Development and Validation of an Instrument to Access the Lecturers' Performance in the Education and Teaching Duties

YUSRIZAL
A. HALIM

ABSTRACT

In this study, an instrument was developed to access the lecturers' performance in performing the education and teaching duties. The steps in the development of the instrument involves the development of conceptual and operational definition of the lecturers' performance variable, the drafting of the lecturers' performance indicators and items piloting the instrument with expert, and university students. The instrument was also piloted for second time with university students. Based on the operational definition and on the assessment conducted on the experts and students, it was obtained seven lecturers' performance indicators and 71 items. The pilot test with experts and university students showed that the instrument has good construct validity. The calculation of reliability coefficient which was analyzed by using the alpha Cronbach formula showed the coefficient of 0.931 for the first pilot test and 0.934 for the second one.

Keywords: Lectures' performance, Education and teaching, quality of lecturer, construct validity, classroom management

ABSTRAK

Dalam kajian ini satu instrumen telah dibangun bagi mengetahui prestasi pensyarah menjalankan kewajipan pengajaran dan pendidikan. Langkah-langkah pembangunan instrumen berkenaan melibatkan pembangunan definisi konseptual dan operasional pemboleh ubah prestasi pensyarah, mendraft indikator dan item prestasi pensyarah, kajian rintis terhadap pakar, kajian rintis tahap satu dan dua terhadap pelajar universiti. Berdasarkan pada definisi operasional dan pada penilaian yang dijalankan oleh pensyarah didapati tujuh indikator dan 71 item. Dapatan kajian rintis terhadap pensyarah dan pelajar universiti menunjukkan instrumen berkenaan mempunyai kesahan konstrak yang baik. Perkiraan pekali kebolehpercayaan dengan formula Cronbach mendapati 0,931 bagi kajian rintis tahap satu dan 0,934 bagi kajian rintis tahap dua.

Kata kunci: Prestasi pensyarah, pengajaran dan pendidikan, kualiti pensyarah, validiti konstruk, pengurusan bilik darjah

INTRODUCTION

Law Number 21 of 2003 on the National Education System in Indonesia states that higher education is aimed at preparing the generation with good academic quality and intellectual so that they are knowledgeable and understand about technology, and preparing for eclectic future leaders who able to dedicate themselves to succeed in the growing global competition (Diknas 2003). To achieve those objectives and to produce high quality human resource who are able to compete in this global era, high quality universities are required. One the most important factors which influence the quality of universities is the lecturer because the lecturers are the most important people who directly deals students with the university.

According to Djamas (2005), the improvement of the quality of lecturer is the key of all efforts to improving the quality of universities. Other efforts aimed to improving the quality of universities without considering the lecturers' capacity are useless. Therefore, as the teaching staff, the lecturers are one of the factors determining the success of a university. It means that the performance of a university is determined collective performance of academic staff, including lecturers.

Suryabrata (2004) states that universities in Indonesia have three roles (tridarma), they are (1) education and teaching roles, (2) research role, and (3) community service role. It also means that lecturers as the main component in campus academic activities should conduct these three roles. Therefore, the lecturers teaching in a university should (1) be eclectic in conducting education and teaching to produce educated people, (2) be able to conduct research related to their disciplines, and (3) be able to participate in community services which is an activity to dissimenate the knowledge for public development.

For some lecturer, education and teaching roles have been regularly conducted starting from the date of receiving teaching offer and order teaching letter with the schedule followed by a technical meeting with the head of department or study program. According to Kees Ruijter and Tjipto Utomo (1985), lecturers should consider representative and topicality of material selection in teaching process so that the materials are useful for students in the future. In this case, most lecturers have designed their lesson plan and sometimes with handout or written in handbook before beginning their classes. Some lectures have even prepared their material years ahead. According to Danim (2003), however, many lectures do not write handbooks, module, or tutorial script at all as their teaching materials. The teaching methods are closely related to the lecturers' capacity as manager in the class, student motivators, protectors, etc (Soekartawi et al. 1995). Many lectures use various methods relevant to the teaching material. However, according to Soekartawi et al. (1995), some lecturers begin their teaching activities after they receive

the offer letter by using lecture method every week, giving tasks, tests, examinations and submitting their students' scores.

Based on the explanation above, the lecturers' activities in performing their roles in education and teaching are different to one another. It means that the lecturers' performance in performing the three roles of university, especially education and teaching roles, varies from one university to another or among the universities. One can not determine the level of the performance that varied lecturer because we co not have a standard for that purpose so far. Currently, the lecturers' performance can only be accessed in general based on DP3 (Format used for the performance evaluation of civil servants). Therefore, DP3 does not have distinct parameters specifically for lecturers thus other standard assessment tool need to be developed.

Referring to the above explanation, it is important to develop an objective, valid and reliable instrument which can be used to access the lecturers' performance in performing the education and teaching roles. Therefore, the following research questions can be formulated: (1) How is the instrument for assessing lecturers' performance designed and developed in universities? (2) What indicators should be considered in designing the instrument for assessing lecturers' performance in universities? (3) How is the construct validity developed for the instrument for lecturers' performance assessment? (4) How is the instrument reliability developed for lecturers' performance assessment?

REVIEW OF LITERATURE

PERFORMANCE

Whitmore (1997) states that the definition of performance as an action, an achievement or what a person shows in his/her real skill. Lase (2003) conceptually defines the performance as a person's assessment on potential and working level including action, achievement, appearance in public, competition, and responsibility. The level of performance is not only considered from quantity level a person that can achieve in working; however, it is measured from the quality. Mangkunegara (1995) states that performance is working achievement, in quantity and quality, a person can achieve in performing duties related to responsibility assigned to that person. Schermerhorn (1999) also states that performance refers to working achievement quantity and quality of a person or a group. These definitions show that there are certain measurement standard to determine a person's performance level in the quantity of working results and their quality.

