Factor Analysis of Peer Supervision Model in Junior High Schools Malang City

Dedi Prestiadi(✉), Ahmad Nurabadi, Ibrahim Bafadal, and Ahmad Munjin Nasih

Universitas Negeri Malang, Malang 65145, East Java, Indonesia
dedi.prestiadi.fip@um.ac.id

Abstract. Supervision is an important activity carried out by the principal to provide assistance to teachers in the face of the problems faced so that it will have an impact on improving the quality of teachers. This study aims to determine the factors of the peer supervision model in Malang City Junior High School. This research uses quantitative research methods through a factor analysis model. The data collection technique was carried out through a questionnaire with a sample of principals in the city's junior high school of 52 principals. The result of this study is that there is one factor in peer supervision, namely factor 1 or collegial relationship factor. The variable that most significantly affects the principal's peer supervision is collegial relationships.

Keywords: peer supervision model · junior high school · school principal

1 Introduction

The rapid development of science and technology requires educational institutions to be better able to adapt to current developments [1]. Among the existing staff, teachers with adequate abilities are at the forefront of determining the quality of education. The teacher faces the students in the teaching process every day. Therefore, every school needs qualified teachers [2, 3]. The main function of teaching supervision is to improve and improve the quality of teaching and guide teaching so that it can continue to improve the quality of teaching [4, 5]. Teaching supervision aims to create a better environment for teaching activities in achieving school educational goals, provide teacher teaching experience, use modern teaching tools, and assist teachers in assessing student progress (this is the main focus of any educational institution). Teachers are the spearhead of the advancement of Education [6]. One of the dimensions of teacher competence in accordance with the Regulation of the Minister of National Education of the Republic of Indonesia Number 16 of 2007 concerning Academic Qualification Standards and Teacher Competencies is professional competence [7–9].

The effectiveness of teacher professional performance depends largely on the principal's ability to carry out tasks, including the ability to carry out academic supervision [9]. To carry out academic supervision, the principal as the supervisor and person in charge of the school must be able to formulate a curriculum, implement and carry out follow-up academic supervision in the school he leads [3, 10]. The implementation of

B. B. Wiyono et al. (Eds.): ICEMT 2022, ASSEHR 727, pp. 532–540, 2023.
https://doi.org/10.2991/978-2-494069-95-4_62

good academic supervision by the principal will also improve the ability of teachers and encourage good learning. In addition, learning correctly will have an impact on improving student performance. Therefore, the success of student learning depends largely on the teacher's ability to promote learning and the principal's ability to carry out academic supervision. The principal's academic supervision competence consists of three aspects, namely competence in preparing programs, implementing, evaluating and following up on findings when carrying out academic supervision [11, 12]. The academic supervision program that must be prepared by a principal is a guideline or reference in carrying out academic supervision [13, 14]. Based on the results of a study conducted by a researcher that the factors that cause low teacher competence are caused by internal and external factors. Internal factors that influence the low professional ability of teachers are believed to include: teachers do not understand the development of learning material skills; the teacher does not analyze the learning material before writing the textbook or learning material; and teachers lack the self-motivation to perform well. External factors that cause low professional competence of teachers are the implementation of supervision by the principal which requires further evaluation [15, 16].

Teachers need to be motivated to be open in the face of academic supervision. Teachers will be able to make good use of the results of supervision if there is openness, motivation, and feel involved in supervision activities. Based on the above problems, academic supervision is carried out by cultivating teachers, namely by self-evaluation. Ideally, supervision is done collegially through cooperation, through partnerships and guidance, and through open and flexible discussions and brainstorming to help teachers reflect on the performance of their professional responsibilities. One approach in promoting partnerships or colleagues between principals and teachers as mentors is to accompany more through open, flexible discussions and brainstorming, and have a clear goal to help teachers develop through activities. Effective professional reflection activities are through a collaborative approach [17, 18].

In peer supervision, those who supervise are professional friends. The assessment is based on criteria determined by the supervised institution. The assessment is carried out not solely from outside the institution but what is in the institution is associated with the criteria that have been determined by the institution concerned. Supervisors do not compare the results obtained between institutions with each other because each institution has different standards [19, 20]. This condition allows the occurrence of the same percentage of achievement, but not necessarily the same success rate. In his journal entitled "Optimization of Academic Supervision through Peer Observation" found that peer observation or observation between friends gave positive results, namely improving teacher perceptions of supervision. The implementation of peer observation also provides significant improvements to the teacher's professionalism in carrying out peer observation. That means that peer observation delivers positive results to optimize academic supervision.

2 Methods

This research uses a quantitative approach. Quantitative research is a method to test certain theories by examining the relationship between variables. This type of research

is carried out through analisis factor. Actor f analysis is a common name that denotes a class of procedures, primarily used to reduce data or summarize, from variables that are widely converted to fewer variables than the original variables. The factors that will be analyzed in this study are variables about peer supervision consisting of seven variables. Data collection was carried out through a closed questionnaire through a likert scale. The population in this study was the principal of the Malang City Junior High School through purposive random sampling. The total sample in this study was 52 principals of the city's Junior High School.

