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Student Factor Analysis Choosing Biology as an Option Subject of Computer-Based National Examination

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Abstract

This study aims to analyze the factors that influence learners in choosing Biology as the subject of choice of UNBK and analyze the most dominant factor in influencing learners choose Biology as the preferred subject of UNBK. This research is a mixed method research using sequential mix method with qualitative-quantitative sequential explanatory strategy. The population in this study are students of science majors class XII who choose Biology in SMA N 1 Pecangaan and SMA N 1 Jepara, amounting to 208 learners. The technique of sampling data using random sampling technique. Determination of the number of samples using Isaac and Michael formula with a 95% confidence level, so that obtained at least 131 samples from 208 members of the population. The results of this study indicate: (1) There are 9 factors that influence the Friends and Parents, Interests and Motivation, Ideals and Profession of Parents, Ability, Teacher and Parents, School Environment, Perception, and Interest and Achievement. The most dominant factor affecting is Friends and Parents with an eigenvalue of 6,922 which can explain the variant variation of 24.723% of cumulative variance percentage of 71,675%.

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INTRODUCTION

Most of the implementation of National Examination/Ujian Nasional (UN) 2018 had been based on computer which usually called Computer-based National Exam (UNBK), however there are differences on the implementation of National Exam (UN) held on 2018. The differences apart from the system that was being used which was originally based on writing now turned into computer-based, and also the subjects tested for UN are different. All of the subjects from the previous year are compulsory to be tested for UN based on the corresponding major. For example, at Natural Sciences Department there are six subjects to be tested for UN, they are Mathematics, Indonesian Language, English Language, Biology, Chemistry, and Physics. UNBK for High School (SMA), there are four subjects to be tested, they are Mathematics, Indonesian Language, English Language, and one more alternative subject based on the major of the student (Natural Sciences/SocialSciences/Language).

The existence of that system gives the students to choose the subject based on their characteristic. The existence of subject selection let the students to easily focus on the attention and concentration separately towards the chosen subjects to be easy on the learning process. Besides, also for measuring the potentials (skills) of the students individually. It means thatchoosing the appropriate subjects has a function in placing the urge of the students through the potentials and skills which the students have. The fault in choosing subjects cause the time loss and failing on learning because the students are not motivated to learn. If the students choose a suitable subject, their learning outcomes would be better. There are many factors affect students' decision. This interests the researcher of conducting further research to analyze the factors which affect the students to choose Biology at SMA N 1 Pecangaan and SMA N 1 Jepara and the factor which is the most dominant in affecting the students on choosing Biology. Based on the research that has been conducted there are factors affecting someone on deciding choices.

The research in economy field by Natalia (2010) about Analyzing Factors Affecting Consumers' Interest to Buy at Giant Hypermarket Bekasi shows that the process of deciding to choose goods or services influenced by the environment factor (external factor) and private factor (internal factor). In accordance with Natalia (2010), Allolayuk (2013) in her research about Factors that Influence Students of Natural Sciences Major on Students Class XI SMA Negeri 72 Jakarta mentioned there are two factors which affect the students in choosing their major, namely internal factor and external factor.

According to Setiadi (2012) *National Exam* is an assessment of study result by the government which aims to assess the graduate's competence achievement nationally on the specific subjects in a group of sciences and technology. Based on Tilaar (2006) *National Exam* is an effort from the government to evaluate education level nationally by establish national education standards. From the various opinions above can be concluded that *National Exam* is an evaluation system or assessment of basic and secondary education standards nationally by establish the national education standards which aims as the mapping of education problems in order to develop education policies.*National Exam* in 2015 that implemented computer-based examination which is called as UNBK is an exam that is relatively equivalent to written exams as long as they have been done.

The difference lies in the problems available in computer files. The study on the implementation of computer-based examinations was conducted by Santosa (2009) who examined the measurement of open university students' learning outcomes. The results of his study indicate that measuring students' learning outcomes can be done through computer-based exams. The development of software or applications to support the implementation of national exams has been developed by Puspendik including infrastructure (computer networks), application programs, development of calibrated question banks, and human resources. The success of UNBK implementation is determined by the availability of program and internet network applications.

