

IDENTIFICATION OF FACTORS IN SELECTING HIGH SCHOOL USING FACTOR ANALYSIS

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Abstract. *Parents want the best education for their children. Before starting the academic year, parents focus on finding the most suitable schools for their children. This study aimed to examine the factors affecting parents' decision-making when selecting schools. A sample of 150 parents whose children are incoming high school students in 2020/2021 is involved in this study and selected using a snowball sampling technique and confirmatory factor analysis. This study has shown that the quality of the teachers is the factor that parents consider the most in their decision-making process. It is followed by the tuition and fee costs, the school facilities, and the school achievements.*

Keywords: *confirmatory factor analysis, parents' decision making when selecting school, school tuition and fee costs, school facilities, school achievements*

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1. INTRODUCTION

Education is something that humans need. It is hoped that humans will become better, insightful, wise, and can improve their standard of living with education. Schools are formal educational institutions that function in students' growth and development. Schools have a vital role in educating, fostering student behavior, and preparing students to become people of noble character and value for the nation and state. According to [1], schools function as a place for students' mental development, meet their needs, and provide guidance to students so that they can continue to learn and develop their potential so that they can become a proud generation. The enactment of Regulation of the Minister of Education and Culture (Permendikbud) Number 23 of 2017 regulates the time of the school day for 5 days (Monday - Friday) with a length of time in school 8 hours per day (full day school). Practically, every day students' time in school becomes more prolonged, and they interact with friends and teachers more. After school hours are over, students may also be busy with extra-curricular activities in the school environment. It can be said that school is a second home for students, so students must feel comfortable at school.

The implementation of full-day school has several aspects that must be met, including: (1) a national curriculum that is integrated with the local curriculum, (2) professional teaching and educational staff, (3) adequate infrastructure, (4) financing aimed at supporting full-day school activities, (5) active role of students in participating in school activities, and (6) community participation in supporting full-day school activities [2].

The implementation of full-day schools in schools in Denpasar City affects parents' perception of choosing schools for their children. Every new school year, parents are seen busy looking for information about schools considered suitable places for their children to study. Parents always want the best school for their children. Several factors influence parents in choosing a school for their children. Research by Ervina et al. [3] shows that the factors influencing parents in choosing a vocational school are: school infrastructure and facilities, teacher quality, and graduate competence. Furthermore, the research of Lestari et al. [4] stated that the factors that influence students in choosing a high school in Blitar are school facilities, human resources, and excellent schools. Another study conducted by Krismawintari [5] showed that competent human resources and soft skills possessed by a school are the main factors that parents consider in choosing a school other than school image, quality education process, toilet cleanliness, adequate learning facilities, affordable costs, relationship with the community and the environment as well as ease of access.

Referring to previous studies on parental considerations in choosing a school for their children, this study aimed to identify parents' factors in choosing a school for their children. The concepts observed include school achievement, teaching staff, education costs, and school facilities. The method used to answer the research objectives is Confirmatory Factor Analysis (*Confirmatory Factor Analysis/CFA*).

Factor analysis is a procedure for identifying variables based on their similarity. A high correlation value indicates similarity. Variables with high correlation are grouped into one group called factors. They have a low correlation with other variables in different groups [6]. Another definition of factor analysis is a statistical analysis that serves to reduce or summarize several original variables 1, 2, 3, ..., into a set of variables that are fewer in number than the original variable. Then, it is grouped into a set of variables referred to as a factor. The relationship between new variables or factors formed is interrelated and has a high correlation by minimizing the loss of information to find and define the basic construction or dimensions that are assumed to underlie the original variable [7].

Factor analysis is divided into 2. 1) Exploratory Factor Analysis / EFA is a statistical approach that can be used to analyze the interrelationships between a large number of variables and explain these variables in terms of the dimensions (factors) that underlie them. The goal of EFA is to find a way to condense the information contained in the original set of variables into a smaller set of variables (factors) with minimal loss of information. Meanwhile. 2) Confirmatory Factor Analysis / CFA is an analysis that is a priori based on theories and concepts that are already known, understood, or determined beforehand. There are two kinds of variables in CFA, namely latent variables and indicator variables. Latent variables are variables that cannot be measured directly but can be formed and constructed by other variables that can be measured, and these variables are indicator variables. The difference between CFA and EFA is that researchers already have an initial assumption that the indicators fall into certain latent variables in CFA. In the beginning, researchers have developed a hypothetical model based on a theoretical framework or previous research that is used as a reference [8].

CFA is often used in the scale development process to examine the latent structure of test instruments (e.g., questionnaires). In this context, CFA is used to verify the number of dimensions underlying the instrument (factors) and the pattern of item-factor relationships (loading factors). The CFA also assists in determining how the test should be assessed. When the latent structure is multifactorial (two or more factors), the factor loading pattern supported by the CFA will show how the test can be assessed using subscales, i.e., the number of factors indicates the number of subscales, and the pattern of item-factor relationships (which items contain which factors) indicates how the subscale should be scored [9].

