaire. The Rasch model analysis using Winsteps software shows results, as shown in Table 3.

The item reliability value from Table 3 shows that the value is 0.88, meaning that it is included in the excellent and accepted category. While the separation item's value is 2.72, it can also be assumed to have a positive value because it is greater than 2. In addition, based on Table 3, the reliability of the person generated is 0.85, which means that the respondent has high reliability. Meanwhile, the value of the separation person is also good because the value is equal to 2.34.

According to Table 4, each item (N1–N9) has a positive PT-MEASURE CORR value. As a result, no instrument component is discarded simply because it complies with the minimum requirements.

Additionally, as shown in Table 4, the value of the N8 measure item is +0.96, indicating that it is the most difficult item for respondents to answer. While the value of the N6 measure item is −0.92, which means that the item is the item most easily answered by the respondent. As shown in Table 4, it can also be seen that all items have a high PT-MEASURE CORR value, so it can be concluded that these items can distinguish the respondents' abilities. Another important thing that can be concluded from Table 4 is that the limit value of infit MNSQ and outfit MNSQ is between 0.6 and 1.4. As a result, the instrument has nine valid and reliable measurement items, as defined by the Rasch model. From the overall interpretation of the analysis of the Rasch model, it can be concluded that stakeholders agree that the variables

that affect students dropping out of the university are the same as the conclusions in Section 4.1 (Figure 6).

Based on the results of the validation of public opinion and stakeholders, it can be concluded that it is true that the variables that affect dropout students are (1) employment status, (2) individual income, (3) parent income, (4) relationship lecturer/supervisor, (5) study program interest, (6) marital status, (7) CGPA, and (8) lecturer quality satisfaction.

4.3. Classifications of Variables. This third step utilizes CATPCA to classify these variables into dimension factors. The respondents were 329 students from a private university in Central Java, both dropouts and graduates in 2020. SPSS version 25.0 software was used for this step's analysis. Before classifying variables, the first step is to clean the data. In this study, data cleaning was performed on missing values and noisy data. This study performed data cleaning on missing values and noisy data. Missing values are resolved using the median. Outlier detection uses casewise diagnostics to determine noise data. There are no missing values or noisy data; in this case, so the next step is data integration.

The primary issue with data integration is redundancy. If a variable is "derived" from another variable, it is redundant. The correlation between the two variables is used to identify redundancy. The chi-square test determines the correlation between nominal and nominal and nominal and categorical data. Meanwhile, the Spearman test was used to determine categorical data with categorical data. The significance value of the correlation analysis of the analyzed variables is given in Table 5. According to Leech et al. [18], two variables are correlated if their significance value is $p < 0.5$. From the results of the analysis, as shown in Table 5, there are several correlated variables, but these variables are not derived from one another. Therefore, although they are correlated, these variables are still used for the next analysis stage.

The next step is to classify the variables using CATPCA. The number of variable classifications is determined by the main component, which has an eigenvalue more than 1. Eigenvalues describe VAF values in the major component

TABLE 3: Summary of 50 measured person and item stakeholder validation.

	Total score	Count	Measure	Model error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Summary of 50 measured person								
Mean	27.1	9.00	0.07	0.57	0.96	−0.1	0.93	−0.1
Standard deviation	4.8	0.0	1.62	0.15	0.49	1.3	0.48	1.1
Maximum	36.0	9.00	3.31	1.00	2.11	2.3	1.96	1.9
Minimum	16.0	9.00	−4.95	0.47	0.04	−2.8	0.04	−2.6
Real RMSE	0.64	True SD	1.49	Separation	2.34	Person reliability		0.85
Model RMSE	0.59	True SD	1.51	Separation	2.56	Person reliability		0.87
Standard error of person mean = 0.23.								
Summary of nine measured item								
Mean	150.8	50.0	0.00	0.23	0.99	0.0	0.93	−0.3
Standard deviation	13.9	0.0	0.68	0.01	0.16	0.9	0.21	0.9
Maximum	169.0	50.0	0.96	0.24	1.24	1.3	1.37	1.5
Minimum	131.0	50.0	−0.92	0.22	0.66	−2.0	0.54	−2.2
Real RMSE	0.23	True standard deviation	0.63	Separation	2.72	Item reliability		0.88
Model RMSE	0.23	True standard deviation	0.64	Separation	2.82	Item reliability		0.89
Standard error of person mean = 0.24								