The future UNBK model is intended to carry out the test online either in the district/city or provincial or national scope and the results of the exam are immediately obtained by students after taking the exam. This UNBK model is also expected to be able to serve students who have used the 2013 curriculum with the semester credit system. Thus, the role of technology can accelerate the results of the examination until the certificate can be obtained by students after the examination takes place. This can have an impact on the opportunity or time to prepare students who want to continue their studies to a higher level or to improve competence for vocational schools.

The implementation of UNBK in fact experienced many obstacles, as stated by Pakpahan (2016), computer-based examinations can be carried out in all regions or education units if supported by computers and internet devices. In order for computer-based exams to run smoothly, the education unit must prepare hardware, internet networks, and local computer networks. Barriers to the model of computer-based national exams include wide area coverage, hardware, internet facilities, and stakeholder support.

RESEARCH METHOD

This research was carried out at SMA N 1 Pecangaan and SMA N 1 Jepara began in March-April 2018. The populations in this study were students of science class XII majoring in Biology at SMA N 1 Pecangaan and 208 students from SMA N 1 Jepara. Data sampling technique used purposive sampling technique. Determination of the number of samples using the formula Isaac and Michael and obtained a minimum of 131 samples from 208 members of the population. This study has two variables: independent variables (factors that influence students choosing Biology) and dependent variables (selection of Biology subjects).

The design of this study is a mixed method that used sequential mixed methods with sequential explanatory strategies. This strategy is the first stage to collect and analyze qualitative data in the form of interview results and then followed by quantitative data collection and analysis in the form of questionnaires built based on the results of interviews. So that the instruments needed are interview sheets and questionnaire sheets.

The results of the interviews were analyzed using the Miles-and Hubberman analysis technique (*Miles et.al.,2014*) which consisted of three stages: data reduction, data presentation, and conclusion drawing. While the results of the questionnaire were analyzed using factor analysis with the stages of formulating problems, compiling matrix, factor extraction, factor rotation, and factor interpretation.

RESULT AND DISCUSSION

Based on research that had been carried out with the object of class XII students of SMA Negeri 1 Jepara and SMA Negeri 1 Pecangaan using interview and questionnaire methods. Based on interviews that have been conducted on 18 samples, the results show that there are some things that are the background of students choosing Biology. These things can be seen in Figure 1.

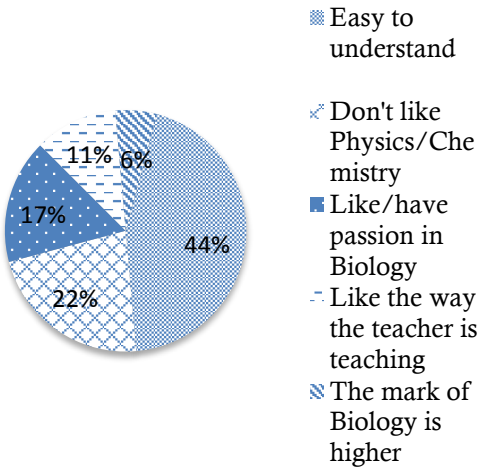

Figure 1. The background of students choosing Biology

Based on Figure 1. it appears that there are 5 things that are the reason for the students to choose Biology, the highest reason because Biology is easy to understand/learn, students do not like Physics/Chemistry, students like/have a passion in Biology, students like the way of teaching Biology teachers, and the mark for Biology of students is higher than other subjects.

Students also revealed that in choosing Biology they were not directed by anyone or joined his friends but it was because of the students' own wishes. Although in choosing Biology is in accordance with his wishes, but in learning, of course, experience difficulties. The biggest difficulty experienced by students is the amount of Biology material that students must learn. Other difficulties faced by students are the Latin names in Biology, heredity material, classification material, and cell metabolic material.

