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Dominant factors that determine college students completing studies in mathematics education study programs

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ABSTRACT

Failure to graduate on time is a problem for both the university and the students themselves. Beside the competencies possessed by students, many other factors affect the completion of student studies. This study aims to reduce the variables that really affect the completion of student studies. The approach of this research was survey research on students of the Mathematics Education Study Program at least in semester 7 (currently taking a final project course). There are 17 factors that determine the completion of student studies, namely achievement motivation, discipline, interest, intelligence, study habits, health, part-time work activities, organizational activities, curriculum, mentoring methods, student relations with lecturers, availability of books, internet facilities, family economic conditions, relationships with parents and family members, friends, and social environment. Data analysis was conducted using Principal Component Analysis (PCA) method to obtain the dominant factor. Based on the results of the study, four main factors that affect the completion of student studies are formed, namely: (1) the first factor: motivation and academic ability; (2) the second factor: activities and social environment; (3) the third factor: facilities and family; and (4) the fourth factor: thesis guidance. The four factors can explain the dominant factor in student study completion at 86.54%, with details of motivation and academic ability at 37.57%, activities and social environment at 26.34%, facilities and family at 15.21%, and thesis guidance at 7.42%.

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INTRODUCTION

Universities have no value without students. Students are the most important asset for any educational institution, so they are termed "agents of change, agents of knowledge" (Akin et al., 2017; Brandt, 2016; Lemke & Coughlin, 2011). Students have great potential in building a nation, so students are required to be active, creative, independent, critical, and innovative (OECD, 2018). Students are expected to have mental awareness, sensitivity, and care, and have a dream for the future to bring progress. Through education, students will be formed into quality human beings by using their interests, talents, and capacities rationally (Brook & Michell, 2014). This is of course supported by all activities and activities carried out by students.

In addition to learning theory, students also carry out practical activities, field practice or practical work, and thesis or Final Projects. Practical activities aim to add clarity to theory and provide basic training in skills to recognize and make observations and scientific approaches (Bradley, 2005; Lodico et al., 2006). Practical activities have proven useful in helping graduates find employment, inform career paths, and improve employability skills (Sprague & Percy, 2014).

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Through field practice, students report various benefits including increased job satisfaction, analytical skills, general professional skills, and community service engagement (Blanz, 2017; Davidescu et al., 2020; James & Yun, 2018). All of these lecture activities will provide graduates with provisions so that they can integrate knowledge according to their fields in everyday life.

Based on the curriculum of the mathematics education study program (Curriculum Team from IndoMs, 2013), students can complete their studies within four years. However, it is not easy to be able to graduate on time. When interviews and surveys with students were conducted, it turned out that some students had cases that caused them not to graduate on time. They mostly mentioned that the main reasons came from themselves, namely: students repeating courses, lack of motivation, feeling lazy, the physical and social environment that is not good enough, difficulty finding learning resources following theory, low ability to manage words in writing the thesis, lack of understanding of scientific writing, and the busyness of students themselves such as caring for sick families, work, and organizations. In addition, there are external factors such as the thesis title does not match the student's wishes, the supervisor being difficult to find, and the refusal from the school where the research is carried out due to inadequate research planning.

The urge to graduate on time begins to wane as self-motivation begins to drop. Motivation to graduate on time is something that creates enthusiasm or encouragement to immediately carry out tasks and graduation requirements to achieve learning goals within the specified study period (Ashraf et al., 2018). Individuals with high motivation are more likely to succeed in school and their careers (Filgona et al., 2020; Syamsuddin, 2021). Motivation to graduate on time is indicated by a high desire and desire to graduate on time, hopes and aspirations to complete studies well and on time, a sense of physiological need and appreciation for the achievement of study completion, and being tenacious and diligent in completing assignments (Caruth, 2018).

