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Exploratory Factor Analysis: Motivation for Learning

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Abstract

Learning motivation is an important aspect of the learning process because it promotes performance goals and maintains learning achievement. This study aims to determine the factor that can affect learning motivation of student at Yogyakarta State University Postgraduate Program. This research was quantitative method with explorative descriptive approach. Technique of collecting data using questionnaire method. Total of 150 postgraduate students at Yogyakarta State University voluntarily participated in answering the learning motivation questionnairs. Analysis of data used Exploratory Factor Analysis procedure to identify factors that can affect students' motivation to study. Based on data analysis obtained six factors, there are *diligent in doing the task, discipline in following lecture, discipline and frequency in learning, encouragement to learn and achievement, doing the task by self, and time for learning*. The study concludes that the most influential factor is diligent in doing the task.

Keywords: Learning Motivation, Exploratory Factor Analysis

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1. Introduction

Learning motivation is an important aspect of learning process because it promotes performance goals and maintains learning achievement [1]. Achievement motivation had an effect on student motivation [2]. Motivation to learn has a relationship with learning achievement [3]. Motivation to learn affects student learning outcomes [4]. The motivation of learning is positively related to academic performance [5]. Motivation to learn has a significant influence on student learning, which is a major determinant of academic performance and creativity [6]. Learning motivation is an important factor that affects (maintains and directs) learning behavior and learning outcomes [7]. Motivation to learn is the main thing in achieving performance [8].

There are two types of motivation, learning motivation can arise from within (intrinsic) and from outside individual (extrinsic) [9]. Intrinsic motivation to learn indirectly and

positively related to academic performance [10]. Motivation that emerges from within the individual will be more stable and steady when compared with learning motivation that arise because of environmental infuences (motivation from outside) [11]. Highly motivated students tend to be more active in their efforts to improve their performance. Learning achievement is influenced by two factors: internal factors and external factors. Internal factors are factor that originate from within individuals such as physical factors, psychology, and fatigue factors. While external factors are all factors that come from outside such as family environment, school and community [12]. In line with that opinion, motivation is known as an important factor affecting student performance. Students who believe they are competent show greater effort and determination in academic performance. Conversely, less student motivation tends to show excessive anxiety to be ready to engage in academic activities. As a result, it is necessary to conduct research that focuses not only on improving techniques but also on motivation and ultimately on self-motivation [13].

This study aims to determine the factor that can affect learning motivation of student at Yogyakarta State University Postgraduate Program. Motivation to learn a person can be seen from the discipline in following the lecture, the level of attention in following the lecture, the frequency of learning at home, and others. Reality we can see, a student who is equally disciplined in entering college, and have the same attention at the time of studying, but have different achievements. Sometimes the condition that happens is that students who rarely attend college actually have a high achievement compared with students who always go to college.

The condition of morbidity is what raises the question how the role of learning motivation in achievement of learning achievement. The low motivation makes the students have no motivation to like the lecture material so that it will be difficult to accept and master the course. This shows that the high level of learning achievement can be influenced by the high and low motivation of student learning or can also be said student achievement that is not optimal this tend to be influenced by less optimal student learning motivation. In this research, the researcher uses exploratory factor analysis for factors that can influence student's learning motivation.

The exploratory factor analysis is a complex statistical method that is an integral part of many fields of research. Using factor analysis requires researchers to make some decisions, each of which affects the resulting solution [14]. EFA is an explorative method used to generate theory; researchers used EFA to search for a smaller set of latent k factors to represent a larger set of j variables [15].

2. Methods

This research used quantitative method with explorative descriptive approach. Quantitative descriptive research is a study that provides an overview of a phenomenon in the current more broadly [16]. The sample were 150 postgraduate students at Yogyakarta State University.

Data collection techniques used questionnaires. Data analysis technique used in this research is factor analysis model with Exploratory Factor Analysis. Exploratory factor analysis is done by using computer program, Statistical Package for Social Sciences (SPSS).

3. Result and Discussion

Exploratory Factor Analysis (EFA) is a statistical technique that explores the underlying factors of a variable through factor rotation on the basis of factor loading values so that researchers assume that some indicators may be related to several factors [17]. The reason for using EFA is because the researcher wants to explore widely the factors that influence student's learning motivation in Postgraduate Program by letting the research variables form their own patterns.

This study consisting of 21 items and examined as the factors that allegedly affect the motivation of Yogyakarta State University postgraduate students. To perform a factor analysis it is necessary to perform a pre-requisite analysis test to determine whether the data to be analyzed is correct or not. There are 3 prerequisite test analyzes namely Barlett's Test of Spherecity, Kaiser-Meyer-Olkin Test (KMO), and Measure of Sampling Adequacy (MSA) Test [17].