The thing done by students in dealing with these difficulties is often practice exercises and find other references on the internet as learning material. In addition to students looking for their own solutions in the face of difficulties, teachers at school always help the difficulties faced by students. But students prefer to ask peers rather than asking the teacher about the difficulties. When students ask the teacher, there is still a sense of hesitation that students feel but when students ask their friends, students can be more open to express all the difficulties faced. When students are reluctant to ask the teacher directly, another alternative that can be done by the teacher is to apply learning models that can improve students' understanding. According to research conducted by *Nisa et al. (2016*) revealed that using a reciprocal teaching model can make an increase in learning activities so that this also leads to increased learning outcomes of students. This result is achieved because the application of reciprocal teaching models can provide

opportunities for students to learn independently, which is to find the concept of working and discussing so that students are able to express ideas. In addition to reciprocal teaching models, inquiry learning models can also improve students' material understanding. Students can find concepts independently, be more active in learning, and be motivated in participating in learning so that learning outcomes increase (*Safufia et al., 2016*).

The results of the interview also revealed that all students chose to continue their study, from 18 respondents 3 respondents chose to continue their studies at the Department of Education and 15 respondents chose to continue their studies at Higher Education. Departments in Higher Education chosen by the fifteen respondents are various, there are those who want to enter the interior design department, international relations, engineering, communication, public health, food technology, nutrition, accounting, agribusiness, health analysts, medicine, and biology. The results of questionnaires that have been obtained are then analyzed by the SPSS 16.0 program. Based on the results of the factor analysis, the results of the study can be seen in Table 1.

The greater the communalities, the more closely related factors are formed. In the Eigenvalues column information is obtained that out of 28 indicators there are 9 components that are new factors because they have more than one eigenvalues value. Nine new factors that are formed can explain all existing variables by 71.675% and the remaining 28.325% is determined by other factors that have not been identified. In the Factor Loading column, it can be seen that there are 2 indicators which have a loading factor value <0.5 which are Interest 1 indicator with a loading factor of 0.488 and Interest 3 with a loading factor of 0.486. This means that the two indicators have a fairly low contribution. While the highest loading factor is Objective 2 with a loading factor value of 0.916. This means that the Objective 2 indicator has a strong contribution to factor 3.

Each of the 9 factors formed is given a name/term, namely (1) factors of friends and parents, (2) factors of interest and motivation, (3) factors of ideals and profession of parents, (4) factors of self-ability, (5) teacher and parent factors, (6) school factors, (7) perception factors, (8) interest and achievement factors, and (9) home environmental factors.

Factor 1 is a factor of friends and parents consisting of friends and guidance from parents with an eigenvalue value of 6,922. In factor 1, the peer environment variable gives the highest influence, which is 90.8%. Contributions to the influence of external factors, namely the peer environment that is so large towards the selection of Biology subjects but based on the results of descriptive analysis of peer environmental questionnaires, it has little effect. The contribution of this large peer influence environment is due to the fact that other factors do not play a role in influencing students to choose Biology. In addition, the magnitude of the influence of friends can also be caused by intense students interacting with their peers. Students' interaction with their peers is intimately intertwined, both in the school environment and in the neighborhood. In addition, students are able to become good learning partners, such as doing group learning with friends and helping students if they have learning difficulties. Peer environment is an environment that provides comfort for students, in addition to the family environment. Students feel comfortable if they can tell their peers, ranging from students 'personal problems, students' experiences, to discussing the choices that students want. According to Hurlock (2006) also saying that one of the factors that influence adolescents is the attitude of peers who are school-oriented or work. Factors of peers greatly influence the decisions a person takes for his future. The strong influence given by peers, the task of the

teacher is to create conducive and positive environmental conditions for students so that they can find a comfortable place to learn and can optimize their learning outcomes. Parental environment variables also have an important role on students in choosing an eye Biology. Family/assistance support provided by family members such as parents, siblings in the form of views, opinions, advices, awards, informations and materials that cause action or emotional effects that are beneficial to individuals in helping themself make decisions (Istifarani 2016).