Student study completion is strongly influenced by their academic performance (Balkis et al., 2013). Student academic achievements play a crucial role in producing the best quality graduates who will become great leaders and human resources for the country, so being responsible for the country's economic and social development (Alamri, 2019; Alani & Hawas, 2021). The measurement of student academic achievement has received great attention in many studies. This is a challenge for academics and student performance influenced by social, psychological, economic, environmental, and personal factors. These factors greatly influence student achievement, however, they vary from person to person and country to country (Islam & Tasnim, 2021; Olufemi et al., 2018). Student academic performance is influenced by internal and external factors (Al-Muslimawi & Hamid, 2019) and it is measured through the cumulative achievement index or achievement index in a certain semester (Ramadiani et al., 2020; Toraman et al., 2020).

There is a positive relationship between student performance and communication. Harb and El-Shaarawi (2006) found that the most influential factor on student performance was communication competence. If students have strong communication skills and have a strong grip on language, it will improve student performance (Amadi & Kufre Paul, 2017). This communication ability is closely related to the ability to write scientific papers (Dallimore et al., 2008). The ability to write scientific papers is the most important thing in completing a thesis. The completion of the thesis is an indicator of the success of students while pursuing their scientific discipline within the specified study time limit. The ability to write scientific papers can be seen from the knowledge and insight about scientific writings, experiences and writing routines, the suitability of the title with the content, the organization of the content or ideas expressed, the choice of words used, and the punctuation and spelling in the writing.

The utilization of appropriate facilities is related to student learning styles and positively affects their performance (Ainon & Rosmaizura, 2018; Ha, 2021). The availability of private student facilities is often associated with their socioeconomic background. Socioeconomic factors such as class attendance, family income, parents' education, ratio between lecturers and students, gender, and distance from residence to campus also affect student performance (Raychaudhuri et al., 2010; Zajacova et al., 2005). Regarding students' background, Adzido et al. (2016) found a sig-

nificant relationship between the level of family income and students' academic performance. This is in line with Mundhe (2021) that the academic environment has a relationship with the level of parental education which will affect student performance. Besides, student academic success will increase if health-related barriers are low (Gadanya & Ahmad, 2021). Students who are physically and psychologically healthy will be able to carry out various learning activities well.

The social environment where there is intensive and fairly regular interaction with people who have the same age and status will have a positive or negative impact or influence. The social environment is used as a place to share knowledge, tell stories to motivate each other, and as well as a measure/standard of learning success for him. Noble et al. (2006) argue that background characteristics (family income, parental education level, parental guidance, and negative situations (conflict at home) will indirectly affect student academic achievement.

Based on the description above, many factors influence the completion of student studies. Therefore, it is necessary to carry out an investigation using Principal Component Analysis (PCA) to obtain the dominant factors that determine the completion of student studies, so that problems for students graduating on time can be anticipated. PCA is a statistical technique for converting most of the original, correlated variables into a new set of smaller, independent (uncorrelated) variables. PCA is used to summarize data and generate hypotheses (Härdle & Simar, 2015; Johnson & Wichern, 2014) so that it can be seen which variables should be considered for interpreting factors, and what actions should be treated.

METHOD

This study uses a survey approach that is carried out on students of the Mathematics Education Study Program who are in the process of completing their studies. Sources of research data are students who were accepted at the university in 2014, 2015, 2016, 2017, and 2018 who have not completed their thesis as a form of completion of their studies. The research respondents were 258 students of the Mathematics Education Study Program from three universities, namely UIN Sunan Kalijaga Yogyakarta, IAIN Ternate, and Universitas Negeri Yogyakarta. Many respondents who were used as research samples are detailed in Table 1.

Table 1. Research Respondents

Year of Acceptance	UIN Sunan Kalijaga Yogyakarta	IAIN Ternate	Universitas Negeri Yogyakarta
2018	25	28	41
2017	19	25	34
2016	27	16	17
2015	9	8	5
2014	3	-	1
Amount	**83**	**77**	**98**

Data were collected using an instrument in the form of a questionnaire containing 17 variables: achievement motivation (X_1), discipline (X_2), interest (X_3), intelligence (X_4), study habits (X_5), health (X_6), part-time work activities (X_7), organizational activities (X_8), curriculum (X_9), mentoring methods (X_{10}), student relations with lecturers (X_{11}), availability of books (X_{12}), internet facilities (X_{13}), family economic conditions (X_{14}), relationships with parents and family members (X_{15}), friends (X_{16}), and social environment (X_{17}). Each variable consists of two statements (one favorable and one unfavorable), so the questionnaire consists of 34 statements. The research instrument has been content validated by psychologists and mathematics education experts.