2. RESEARCH METHOD

To answer the research objectives, 150 parents of students who had children who graduated from elementary school or junior high school were taken in the 2020/2021 academic year. The approach used was quantitative. It is a study whose data are in the form of numbers and analyzed using statistical procedures [10]. In this study, data were obtained by designing a research instrument in a questionnaire, with statement items arranged on a five-level Likert scale. The questionnaires distributed to respondents had previously been tested for validity and reliability by distributing questionnaires to 15 parents who had children who would enroll in junior high school and 15 parents who had children who would enroll in high school. The questionnaire whose statement items were valid and the concept reliable was then distributed to 150 respondents in Denpasar. To make it easier to get research respondents, the sampling technique used in this research was snowball sampling. Snowball sampling is a sampling method in which samples are obtained on a rolling basis from one respondent to another [11] [12]. Snowball sampling process by taking an initial sample of 15 respondents. The 15 initial respondents were explained the contents of the questionnaire with the intention that they could distribute the questionnaire to other respondents who met the criteria as research samples. Then, the respondents who became the sample would look for other respondents until they finally obtained as many respondents as they wanted. This sampling technique was effectively used during the COVID-19 pandemic. It allows researchers not to make direct contact with many respondents.

To determine the factors that parents consider in choosing a school for their children, the method used was confirmatory factor analysis (CFA). CFA was carried out with the assistance of SPSS 22.0 (Statistical Package for Social Sciences) software. The concepts and measuring items used for factor analysis are described in Table 1.

Table 1. Operational Definition of Research Variables

Concept	Measuring Items	Indicators
School Achievement	X ₁₁	Students at the school often win academic competitions.
	X ₁₂	The school's students often win sports competitions
	X ₁₃	The school has students who excel in the arts.
	X ₁₄	The school is known for its students who often win creativity competitions outside of arts and sports.
Instructor	X ₂₁	The school has outstanding teachers
	X ₂₂	The school has creative teachers.
	X ₂₃	The school always provides reports on student progress on a regular basis.
Cost of education	X ₃₁	The school does not charge building fees
	X ₃₂	The school fees are in accordance with the facilities received.
	X ₃₃	The school does not charge a practicum fee.
School facility	X ₄₁	The school is equipped with science laboratories and computers
	X ₄₂	The school is equipped with a language laboratory
	X ₄₃	The school is equipped with WIFI
	X ₄₄	The school has complete sports facilities

The stages of data analysis carried out were:

1. Testing the validity and reliability of the instrument before the questionnaire was distributed to all respondents. Validity and reliability are fundamental in quantitative research. Validity is defined as the extent to which a concept can be measured. An instrument is valid if the instrument can accurately

measure what it is intended to measure. Reliability measures the accuracy of an instrument. In other words, the extent to which the research instrument consistently has the same results when used in the same situation at different times [13] [14]. The validity test is done by correlating each item with a total score. The item is valid if the correlation value (r) $> r_{tabel,n-2}$. A concept is said to be reliable if the value of α Cronbach > 0.60 [15].

2. Conducting Confirmatory Factor Analysis with the following steps: [7]
 - a. Calculating the Kaiser-Meyer-Olkin (KMO) statistic value and the Bartlett statistic χ^2 . The data is feasible to be extracted using factor analysis if the Bartlett statistic value χ^2 is significant and the KMO value ≥ 0.50 .
 - b. Measuring the adequacy of sampling with the Measure of Sampling Adequacy (MSA) test, if MSA ≥ 0.50 , items are eligible to be included in the factor analysis.
 - c. Performing factor extraction on each dimension by using Principal Component Analysis (PCA). The number of components extracted in this paper was determined by the eigenvalues greater than 1. Suppose the number of components formed is more than 1. In that case, factor rotation is conducted using orthogonal rotation to simplify the components' interpretation.
3. Interpreting the components formed.

3. RESULTS AND DISCUSSION

3.1. Item Validity Test and Research Concept Reliability

Before the questionnaire was distributed to all respondents, it was first distributed to 30 respondents to test the validity of the measuring items and test the reliability of the concepts used. For $n=30$, the value of $r_{tabel,28} = 0.30$, so the item is said to be valid if the value of $r > 0.30$. Furthermore, the concept is said to be reliable if the value of Cronbach > 0.60 . The results of the validity and reliability tests are shown in Table 2.