Factor 2 is given the name of interest and motivation consisting of six (6) indicators, namely, Motivation 4, Interest 6, Motivation 1, Interest 5, Motivation 3, and Interest 3. If the students have high motivation, then they will issue all of its ability to get optimal results in learning. Research conducted by Kharisma (2015) shows that there is a positive influence of motivation on students' interest in determining their choices to continue their studies. According to Hamalik (2012) motivation is able to stimulate interest in learning with high motivation, one can also have high learning interest.

Factor 3 is named after the goal and profession of parents. This factor consists of three (3) indicators, namely Goal 2, Parents' Profession 1, and Goal 1. The results of this study corroborate the opinion expressed by Kharisma (2015) that in addition to motivation, goal is also a factor which can affect the growth and development of one's interest in a matter. The existence of strong goal in a person will be able to increase the interest of the person towards an object. Conversely, if goal do not exist, then interest is difficult to grow.

Factor 4 is given the name of self ability which consists of five (5) indicators namely Talent 1, Perception 1, Perception 2, Achievement 3, and Interest 1 with eigenvalue value of 1,734. The results of economic research conducted by Ramadhani (2011) and Bilondatu (2013) show that perception has a significant influence on a person's decision to purchase a motorcycle. Other research in the field of education shows that there is a positive relationship between the talents of students and the choice of majors. Talent can affect the level of learning achievement in certain fields of study. Therefore the imposition of will on a student and also the students' unconsciousness to their own talents so that he chooses a particular expertise department which is actually not his talent, will adversely affect his academic performance or learning achievement (Winarsih 2007). The results of this study also in accordance with research conducted by Kharisma (2015) it can be seen that learning achievement has an influence on the interest in continuing education to college in class XII students. The higher students' learning achievement, the higher the interest in continuing their education to college.

Factor 5 is named teacher and parent. This factor consists of Teacher's Direction 1 and Parental Guidance 1 with an eigenvalue of 1,487. Teacher's Direction 1 is a direction from the teacher who instructs his students to choose Biology while Parental Guidance 1 is guidance from parents who tell their children to choose Biology. This factor can explain the various variance of 5.310%. When viewed from the loading factor, the indicator on this factor has a range factor ranging from 0.814 to 0.824. This means that the correlation between indicators with factors ranges from 81.4% to 82.4%. The largest factor loading value is found in Teacher's Direction 1 indicator with a value of 0.824 and the smallest factor loading value is on Parental Guidance indicator 1 with a value of 0.814.

According to Hasibuan (2017) a teacher does not only teach in the classroom but a teacher must also be able to be a catalyst, motivator and dynamicator. These three tasks if viewed in terms of students, the teacher must provide values that contain past, present and future knowledge, choices of life values and communication practices. In addition to the three

tasks above the teacher also acts as a teacher and mentor in the learning experience. Each teacher must provide knowledge, skills and other experiences outside of school functions such as learning outcomes in the form of personal and spiritual behavior and choosing work in the community. The teacher also has an advisory role. The teacher is an advisor for students. Students are always faced with the need to make decisions and in the process will run to the teacher, therefore the direction of the teacher can have an influence on the subject selection decisions chosen by their students.

Factor 6 is named the school environment which consists of two (2) indicators namely Teacher's Direction 2 and Infrastructure 1 with eigenvalue value of 1.308. The teacher's direction on this factor about the additional hours at school to deepen the material of Biology and Infrastructure 1 is that the facilities/teaching aids in the school are complete. This factor can explain the diversity of variants by 24,723%. When viewed from the loading factor, the indicator on this factor has a range factor ranging from 0.683 to 0.779. This means that the correlation between indicators with factors ranges from 68.3% to 77.9%. The largest factor loading value is found in Teacher's Direction 2 indicator with a value of 0.683 and the smallest factor loading value is in the Infrastructure 1 indicator with a value of 0.779. Facilities and infrastructure are one of the necessary and very important educational resources that are well managed and are an inseparable part of education management.