3 Result and Discussion

Validity or validity is an index that shows that the measuring instrument actually measures what is measured. This validity concerns the accuracy of the instrument. To find out whether the questionnaire compiled is valid, it is necessary to test it. This research is based on the basic concept of Cronbach's Alpha reliability test that the research questionnaire is said to be of high quality if it has proven its validity and reliability.

Testing the validity of each item is used for item analysis, which correlates the score of each item with the total score which is the sum of each item score (corrected item total correlation) and the value can be seen in the results of processing using the Statistical Package For Social Science (SPSS) program. A question is declared valid if the calculated r value which is the corrected item total correlation value is greater than the r table.

Meanwhile, reliability or reliability is an index that shows the extent to which the measuring device is said to be consistent, if two or more measurements are taken against the same symptoms. Please be aware that the calculation of the reliability test should be carried out only on questions that already have or meet the validity test. The reliability test in this study used Cronbach Alpha with the help of SPSS version 25 for windows.

Table 1. Reliability score

Reliability Statistics	
Cronbach's Alpha	N of Items
.837	7

Table 2. Kaiser-Meyer-Olkin (KMO) and Bartlett Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.731
Bartlett's Test of Sphericity	Approx. Chi-Square	144.408
	df	21
	Sig.	.000

Table 3. Result of Measure of Sampling Adequacy (MSA)

		Collegial relationships	collegial communication	Consideration	Professional collegial discussion	Professional collegial support	Emotional sense	Professional collegial communication topics
Anti-image Covariance	Collegial relationships	.445	−.205	−.203	.155	−.158	.028	.011
	collegial communication	−.205	.417	.133	−.205	.092	−.153	−.049
	Consideration	−.203	.133	.449	−.164	−.004	−.115	−.108
	Professional collegial discussion	.155	−.205	−.164	.567	−.109	−.023	.024
	Professional collegial support	−.158	.092	−.004	−.109	.562	−.170	.078
	Emotional sense	.028	−.153	−.115	−.023	−.170	.348	−.143
	Professional collegial communication topics	.011	−.049	−.108	.024	.078	−.143	.692
Anti-image Correlation	Collegial relationships	.672[a]	−.476	−.455	.309	−.316	.072	.020
	collegial communication	−.476	.655[a]	.307	−.421	.190	−.402	−.092
	Consideration	−.455	.307	.728[a]	−.326	−.008	−.291	−.193
	Professional collegial discussion	.309	−.421	−.326	.708[a]	−.193	−.053	.039
	Professional collegial support	−.316	.190	−.008	−.193	.768[a]	−.384	.125
	Emotional sense	.072	−.402	−.291	−.053	−.384	.792[a]	−.292
	Professional collegial communication topics	.020	−.092	−.193	.039	.125	−.292	.845[a]

a. Measures of Sampling Adequacy (MSA)

The measure used to make the statement reliable is reliable, if the Cronbach Alpha value is 0.6. In general, reliability in the range of 0.60 to 0.80 is good, as well as in the range of 0.80 to 1.00 is considered very good. Based on the results of the reliability test, a score of 0.837 can be seen in the Table 1.

This study used Kaiser-Meyer-Olkin Measure (KMO) testing and Bartlett Test with the help of SPSS 25.0 for Windows. This test requires that there be a significant correlation between the variables studied. Factor analysis can or may not be carried out based on the results of the Kaiser-Meyer-Olkin (KMO) Measure of Adequacy test. The test is used to test the adequacy of the relationships between variables, with the identity matrix containing the diagonal of the matrix worth 1 while the other is 0. This study is expected to have sufficient correlation relationships between variables. Adequacy in this factor

Table 4. Score Communalities

	Initial	Extraction
Collegial relationships	1.000	.688
collegial communication	1.000	.606
Consideration	1.000	.611
Professional collegial discussion	1.000	.508
Professional collegial support	1.000	.720
Emotional sense	1.000	.754
Professional collegial communication topics	1.000	.647
Extraction Method: Principal Component Analysis.		

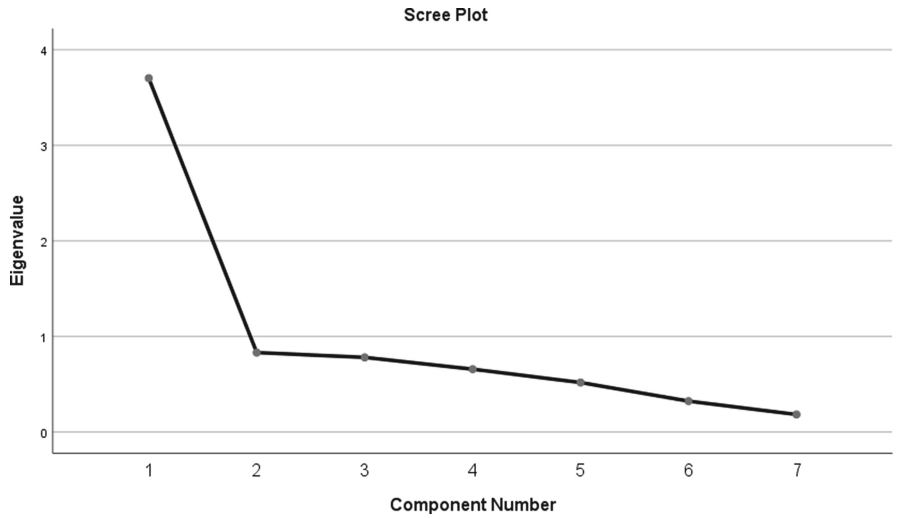

Fig. 1. Scree Plot

analysis can be obtained if the significant (p-value) is < 0.05. Meanwhile, the results of the KMO test and the Bartlett test are shown in Table 2.