Student response data were analyzed using PCA method, a statistical technique for changing from most of the original variables used correlated with one another into a new set of variables that were smaller and independent of each other. PCA is used to reduce data, making it easier to interpret the data (Johnson & Wichern, 2014). PCA implementation is, among others, to (1) identify new variables that underlie multiple variable data; (2) reduce the number of dimensions of the set of correlated variables by maintaining as much diversity as possible in the data

set; and (3) eliminating the original variable which has a relatively small contribution of information (Hair et al., 2019). The new variable formed is called the principal component, a linear combination of the original variables with the number of coefficients squared in a linear combination with a value of one, uncorrelated, and has an ordered variance from the largest to the smallest.

FINDINGS AND DISCUSSION

The main idea of PCA is to reduce a data set's dimension in which there are a large number of interrelated variables while maintaining as much variation as possible in the data set (Jolliffe, 2002). This reduction is achieved by transforming to a new set of variables, principal components, which are uncorrelated, and ordered to retain most of the variation present in all the original variables. PCA is used to describe the structure of the variance-covariance matrix of a set of variables through a linear combination of these variables. The study of various theories and research results obtained 17 variables that affect student performance in completing studies.

Findings

The first step in the principal component analysis is the formation of a correlation matrix. This matrix is used to obtain the value of the closeness of the relationship between research variables. This proximity value can be used to perform several tests to see if it matches the correlation value obtained from principal component analysis (Jolliffe, 2002). Two steps to determine sampling with a correlation matrix are Bartlett's Test of Sphericity to test the correlation between variables and Kaiser-Meyer-Olkin (KMO) to determine the adequacy of sampling.

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.767
Bartlett's Test of Sphericity	Approx. Chi-Square	7196.884
	df	136
	Sig.	.000

Table 2 shows that KMO=0.767 > 0.5, meaning that this study has sufficient data. In addition, the significance of Bartlett's test shows that the HO (correlation matrix is an identity matrix) is rejected so that the data forms a correlation matrix with a close relationship between variables. The power of Bartlett's test is relatively high (Shrestha, 2021; Watkins, 2018), but it depends on Chi-Squared estimates and assumes that the data are normally distributed.

Shrestha (2021) states that the Bartlett test can be used as a lower bond with matrix quality. The results of the simulation study show that the KMO increases with the increase in the number of variables and the correlation coefficient, but does not depend much on the sample size. In particular, a small KMO value indicates that the correlation between pairs of variables cannot be explained by other variables and it is possible that the data were not analyzed by factor analysis. Then, based on the anti-images correlation, a measure of the adequacy of sampling can be seen.