Person raw score-to-measure correlation = 0.98. Cronbach's alpha (KR-20) person raw score "test" reliability = 0.82.

TABLE 4: Misfit order stakeholder validation.

Entry number	Total score	Total count	Measure	Model standard error	Infit		Outfit		PT measure		Exact	Match	Item
					MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS %	EXP %	
8	131	50	0.96	0.23	1.24	1.3	1.37	1.5	A 0.50	0.59	56.0	54.9	N8
3	163	50	−0.59	0.23	1.20	1.1	0.99	0.1	B 0.59	0.65	62.0	61.3	N3
9	163	50	−0.59	0.23	1.08	0.5	1.07	0.3	C 0.60	0.65	52.0	57.6	N9
6	169	50	−0.92	0.24	1.05	0.3	1.03	0.2	D 0.72	0.67	66.0	54.6	N6
7	142	50	0.42	0.22	0.97	−0.1	0.83	−0.7	E 0.67	0.61	58.0	52.8	N7
5	140	50	0.52	0.22	0.93	−0.3	0.83	−0.7	d 0.59	0.60	66.0	52.8	N5
2	154	50	−0.14	0.22	0.91	−0.5	0.86	−0.6	c 0.65	0.63	62.0	54.8	N2
4	132	50	0.91	0.23	0.89	−0.5	0.87	−0.5	b 0.59	0.59	58.0	61.2	N4
1	163	50	−0.59	0.23	0.66	−2.0	0.54	−2.2	a 0.73	0.65	66.0	54.6	N1
Mean	150.8	50.0	0.00	0.23	0.99	0.0	0.93	−0.3			60.7	57.1	
Standard deviation	13.9	0.0	0.68	0.01	0.16	0.9	0.21	0.9			4.7	2.5	

variable. The balance of component-based VAF values describes the eigenvalues ordered by the number of analysis variables. As shown in Table 6, there are four dimensions with eigenvalues greater than 1, meaning that the variables that affect dropout students are classified into four factor dimensions.

Then, the next analysis uses the four dimensions of these factors, which can be seen in Table 7. The sum of the four components' VAF is 74.415% (Table 7), which means that the four dimensions of the grouping of eight ordinal and nominal variables show a good fit. VAF should be recognized as the primary criterion for selecting variables because it is crucial evidence of consistency between the principal components and measured variables. The variables were chosen from Table 8, taking the total VAF value into account. Variables with a total VAF of 25% or greater will be used for further

analysis. As shown in Table 8, the combined VAF of all variables is greater than 25%, and, thus, all variables are included in the following analysis.

Table 9 illustrates how variables are created from student dropout factor components. Component loading displays the Pearson correlation coefficient between the quantified variable and its central component between −1 and 1. This symbol indicates the relationship within the variable, and each component is either precisely positive or negative. From Table 9, the first-factor dimension consists of individual income and employment status, in this case, called the personal economic factor. The second factor consists of relationship lecturer and supervisor and lecturer quality satisfaction, in this case, called the academic satisfaction factor.

The third factor consists of CGPA and program study interest, in this case, called the academic factor. Finally, the fourth

TABLE 5: Sig. correlation test.