The KMO and Bartlett's Test output table (Table 2) is useful for knowing the feasibility of a variable, whether it can be further processed using this factor analysis technique or not. You do this by looking at the KMO value. If the KMO value is greater than 0.50 then the factor analysis technique can be continued. Based on Table 2, it can be seen that the KMO value is 0.731 which can be interpreted to mean that the data can be analyzed for further factors due to the KMO value (>0.5). Meanwhile, Bartlett's Test of Sphericity can be seen that the p-value is 0.000 which means < 0.05. This value means that the variables studied can be continued to the stage of factor analysis (Table 3).

Anti-image Matrices is useful for knowing and determining which variables are worth using in factor analysis. Pay attention to the Anti-image Correlation section, in the table

Table 5. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.703	52.899	52.899	3.703	52.899	52.899
2	.832	11.884	64.783	.832	11.884	64.783
3	.781	11.160	75.943			
4	.658	9.404	85.346			
5	.518	7.403	92.749			
6	.324	4.624	97.373			
7	.184	2.627	100.000			

Extraction Method: Principal Component Analysis.

there is a letter code (a) which means a sign for the Measure of Sampling Adequacy (MSA). It is known that the MSA values of each of those studied are as follows: collegial relationship 0.672, collegial communication 0.655, Consideration 0.728, Professional collegial discussion 0.708, Professional collegial support 0.768, emotional sense 0.792, Professional collegial communication topics 0.845.

The requirement that must be met in the factor analysis is an MSA value $>$ 0.50. From the results above, it is known that the MSA value for all variables studied is $>$ 0.50, then all variables are worthy of factor analysis.

This Communalities table shows the value of the variable under study whether it is able to explain the factor or not. The variable is considered capable of explaining the factor if the Extraction value $>$ 0.50. Based on Table 4, it is known that the Extraction value for all variables is greater than 0.50. Thus it can be concluded that all variables can be used to explain factors.

The Total Variance Explained table shows the value of each variable analyzed. Based on Table 5 "Initial Eigenvalues", there is one factor that can be formed from the seven variables analyzed. Where the condition is to be a factor, the Eigenvalue value must be $>$ 1. The Eigenvalue of Component 1 is 3,703 which means $>$ 1 is a factor of 1 and is able to explain 52.899% of the variation.

While the Eigenvalue Component value 2 to 7 has a value of $<$ 1 which means it is not a factor. While the Extraction Sums of Squared Loadings section shows the number of variations or the number of factors that can be formed, in the output results above there is one factor variation, namely component 1 3,703. The Eigenvalue value can also be seen in Fig. 1.

Based on Table 5, it shows that communalities in collegial relationship variables have the highest value, namely 3,703 or in other words, have the highest influence on forming the main component, namely peer supervision. Next in second place is collegial communication with a value of 0.832, then Consideration 0.7 81, professional collegial discussion 0.658, professional collegial support 0.518, emotional sense 0.324, and the lowest is collegial communication professional 0.184.

Table 6. Component Matrix

Component Matrix[a]	
Collegial relationships	.734
Collegial communication	.745
Consideration	.768
Professional collegial discussion	.662
Professional collegial support	.690
Emotional sense	.865
Professional collegial communication topics	.597
Extraction Method: Principal Component Analysis.	

a. 1 components extracted

The next calculation is to ensure that a variable belongs to which group of factors, then it can be determined by looking at the value of the largest correlation between the variable and the factor (Component) formed. The results of the previous calculations showed that there is one factor that is the optimal amount to explain the seven peer supervision variables. Furthermore, it is continued with the calculation of the matrix components which are used to show the distribution of the seven variables on the factors that have been formed.

The results of this Component Matrix calculation show the correlation value between each variable and the factor formed. Based on the component matrix, data on collegial relationships 0.734, collegial communication 0.745, consideration 0.76 8, professional collegial discussion 0.662, professional collegial support 0.690, emotional sense 0.865, professional collegial communication topics 0.597 were obtained. Based on the data in Table 6, it can be concluded that all variables have a correlation value of variables with a factor of 1. Thus because there is only one factor then the rotated value of the Component Matrix cannot be done.

4 Conclusion

Based on the eigenvalue, and the total variance value obtained, it can be known that there is one main component or factor that is most suitable to explain the seven variables used. The factor is factor 1 or the collegial relationship factor. Thus, this research resulted in the finding that there is one factor in peer supervision, namely factor 1 or collegial relationship factor. The variable that most significantly affects the principal's peer supervision is collegial relationships.

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