Table 3. Anti-images Matrices

Anti-image Correlation	X1	.858[a]	.032	-.118	-.481	.150	-.095	.179	-.063	.018	-.152	.145	.137	.053	.093	-.124	.090	-.220
	X2	.032	.879[a]	.034	-.108	-.053	-.408	-.210	.009	.014	.124	-.116	.187	-.122	.071	-.138	.238	-.013
	X3	-.118	.034	.873[a]	.023	-.596	-.030	.074	-.169	.046	.046	-.064	.058	.005	-.013	-.140	-.053	.109
	X4	-.481	-.108	.023	.833[a]	-.496	-.270	-.074	.029	-.030	.241	-.243	-.053	-.050	-.077	.071	-.123	.142
	X5	.150	-.053	-.596	-.496	.820[a]	-.202	-.043	.118	-.038	-.164	.209	-.089	-.007	-.005	.069	.057	-.104
	X6	-.095	-.408	-.030	-.270	-.202	.905[a]	.063	.007	-.022	-.156	.089	-.074	.094	.026	.113	-.067	.026
	X7	.179	-.210	.074	-.074	-.043	.063	.753[a]	-.766	.092	-.033	.034	.047	.039	.085	-.147	.239	-.600
	X8	-.063	.009	-.169	.029	.118	.007	-.766	.778[a]	-.066	-.007	.023	-.128	.034	-.187	.273	-.378	.250
	X9	.018	.014	.046	-.030	-.038	-.022	.092	-.066	.558[a]	.074	-.103	.013	-.020	.008	-.059	.111	-.119
	X10	-.152	.124	.046	.241	-.164	-.156	-.033	-.007	.074	.657[a]	-.859	.242	-.114	-.164	-.109	-.204	.155
	X11	.145	-.116	-.064	-.243	.209	.089	.034	.023	-.103	-.859	.644[a]	-.207	.127	.146	.085	.197	-.221
	X12	.137	.187	.058	-.053	-.089	-.074	.047	-.128	.013	.242	-.207	.606[a]	-.013	-.214	-.542	-.069	.100
	X13	.053	-.122	.005	-.050	-.007	.094	.039	.034	-.020	-.114	.127	-.013	.243[a]	-.068	.024	-.122	.031
	X14	.093	.071	-.013	-.077	-.005	.026	.085	-.187	.008	-.164	.146	-.214	-.068	.510[a]	-.436	.505	-.314
	X15	-.124	-.138	-.140	.071	.069	.113	-.147	.273	-.059	-.109	.085	-.542	.024	-.436	.542[a]	-.272	.136
	X16	.090	.238	-.053	-.123	.057	-.067	.239	-.378	.111	-.204	.197	-.069	-.122	.505	-.272	.733[a]	-.694
	X17	-.220	-.013	.109	.142	-.104	.026	-.600	.250	-.119	.155	-.221	.100	.031	-.314	.136	-.694	.743[a]

Anti-image matrices in Table 3 are useful for knowing and determining which variables are appropriate for use in obtaining information about the grouping of variables in a study (Johnson & Wichern, 2014). One of the outputs of the anti-image matrices is anti-image correlation which refers to a partial correlation that shows a pure relationship between two variables where other variables that are considered influential have been controlled or fixed. Partial correlation refers to negative anti-image correlation where the value must be as small as possible so that the correlation matrix used is suitable for factor analysis (Tabachnick & Fidell, 2013).

Table 4. Anti-image Correlation

Variable	Anti-image Correlation	Variable	Anti-image Correlation
$X_1 - X_1$	0.858	$X_{10} - X_{10}$	0.657
$X_2 - X_2$	0.879	$X_{11} - X_{11}$	0.644
$X_3 - X_3$	0.873	$X_{12} - X_{12}$	0.606
$X_4 - X_4$	0.833	$X_{13} - X_{13}$	0.243
$X_5 - X_5$	0.820	$X_{14} - X_{14}$	0.510
$X_6 - X_6$	0.905	$X_{15} - X_{15}$	0.542
$X_7 - X_7$	0.753	$X_{16} - X_{16}$	0.733
$X_8 - X_8$	0.778	$X_{17} - X_{17}$	0.743
$X_9 - X_9$	0.558		

Measures of Adequate Sampling (MSA) is used to determine which items are appropriate for factor analysis. The MSA value lies between 0 and 1 giving the interpretation that MSA = 1 means that the item can be predicted without error by other items. MSA > 0.5 means that items can still be predicted and analyzed further, while MSA < 0.5 means items cannot be predicted and cannot be analyzed further (Gorsuch, 2014; Watkins, 2018). Based on the output of the anti-images correlation (Table 4), there is one variable that is not feasible for factor analysis, namely the variable X_{13}, so this variable most likely has to be eliminated. One of the most important problems in PCA and factor analysis is determining the number of factors to extract. The eigenvalues indicate the number of dimensions or factors as seen in Table 5.