Table 2. Item Validity Test Results and Research Concept Reliability

Concept	Measuring items		R value	Interpretation
	Kode	Indicators		
School Achievement $\alpha = 0.611$	X ₁₁	Students at the school often win academic competitions.	0.501	valid
	X ₁₂	The school's students often win sports competitions	0.402	valid
	X ₁₃	The school has students who excel in the arts.	0.213	<i>invalid</i>
	X ₁₄	The school is known for its students who often win creativity competitions outside of arts and sports.	0.503	valid
Instructor $\alpha = 0.570$	X ₂₁	The school has outstanding teachers	0.417	valid
	X ₂₂	The school has creative teachers.	0.486	valid
	X ₂₃	The school always provides reports on student progress on a regular basis.	0.246	<i>invalid</i>
Cost of education $\alpha = 0.640$	X ₃₁	The school does not charge building fees	0.722	valid
	X ₃₂	The school fees are in accordance with the facilities received.	0.453	valid
	X ₃₃	The school does not charge a practicum fee.	0.342	valid
School facility $\alpha = 0.831$	X ₄₁	The school is equipped with science laboratories and computers	0.678	valid
	X ₄₂	The school is equipped with a language laboratory	0.535	valid
	X ₄₃	The school is equipped with WIFI	0.646	valid
	X ₄₄	The school has complete sports facilities	0.772	valid

Source: Analysis Results (2020)

Table 2. shows that there are two invalid items, namely X_{13} and X_{23} , so that the validity and reliability tests were carried out again by removing the two items. The full results are shown in Table 3.

Table 3. Item Validity Test Results and Concept Reliability After X_{13} and X_{23} are issued

Concept	Measuring items		R Value	Interpretation
	Kode	Indicator		
School Achievement $\alpha = 0.743$	X ₁₁	Students at the school often win academic competitions.	0.766	valid
	X ₁₂	The school's students often win sports competitions	0.597	valid
	X ₁₄	The school is known for its students who often win creativity competitions outside of arts and sports.	0.396	valid
Instructor $\alpha = 0.678$	X ₂₁	The school has outstanding teachers	0.671	valid
	X ₂₂	The school has creative teachers.	0.530	valid
Cost of education $\alpha = 0.640$	X ₃₁	The school does not charge building fees	0.722	valid
	X ₃₂	The school fees are in accordance with the facilities received.	0.453	valid
	X ₃₃	The school does not charge a practicum fee.	0.342	valid
School facility $\alpha = 0.831$	X ₄₁	The school is equipped with science laboratories and computers	0.678	valid
	X ₄₂	The school is equipped with a language laboratory	0.535	valid
	X ₄₃	The school is equipped with WIFI	0.646	valid
	X ₄₄	The school has complete sports facilities	0.772	valid

Source: Analysis Results (2020)

The results of the final analysis show that all items are valid and all concepts are reliable, then the questionnaire was distributed to 150 respondents.

3.2. The Extraction of Parents' Considerations in Choosing Schools for Their Children

Parents' considerations in choosing a school for their children at a higher level of education were measured through 12 valid statement items. Then, it was extracted using confirmatory factor analysis. Because the analysis used was confirmatory factor analysis and easier to interpret, each research concept is extracted into 1 component.

Table 4. The Extraction of Parents' Considerations in Choosing Schools for Their Children

Concept	Measuring Items		MSA	Communality	Loading Factor
	Code	Indicator			
School Achievement	X ₁₁	Students at the school often win academic competitions.	0.587	0.728	0.583
	X ₁₂	The school's students often win sports competitions	0.645	0.576	0.759
	X ₁₄	The school is known for its students who often win creativity competitions outside of arts and sports.	0.633	0.559	0.741

KMO= 0.624
 $\chi^2 = 80.209$
P= 0.008

Eigenvalue = 1.853
Diversity explained = 61.778%

Concept	Measuring Items		MSA	Communality	Loading Factor
	Code	Indicator			
Instructor KMO= 0.512 $\chi^2 = 25.183$ P=0.000 Eigenvalue = 1.396 Diversity explained = 69.890%	X ₂₁	The school has outstanding teachers	0.500	0.698	0.836
	X ₂₂	The school has creative teachers.	0.500	0.698	0.836
Cost of education KMO= 0.578 $\chi^2 = 39.861$ P=0.000 Eigenvalue = 1.588 Diversity explained = 52.926%	X ₃₁	The school does not charge building fees	0.548	0.667	0.817
	X ₃₂	The school fees are in accordance with the facilities received.	0.612	0.441*	0.641
	X ₃₃	The school does not charge a practicum fee.	0.575	0.510	0.714
School facility KMO= 0.706 $\chi^2 = 135.102$ P=0.000 Eigenvalue = 2.274 Diversity explained = 56.221%	X ₄₁	The school is equipped with science laboratories and computers	0.718	0.531	0.728
	X ₄₂	The school is equipped with a language laboratory	0.773	0.553	0.744
	X ₄₃	The school is equipped with WIFI	0.685	0.455*	0.674
	X ₄₄	The school has complete sports facilities	0.670	0.709	0.842

Source: Analysis Results (2020)

Referring to Table 4, based on the KMO value and the Bartlett statistic, the four data matrices are feasible to be extracted. By checking the MSA value of each item, it shows that the measuring items are worth extracting. Although based on the MSA value, all measuring items deserve to be extracted. However, the commonality value of X₃₂ and X₄₃ items, which are still below the minimum requirement of 0.5, re-extraction was carried out on the dimensions of education costs by removing the X₃₂ item and re-extraction of the dimensions of school facilities by removing the X₄₃ item. The results of the re-extraction of these two dimensions can be seen in Table 5.