Barlett's Test of Spherecity test aims to see the normality of data with a significance level of less than 0.05 [18]. Based on Barlett's Test of Spherecity test for 21 indicator statistics obtained value 896,779 with a significance level of 0.000, which means that among all indicators of the statement there is correlation so feasible for factor analysis.

The Kaiser-Meyer-Olkin (KMO) test is used to decide whether or not a data can be analyzed by factor analysis with KMO values. If the KMO value is above 0.5 then the data is feasible to use [18]. Based on the calculation with SPPS Version 18, the value of KMO obtained is 0.779, because the value of KMO is high or more than 0.5 then factor analysis is feasible to be used for this research.

The next step is the Measure of Sampling Adequacy (MSA) test. MSA values actually have the same meaning as KMO, except MSA rate each item and not for the whole.

TABLE 1: KMO and Bartlett's Test Score.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.779
Bartlett's Test of Sphericity	Approx. Chi-Square	896.779
	df	210
	Sig.	.000

Based on the results of MSA calculations with SPSS Software Version 18 shows all items have MSA values greater than 0.5. The MSA values for each variable are shown in Table 2.

TABLE 2: MSA values of each variable on data reduction.

Variable Names	MSA Values
Item1	0,760
Item2	0,773
Item3	0,795
Item4	0,818
Item5	0,813
Item6	0,838
Item7	0,802
Item8	0,800
Item9	0,724
Item10	0,791
Item11	0,802
Item12	0,806
Item13	0,723
Item14	0,807
Item15	0,702
Item16	0,756
Item17	0,816
Item18	0,692
Item19	0,770
Item20	0,708
Item21	0,774

It shows that all variables can be said to significantly affect student's learning motivation.

After performing the pre-requisite analysis test, the next step is to determine the number of factors by means of factor extraction. This process is used to group a number of factors by issuing items whose eigenvalue is less than 1.0. According to Johnson & Wichern (2007: 482), the determination of the number of factors viewed from eigenvalue that has values above 1.0. Eigenvalue is the total variance contained in each factor. Analysis to find eigenvalue done using SPSS Software Version 18 forming of 6 factors. The results of factors extraction and distribution of items on each factor formed can be seen in Table 3 below:

TABLE 3: Distribution of factor components.

	Eigenvalue	% of Variance	Cumulative
1	5.129	24.424	24.424
2	2.054	9.783	34.207
3	1.784	8.496	42.702
4	1.388	6.607	49.309
5	1.307	6.224	55.533
6	1.044	4.973	60.506

Total Variance Explained shows the value of each variable being analyzed. The "total" column on these eigenvalues greater than 1 indicates the number of factors formed. In this case there are six values of eigenvalues whose value is more than 1, respectively 5,129; 2.054; 1,784; 1,388; 1.307 and 1.044. This means that the 21 variables analyzed can be grouped into 6 major factor components. In Extraction Sums of Squared Loadings gives the meaning of the number of variants obtained is 6.

If from 21 variables only extracted into one factor then the variables that can be explained as (5,129 / 21) x 100% = 24,424%. If from 21 variables only extracted into two factors only then the variant which can be explained by two factors are (2,054 / 21) x 100% = 9,783%. If both variations accumulate will be able to explain 24.424% + 9.783% = 34.207% of the 21 variables (see cumulative column% in Extraction Sums Of Square Loadings). But if all (21 variables) are extracted into six factors it will be able to explain 60.506% of the total factor.

The first factor is the strongest factor influencing student learning motivation, consisting of item 7, 8, and 9. These three items receive loadings of.747;.723; and.780. This factor is labelled as *diligent in doing the* task. This is consistent with opinion that diligent in doing the task is very important for students in achieving [20]. The second factor consists of item 4, 5 and 6 which receive loadings ranging from.649 to.730. This factor labelled as *discipline in following lecture*. The third factor consists of item 1, 2, 3 and 13

which receive loadings ranging from.649 to.730. This factor labelled as *discipline and frequency in learning*. The fourth factor are item 19, 20, and 21. These three items receive loadings of.747;.723; and.780. This factor is labelled as *encouragement to learn and achievement*. This is consistent with opinion that student encouragement to learn and achievement is key for students to get positive results including good results because students have high motivation [21]. The fifth factor item 16 and 17. These two items receive loadings which are.731; and.733 respectively. This factor is labelled as *doing the task by self*. The sixth factor is the weakest factor comprising item 12 which receive loading of.787. Thus, this factor labelled as *time for learning*. This is consistent with the research by Ukpong and George that students who have long time to study can affect student achievement. Students who have a long time to study have a better achievement than students who have short learning time [22].

4. Conclusion

Based on the result of research, data analysis, and discussion, it can be concluded that there are 6 factors that influence the motivation of students at Postgraduate Program of Yogyakarta State University, there are *diligent in doing the task, discipline in following lecture, discipline and frequency in learning, encouragement to learn and achievement, doing the task by self, and time for learning*.

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