Table 5. Total Variance Explained

Component	Initial Eigenvalues			Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %		Total	% of Variance	Cumulative %
1	5.644	33.202	33.202	1	5.644	35.277	35.277
2	3.965	23.321	56.523	2	3.960	24.751	60.028
3	2.294	13.494	70.017	3	2.288	14.298	74.326
4	1.152	6.777	76.794	4	1.149	7.179	81.505
5	.991	5.832	82.626	5	.946	5.912	87.417
6	.946	5.564	88.190	6	.502	3.138	90.555
7	.502	2.951	91.141	7	.395	2.467	93.022
8	.395	2.322	93.462	8	.334	2.087	95.109
9	.334	1.964	95.426	9	.278	1.738	96.847
10	.277	1.629	97.055	10	.151	.945	97.792
11	.151	.888	97.943	11	.116	.725	98.517
12	.116	.680	98.623	12	.091	.570	99.087
13	.089	.525	99.149	13	.058	.364	99.451
14	.058	.342	99.490	14	.052	.323	99.774
15	.050	.297	99.787	15	.026	.164	99.938
16	.026	.154	99.942	16	0.10	.062	100.000
17	.010	.058	100.000				

Extraction Method: Principal Component Analysis.

Extraction Method: Principal Component Analysis.

The principal component analysis is used to minimize the number of observed variables to a small number of principal components that make up most of the variance of the observed variables. The number of factors can be determined by selecting factors with an Eigenvalue greater

than 1, which means these factors are more than the average total variance in the item known as the Kaiser-Guttman rule (Yeomans & Golder, 1982). Table 5 shows that based on empirical data, the variable factors that influence study completion are divided into four factors. Table 5 (right) by eliminating the variable X_{13} shows that the four factors have an influence on study completion of 81.505%. This value is greater when compared to Table 5 (left) by including the variable X_{13} which shows that the four factors have an influence on study completion of 76.794%. The formation of four factors that influence the completion of the study can also be seen from the scree plot output (Figure 1) by looking for angles (bends) to determine the number of factors.

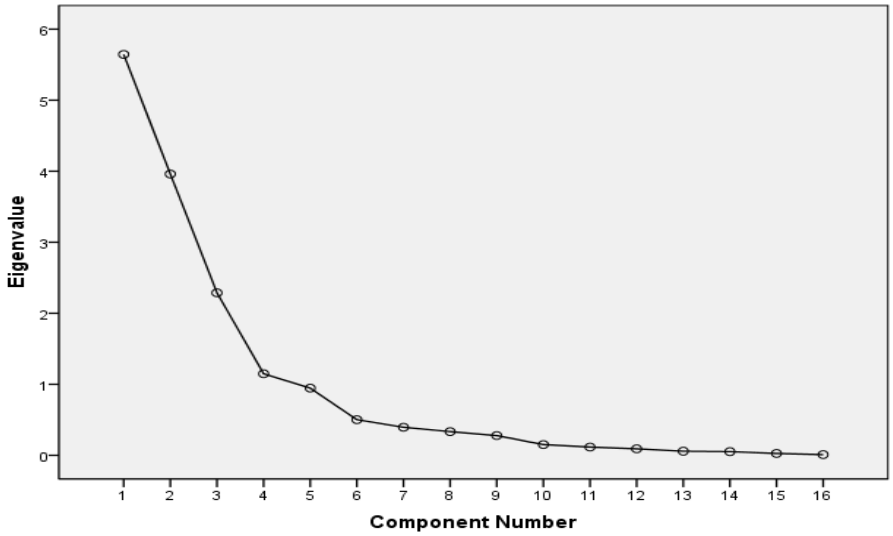

Figure 1. Scree Plot of Principal Component Analysis without Variable X_{13}

Factors can be rotated freely to determine specific positions with a 'simple structure' for easy interpretation. Unrotated factor solutions are usually biased toward the first common factor which can confound many variables (Watkins, 2018). By using varimax rotation, the 16 variables are grouped into four factors.