Factor 7 is given the name perception which consists of two (2) indicators, namely Perception 3 and Perception 4 with an eigenvalue of 1,215. This factor can explain the diversity of variants by 4,339%. Perception 3 is the level of Biology difficulty is not too high while Perception 4 is that students do not need a long time to study Biology material. When viewed from the loading factor, the indicator on this factor has a range factor that ranges from 0.641 to 0.709. This means that the correlation between indicators with factors ranges from 64.1% to 70.9%. The largest factor loading value is found in Perception 3 indicator with a value of 0.709 and the smallest factor loading value is on Perception 4 indicator with a value of 0.641.

Factor 8 is given the name of interest and achievement. This factor consists of two (2) indicators, namely Interest 2 and Achievement 1 with an eigenvalue of 1,088. Interest in this factor about students not liking other elective subjects and Achievement 1 explaining the biology mark of students is always satisfying. This factor can explain the diversity of variants by 3.887%. When viewed from the loading factor, the indicator on this factor has a range factor that ranges from 0.705 to 0.762. This means that the correlation between indicators with factors ranges from 76.2% to 70.5%. The largest factor loading value is found in Interest Indicator 2 with a value of 0.762 and the smallest factor loading value is on the Achievement 1 indicator with a value of 0.705.

Factor 9 is named the home environment which only consists of one (1) indicator, namely the Atmosphere of the House with an eigenvalue of 1.004. The atmosphere of the house in question is a home atmosphere that supports learning Biology. This factor can explain the diversity of variants by 3,587%. When viewed from the loading factor, the indicator on this factor is 0.670. This means that the correlation between indicators with factors is 67%.

Based on Table 1 shows that the Kaiser-Meyer-Olkin (KMO) and Barlett's Test is 0.698 because the KMO value is above 0.5 (0.698> 0.5), then the variables and samples are able/feasible to be analyzed by factor analysis. In addition to KMO values, it is also known that the variables that are feasible to be tested can be reduced to one or more factors. In SPSS this refers to the Communalities table. Communalities are the number of variants of an initial

variable that can be explained by existing factors.

Table 1. Factor Analysis Results

Factor	Indicator	KMO dan *Barlett's Test*	Factor Loading	Initial Eigenvalues	Total Variance Explained(%)
		0,698			
Factor 1	Friends 2		0,908	6,922	24,723
	Parental Guidance		0,893		
	Friends 1		0,832		
	Parental Guidance 2		0,799		
Factor 2	Motivation 4		0,735	3,244	11,587
	Interest 6		0,722		
	Motivation 1		0,695		
	Interest 5		0,626		
	Motivation 3		0,617		
	Interest 3		0,488		
Factor 3	Goals 2		0,916	2,066	7,380
	Parents' Profession 1		0,915		
	Goals 1		0,658		
Factor 4	Talent 1		0,717	1,734	6,192
	Perseption 1		0,679		
	Perseption 2		0,631		
	Achievement 3		0,577		
	Interest 1		0,486		
Factor 5	Teachers' Direction 1		0,824	1,487	5,310
	Parental Guidance 1		0,814		
Factor 6	Teachers' Direction 2		0,779	1,308	4,671
	Infrastructures		0,683		
	Teaching method 1		0,625		
Factor 7	Perseption 3		0,709	1,215	4,339
	Perseption 4		0,501		
Factor 8	Interest 2		0,678	1,088	3,887
	Achievement 1		0,693		
Factor 9	Home Environment 1		0,630	1,004	3,587

CONCLUSION

Based on the results of the study it can be concluded that the factors that influence students choose Biology because Biology lessons are easy to learn, students do not like physics/chemistry subjects, students have a passion in Biology, students like the way of teaching of the Biology teachers, and students have a high mark on Biology and the dominant factor that has a big influence is the factor of friends and parents. The factors that are formed contribute to the cumulative variance percentage of 71.675%, while the remaining 28.325% is explained by other indicators that are not included in the indicators that the researcher studied.

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