	Parent income	Individual income	CGPA	Marital status	Program study interest	Employment status	Lecturer quality satisfaction	Relationship lecturer and supervisor
Parent income	–	0.098	0.856	0.051	0.279	0.806	0.360	0.999
Individual income	0.098	–	0.252	0.000	0.343	0.000	0.065	0.327
CGPA	0.856	0.252	–	0.198	0.000	0.572	0.466	0.035
Marital status	0.051	0.000	0.198	–	0.150	0.000	0.937	0.048
Program study interest	0.279	0.343	0.000	0.150	–	0.820	0.000	0.000
Employment status	0.806	0.000	0.572	0.000	0.820	–	0.078	0.329
Lecturer quality satisfaction	0.360	0.065	0.466	0.937	0.000	0.078	–	0.000
Relationship lecturer and supervisor	0.999	0.327	0.035	0.048	0.000	0.329	0.000	–

TABLE 6: Model summary six dimensions.

Dimensions	Cronbach's alpha	Variance accounted for	
		Total (eigenvalue)	Variance (%)
1	0.558	1.954	24.426
2	0.409	1.557	19.465
3	0.125	1.123	14.037
4	0.073	1.069	13.362
5	−0.188	0.859	10.739
6	−0.406	0.738	9.221
Total	0.986[a]	7.300	91.250

[a]Total Cronbach's alpha is based on the total eigenvalue.

TABLE 7: Model summary four dimensions.

Dimensions	Cronbach's alpha	Variance accounted for	
		Total (eigenvalue)	Variance (%)
1	0.563	1.970	24.626
2	0.436	1.617	20.210
3	0.266	1.304	16.296
4	0.067	1.063	13.283
Total	0.951[a]	5.953	74.415

[a]Total Cronbach's alpha is based on the total eigenvalue.

factor consists of parents' income and marital status, in this case, called the family economic factor.

5. Discussion and Implications

Numerous variables contribute to the complexity of the causes of student dropouts in HE. This study aimed to determine what factors influence dropout students at private universities in Indonesia, especially Central Java. Existing research shows that the factors affecting dropout students differ from country to country. Troelsen and Laursen's [10] research also reinforces this, which suggests that countries with different cultures have various assessments of the value of education. Therefore, the factors that influence the success or failure of student studies are also other. Accordingly, the selection of

variables that affect dropout students is adjusted to the country's circumstances. This research explores the reasons for dropout students directly from the dropout students in the Central Java region. Based on Sections 4.1–4.3, four factors influence dropout students at private universities in Indonesia, as shown in Figure 7.

The first factor is the personal economic factor, including individual income and employment status. Busy work and the inability to allocate time to complete college are significant reasons for student dropouts, especially if there is no firm commitment to complete their studies. These results reinforce the findings in a previous research conducted by Amartayakul [19]. Students who simultaneously study and work have a high risk of dropping out. The most crucial factor, readiness to learn, is influenced by individual full-time jobs that do not

TABLE 8: Variance accounted for (VAF) statistics.

	Centroid coordinates dimension					Total (vector coordinates) dimension				
	1	2	3	4	Mean	1	2	3	4	Total
Parent income	0.019	0.011	0.100	0.748	0.219	0.005	0.006	0.084	0.744	0.840
Individual income	−833	0.041	0.015	0.074	0.241	0.831	0.031	0.000	0.015	0.878
CGPA	0.013	0.330	0.397	0.011	0.188	0.003	0.326	0.394	0.001	0.724
Marital status	0.221	0.004	0.088	0.218	0.133	0.221	0.000	0.088	0.218	0.527
Employment status	0.818	0.021	0.003	0.027	0.217	0.818	0.021	0.003	0.027	0.870
Program study interest	0.006	0.547	0.181	0.017	0.187	0.000	0.536	0.134	0.016	0.685
Relationship lecturer and supervisor	0.054	0.388	0.253	0.100	0.199	0.038	0.386	0.244	0.038	0.707
Lecturer quality	0.063	0.310	0.358	0.005	0.184	0.053	0.310	0.356	0.004	0.722
Active total	2.027	1.653	1.396	1.198	1.568	1.970	1.617	1.304	1.063	5.953
Variance (%)	25.334	20.662	17.449	14.979	19.606	24.626	20.210	16.296	13.283	74.415

TABLE 9: Rotated component loadings.