Table 6. Rotated Component Matrix

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
X1	.841			
X2	.804			
X3	.899			
X4	.960			
X5	.954			
X6	.937			
X7		.975		
X8		.972		
X9				
X10				.772
X11				.813
X12			.870	
X13				
X14			.829	
X15			.894	
X16		.964		
X17		.972		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
X1	.838			
X2	.802			
X3	.900			
X4	.958			
X5	.953			
X6	.934			
X7		.976		
X8		.973		
X9				
X10				.783
X11				.814
X12			.874	
X14			.827	
X15			.893	
X16		.964		
X17		.973		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

The orthogonal varimax rotation was chosen based on the mathematical considerations that orthogonal rotation is simpler and involves fewer parameter estimates (Watkins, 2018). Thus, the orthogonal rotation will give more stable results. Sample estimates of inter-factor correlations in such cases will be of small value because of the very large standard errors. Table 6 shows the components resulting from matrix rotation using the varimax method, Table 6 (right) includes the variable X_{13}, and Table 6 (left) eliminates the variable X_{13}. The results of these two rotations place 15 variables in the same component and variable X_9 does not enter any of the components. The variable X_9 has a relatively smaller loading factor than the other variables, so researchers need to review the statement items that measure the variable X_9.

There is no agreement on the minimum factor (absolute value) that should be considered when interpreting factors. Most books recommend 0.3 or 0.4 as a minimum (Gorsuch, 2014). However, this classic recommendation assumes a large sample size and no rules have been developed for small samples. When the sample size is large (> 100) then you can choose a loading factor > 0.40, while for a small sample size, the loading factor must be higher, i.e., higher than 0.50 or even 0.70.

Variable X_9 relates to the curriculum used with the statement items "The courses that have been taken support me in working on the thesis" and "I have difficulty working on the thesis because the material has never been studied". After reviewing the curriculum, several courses strongly support thesis work, such as research methodology courses, instrument development, and learning evaluation (for students of education study programs). After considering variable X_9, it is also reduced, so that the remaining variables are 15. Based on the results of reanalysis without variables X_9 and X_{13}, the fifteen variables can explain the dominant factor in student study completion of 86.54% (up 5.03% from the previous 81.51%). By using varimax rotation, 15 variables (without variables X_9 and X_{13}) are grouped into four factors as presented in Table 7.

Table 7. Rotated Component Matrix without Variables X_9 and X_{13}

	Component			
	1	**2**	**3**	**4**
X1	.841			
X2	.802			
X3	.900			
X4	.960			
X5	.954			
X6	.937			
X7		.967		
X8		.967		
X10				.896
X11				.902
X12			.873	
X14			.830	
X15			.896	
X16		.950		
X17		.960		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

The reduction of variables X_9 and X_{13} produces four components in the form of factors that influence the completion of the study, along with the grouping of the variables. Re-analysis by eliminating variables X_9 and X_{13} was carried out to find out how much the four factors influenced study completion.

The results of the study formed four dominant factors that affect the completion of student studies. Then an assessment is carried out and named for each factor by looking at the indicators for each variable. The following are the dominant factors that influence the completion of

student studies, namely: (1) factor 1 is motivation and academic ability (consisting of six variables: X_1, X_2, X_3, X_4, X_5, and X_6); (2) factor 2 is activity and social environment (consisting of four variables: X_7, X_8, X_{16}, and X_{17}); (3) factor 3 is family (consisting of three variables: X_{12}, X_{14}, and X_{15}); and factor 4 is the final assignment guidance (consisting of two variables: X_{10} and X_{11}).

Table 8. Total Variance Explained After Variable Reduction

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.636	37.573	37.573	5.636	37.573	37.573	4.913	32.755	32.755
2	3.952	26.344	63.917	3.952	26.344	63.917	3.988	26.586	59.341
3	2.281	15.206	79.123	2.281	15.206	79.123	2.285	15.236	74.577
4	1.113	7.421	86.544	1.113	7.421	86.544	1.795	11.967	86.544
5	.504	3.358	89.902						
6	.395	2.633	92.535						
7	.334	2.227	94.762						
8	.279	1.859	96.621						
9	.151	1.008	97.629						
10	.118	.785	98.414						
11	.091	.609	99.024						
12	.058	.388	99.412						
13	.052	.345	99.757						
14	.026	.175	99.933						
15	.010	.067	100.000						

Extraction Method: Principal Component Analysis.

Discussion

There are many studies on the factors that affect student performance in completing their studies. These factors include achievement motivation, discipline, interest, intelligence, study habits, health, part-time work activities, organizational activities, curriculum, mentoring methods, student-lecturer relations, availability of books, internet facilities, family economic conditions, relationships with parents and family members, friends, and social environment. The focus of this study is to determine the dominant factors that affect student performance in completing studies. Researchers use the Principal Component Analysis (PCA) in determining the dominant factor.