Table 5. The Re-extraction of Parents' Considerations in Choosing Schools for Their Children

Concept	Measuring Items		MSA	Communality	Loading Factor
	Code	Indicators			
Cost of education KMO= 0.508 $\chi^2 = 23.813$ P=0.000 Eigenvalue = 1.386 Diversity explained = 69.306%	X ₃₁	The school does not charge building fees	0.500	0.693	0.833
	X ₃₃	The school fees are in accordance with the facilities received.	0.500	0.693	0.830
School facility KMO= 0.706 $\chi^2 = 135.102$ P=0.000 Eigenvalue = 1.987 Diversity explain= 68.590%	X ₄₁	The school is equipped with science laboratories and computers	0.681	0.649	0.804
	X ₄₂	The school is equipped with a language laboratory	0.697	0.626	0.794
	X ₄₄	The school has complete sports facilities	0.668	0.668	0.815

Source: Analysis Results (2020)

Referring to Tables 4 and 5, all concepts are eligible for extraction. The measuring items used are feasible to be extracted considering the MSA value and the communality value obtained has exceeded the required lower threshold value. To determine the number of factors extracted, the criteria for eigenvalues > 1 were used. Each concept was extracted into one component. Because each concept is extracted in one component, there is no need to rotate again.

3.3. Interpretation and Discussion

By paying attention to the amount of diversity described in each concept, the teaching staff is the first level of consideration for parents in choosing a school for their child. It contains 2 indicators, namely "The school has outstanding teachers and creative teachers," with an explained diversity of 69.890%. Parents think that teaching staff is the main factor that determines children's success, so in choosing schools for their children, parents prioritize schools that have reliable teaching staff. With the implementation of the full-day school system, students are in school longer, so creative teachers are needed so that students do not get bored studying at school.

The second rank that parents consider in choosing a school for their children is the cost of education. The concept of education costs consists of 2 indicators: "The school does not charge building fees, and the school does not charge practicum fees," with an explained variance of 69.306%. Parents objected to schools regarding fees other than school fees. This consideration was expressed by parents who wanted their children to enroll in public schools because the school has received School Operational Assistance (BOS) funds from the government.

School facilities are in the third place; which parents consider in choosing a school with an explained diversity value of 68.590%. Parents want a school for their children equipped with a science laboratory and a language laboratory to support their children's academic achievement. Parents also consider a school that has complete sports facilities. Complete sports facilities can support students to exercise at school without borrowing sports facilities elsewhere. Schools that borrow or rent sports facilities outside of school will increase student transportation costs or make it difficult for parents to pick up and drop off.

Parents' last concept in choosing a school for their children is school achievement. School achievement consists of 3 indicators, namely: "Students at the school often win academic competitions, the school's students often win sports competitions, and the school is known for its students who often win creativity competitions outside of art and sport." with the diversity represented by 61.778%. In today's digital era, school achievement information is easily accessible on social media. Parents and students will be proud if they go to a school with notable achievements. The summary of the final extraction results from each concept with the explained diversity values is presented in Table 6.

Table 6. The Final Extraction of Parents' Considerations in Choosing a School

Concept	Measuring Items		Loading Factor	Uniformity
	Kode	Indicators		
School Achievement	X ₁₁	Students at the school often win academic competitions.	0.583	61.778%
	X ₁₂	The school's students often win sports competitions	0.759	
	X ₁₄	The school is known for its students who often win creativity competitions outside of arts and sports.	0.741	
Instructor	X ₂₁	The school has outstanding teachers	0.836	69.890%
	X ₂₂	The school has creative teachers.	0.836	
Cost of education	X ₃₁	The school does not charge building fees	0.833	69.306%
	X ₃₃	The school does not charge a practicum fee.	0.833	
School Facility	X ₄₁	The school is equipped with science laboratories and computers	0.804	68.590%
	X ₄₂	The school is equipped with a language laboratory	0.791	
	X ₄₄	The school has complete sports facilities	0.815	

Source: Analysis Results (2020)

4. CONCLUSIONS

The four confirmed factors, the most dominant factor parents pay attention to in choosing a school is the teaching staff. The second consideration is the cost of education at the targeted school, followed by school facilities. Meanwhile, school achievement is the last consideration for parents in choosing a school for their children.

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