	Dimensions			
	1	2	3	4
Parent income	0.073	0.083	−0.139	0.899
Individual income	0.932	−0.063	0.068	−0.023
CGPA	−0.027	−0.057	0.844	−0.084
Marital status	0.423	0.158	−0.297	−0.484
Employment status	−0.930	0.060	−0.026	−0.024
Program study interest	0.087	0.218	0.793	0.034
Relationship lecturer and supervisor	−0.043	0.824	0.102	−0.124
Lecturer quality	−0.039	0.835	0.021	0.149

Variable principal normalization. [a]Rotation method: varimax with kaiser normalization. Rotation failed to converge in five iterations (convergence = 0.000).

permit study time, lack of motivation to complete courses, lack of time to read course materials, and study fatigue. Pierrakeas et al.'s [6] research also strengthens this study's results. Several factors were revealed by Pierrakeas related to variables that affect dropout students. However, in Pierrakea's research, it is stated that employment status is a significant variable that affects dropout students. In addition to not dividing their time, another finding was that students worked due to a lack of funds, and students with financial deficiencies were affected by individual income.

In addition to not dividing their time, another finding was that students were working due to a lack of funds; individual income affected students with financial deficiencies. The opinion of Contini and Zotti [20] confirmed this. The low income of individual students also has an impact on their academic success. Personal student income is more important than parental income to the student's finances. If the student is married, they no longer discuss parental support and instead discuss their income. This also affects their studies if they are unmarried and unable to manage their finances properly.

The second factor is academic satisfaction, including student relationships with lecturers/supervisors and lecturer quality satisfaction. In carrying out their duties and responsibilities, lecturers must be able to teach well. Lecturers who will teach are required to have pedagogic competence. Pedagogic competence is a person's ability in the field of education.

Student satisfaction with academic services is one thing that must be considered in implementing an education [21]. These findings strengthen the results of previous studies by Behr et al. [5], which explain that one factor influencing dropout students is academic satisfaction, including student relationships with lecturers. Berens et al.'s [21] and Wiers-Jenssen et al.'s [22] research also supports that satisfaction with lecture quality affects dropout rates.

The third factor is the academic performance factor that includes CGPA and program study interest. One of the critical factors in the success of student study is academic ability. This academic ability is measured using CGPA. Poor academic ability will result in the student failing to follow the lesson or not working on the thesis. This is also supported by Bujang et al.'s [23] research, which indicates that CGPA affects a student's ability to complete a thesis. Furthermore, the implication is that CGPA is one of the variables that can predict student dropouts. These findings are the opinion of several experts in their research [9, 24–28]. In addition, the inability to adapt to the program and failure to select a program aligned with the student's interests are notable factors in dropping out. From this, it can be concluded that interest in the study program is one of the key variables influencing dropout students. This finding is also supported by Bağrıacık Yılmaz and Karataş's [29] research which states that study interest programs are one of the causes of student dropouts.
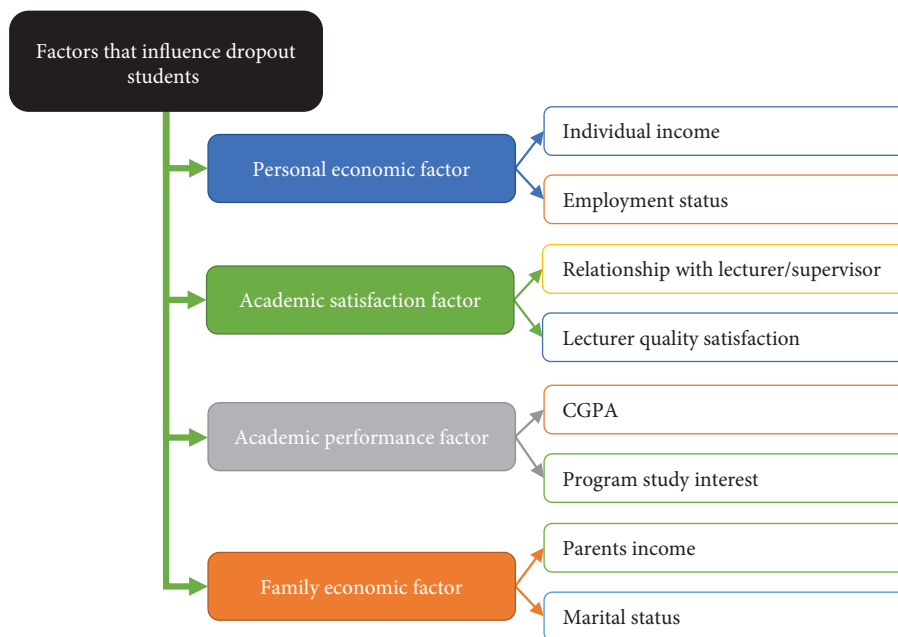
FIGURE 7: Factors that influence dropout students.