Table 5 shows that the factors influencing the completion of the study are divided into four factors. The partial correlation matrix shows that the first four components constitute 81.51% of the total variance. After the orthogonal Varimax rotation, there are two variables included in the two factors, and there is one variable that has a relatively smaller loading factor. After a review of the instrument, a reduction is made to one variable that has a relatively small loading factor, so that the remaining variables are 15. The partial correlation matrix of the 15 remaining variables in Table 8 shows that the first four components constitute 86.54% of the total variance; the first component (37.57%) motivation and academic ability, the second component (26.34%) activity and social environment, the third component (15.21%) family, and the fourth component (7.42%) final project guidance.

Highly motivated students will take concrete actions that lead to the completion of their studies. This is in line with the opinion of Filgona et al. (2020) that achievement motivation is a driving factor to determine success in learning and achieving something he wants to achieve success. Motivation generates the power of motion or moves someone to do something to achieve a satisfaction or goal. The need for achievement is achievement motivation as a desire or tendency to do something difficult as quickly and as best as possible (Bency, 2019). Good academic ability will influence students to plan strategies for completing assignments, take the necessary steps to solve problems, reflect on and evaluate their learning outcomes, and control the changes needed in learning. This is in line with the opinion of Noble et al. (2006) that academic ability and family background affect learning success. Social and academic influences in the college environment

reflect the relationship between students and institutions, the quality of student peer relations, academic achievement, and other factors. Effective communication and the use of time, interaction with other students, and a supportive campus environment can predict success in college (Pascarella et al., 2011).

Facilities and learning environment are factors that come from outside of students which usually have an indirect effect on increasing achievement. However, the unavailability of facilities and a good learning environment can be a problem and an obstacle to the learning process and the achievement of good learning achievements because their availability is neglected. Hopson et al. (2014) revealed that students will have much higher academic performance when they have a support system. This study focuses on how social norms, parental expectations, and a safe environment affect students. This shows that social influence has a very large impact on students' academic performance.

The educational environment is very influential in shaping a child's personality pattern is the family. Family education provides basic knowledge and skills, religion and beliefs, moral values, social norms and way of life. Parental factors are very influential on children's success in learning (Adzido et al., 2016; Mundhe, 2021). The level of parental education, the size of the income, the lack of parental attention and guidance, whether or not both parents get along, also affect the achievement of learning outcomes. Tang et al. (2013) emphasized that family plays a very important role in motivating and encouraging students to pursue higher education. In his study, it was explained that a well-established family and life are important motivators for school achievement. Although this family factor affects the completion of the study, the effect is not too big 15.21%. This is supported by research by Garkaz et al. (2011) which shows that family support does not have a significant effect on student academic achievement.

Completion of student studies cannot be separated from the role of the lecturer as an educator who is obliged to guide students in the learning process. Guidance as one aspect of the educational program is directed primarily at helping students to adapt to the situation they are currently facing and to plan their future according to their interests, abilities, and social needs. Students who guide lecturers regularly will affect the completion of studies (Linder & Kung, 2011). Supervising lecturers can help students plan their study programs, help students get to know themselves, such as their respective interests, talents, and abilities, direct students to the world of work according to their expertise, help students solve the problems they are facing, both social problems and personal problems.

CONCLUSION

The results of the PCA recommend that the dominant factors that affect student study completion can be grouped into four parts consisting of (1) the first factor: motivation and academic ability (achievement motivation, discipline, interest, intelligence, study habits, and health); (2) the second factor: activities and social environment (partial work activities, organizational activities, friends, and social environment); (3) the third factor: facilities and family (availability of books, family economic situation, and relationship with parents and family members); and (4) the fourth factor: thesis guidance (guidance method and student-lecturer relationship). The four factors can explain the dominant factor in student study completion of 86.544%, with details of motivation and academic ability of 37.573%, activities and social environment of 26.344%, facilities and family of 15.206%, and thesis guidance of 7.421%.

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