The last factor is the family's economic, including the parent's income and marital status. Economic factors are factors that significantly affect the number of dropouts in Indonesia. Suppose from the family, and there is no cost to continue their studies, in this case, it will automatically impact the student dropping out of college because there are no fees or other options for studying while working. Even though the student is looking while working, it will also impact the student not being focused on lectures and finding it difficult to divide his time. This is also supported from research by Tarmizi et al. [24], Yaacob et al. [25], Viloria et al. [30], Cuji Chacha et al. [31], and Mduma et al. [32] that parents' income affects dropout students. Another family economic factor that affects dropout students is marital status. Married students will prioritize their finances for their families rather than their education. This is also supported from research by Tarmizi et al. [24], da Costa et al. [33], Yasmin [34], and Ashour [35], all of which indicate that marital status affects dropout students.

A theoretical implication of this study is that four factors influence dropout students at private universities in Indonesia, especially Central Java. These findings can be used as a basis for further research predicting dropout students in Central Java, Indonesia. Knowing the students who are predicted to dropout or not is the first step for policymakers to take preventive actions.

There are several pedagogical implications proposed from the findings of this study, including:

(1) Socialization in universities is related to variables that affect student dropouts. This socialization is crucial to provide an initial explanation to the university to prevent student dropouts.

(2) They are improving the quality of a comfortable lecture environment so that students themselves are more interested in the courses taken. The rate can be from the university's learning atmosphere, service system, and facilities.

(3) We are improving the quality of human resources, especially lecturers/academic supervisors.

(4) Provide much motivation for students to focus on lectures and be innovative in dividing time between classes and work.

(5) Provide services to students who experience problems in learning or difficulties in understanding the material.

6. Conclusion and Limitations

Dropout is a crucial problem for universities that need to be overcome. The results of this study indicate that there are four-dimensional factors that influence dropout students, including personal economic factor (individual income and employment status), academic satisfaction factor (relationship with lecturer and supervisor and lecturer quality satisfaction), academic performance factor (CGPA and program study interest), and economic family factor (parents income and marital status). The results of this study are significant as the basis for further research to predict and overcome dropout students.

This study has several shortcomings that must be discussed and recommended for further research. This study uses a combination of qualitative and quantitative methods. A qualitative approach is used to look for variables that affect

dropout students, and a quantitative approach is used to validate the finding variables and classify the factors. This research step is considered very complex and long. The limitation of this research is that it is still done indirectly in the interview stage of dropout students. Researchers suggest that in further research, the interviews should be conducted directly. Another limitation of the stakeholder validation process is only using a questionnaire. We recommend that, at this stage, be added to the interview process with these stakeholders to provide input according to the conditions in each university.

Data Availability

The datasets generated and analyzed during the current study are not publicly available. Other materials are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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