There are more scopes proposed by some experts about this performance definition. All of them have different views but they principally agreed that

performance refers to an effort to obtain better working achievement. Maier (As'ad 1977), for example, states that the performance is a success of a person in completing a work. This definition shows that performance is a result obtained by a person based on the standard for that work.

Good performance is influenced by two factors, good capacity and working motivation (Mitchell 1982). The capacity of a person is influenced by his/her understanding of the work and skill the person conducts; therefore, the person should enhance his/her capacity and skill. Besides, the contribution of working motivation to the performance can not be ignored. If the employee motivation is low, although the performance is very good, his/her performance remains low. Prawirosentono (1999) states that to access individual performance, we use this equation: performance = capacity + motivation. Based on the theory above, we can conclude that the performance is a combination of motivation, effort, capacity, skill and leadership towards bearing responsibility.

THE ROLES OF LECTURERS

Law Number 20 of 2003, on the National Education System, states that an educator who teaches at a university is called *dosen* (lecturer). Therefore, a lecturer is an educator or a teacher teaching in a university. For that reason, a lecturer as a teaching staff at higher education institution or university bears a functions to support and conduct higher education objective, to conduct education and teaching, research, and community service. The education and teaching, research, and community service roles or duties are the ones which can not be conducted by every person because they deal with university students who are expected to be leaders in any field, both at work and at scientific institutions.

According to Sudjana (1995), professional work is a work which can be conducted by those who are trained to. It is not a work conducted by those who can not do it or who do not get other accupation. Although lecturers are not assigned to teach all the time, teaching is still their main job and should be conducted professionally. Because of this profession, then teaching should be conducted seriously. Colletti (Soekartawi et al. 1995) states that the lecturer position is a professional position which should be conducted professionally.

Based on the explanation above, we can clarify that a lecturer is considered professional if he/she has skill in his/her discipline, who are responsible, and corporative. Besides that, as professional lectures, they should enhance their knowledge, attitude, and skill continually based on the requirement of their jobs.

ASSESSMENT FOR LECTURERS' PERFORMANCE

Referring to Dunkin and Biddle concept in Reddy (1998), which states that the process variable is more important than the result variable in accessing lecturers' performance, the assessment of lecturers' performance in education and teaching

roles refers to lecturers' goals in teaching or training, from planning, preparing until teaching in class. Suryabrata (2004) states that universities in Indonesia bear three main duties, that is (1) education and teaching duties, (2) research duty, and (3) community service duty. In Letter of Decision, Minister of development Supervision and government official empowerment affairs Number 38 on Lecturer Functional Position and its credit number, Article 4, states that there are 12 (twelve) lecturers' duties in education and teaching, five duties in research, and five duties in community service. Therefore, lecturers as the main component of academic activities in campus should also bear the three duties at the same time.

In relation to performance, the lecturers' performance at universities is based on the objectives assigned in performing their professional responsibility in three main duties of universities, that is (1) education and teaching duties, (2) research duty, and (3) community service duty. The most basic assessment for lecturers in education and teaching duties is those related to achievement in teaching duties, from preparation to conducting the evaluation. The assessment for activities during the teaching process is called an assessment for lecturers' performance, and it is one of the conditions to be fulfilled by the lecturer.

To investigate the lecturers' performance in education and teaching, an assessment should be conducted. People who can conduct the assessment on teachers' performance are university students. Miller (1975) states that evidences have shown that university students can fairly assess lecturers' teaching performance. Therefore, if students conduct assess their lecturers, the results will be more objective than if the deans or rectors do. Shackelford and Henak (Soekartawi et al. 1995) provide ten criteria in defining lecturers' characteristics effectively, (1) lecturers are enthusiastic, (2) lecturers have communication skill, (3) lecturers can describe problems and topics clearly, (4) lecturers master teaching materials, (5) lecturers are able to make class lively, (6) lecturers are flexible, (7) lecturers give organized teaching materials according to syllabus, (8) lecturers are fair in grading, (9) lecturers have an open their mind for feedback, (10) lecturers are friendly in classroom. Riyanto (2003) states that the teaching components at universities include objectives, materials, methods, lecturers, students, facilities, interaction, and evaluation.

The lecturers' performance in education and teaching as the goals the lecturers achieve in conducting their professional duties as teaching staff which include: teaching plan, teaching activity, material mastering, class management, communication skill with students, discipline and students grading.

CONSTRUCT VALIDITY

According to Suryabrata (2002) construct validity deals with how far the scores resulted from measurement by using an instrument reflects the theoretical construct of the instrument underlying the design. The construct validity

refers to how far the instrument can measure the definition in measured materials (Hamzah B. Uno et al. 2001). To measure the performance, we need to define what performance is. To define the performance, we need a number of theories. According to Hadi (1986), if the theory used is correct, the measurement results using the theory based instrument are considered valid.

According to Suryabrata (2002), there are two methods which experts have approved in this case, that is (1) factor analysis, and (2) multitrait-multimethod analysis. The definition of construct which is hidden and abstract is usually related to a lot of empirical behaviour indicators, requiring analysis through the analysis factor. The factor analysis can be used to test hypothesis concerning construct existence, or to find constructs in variable groups. According to Ancok (2002), if instrument has the construct validity, all items (questions or performance) in the instruments will definitely measure the concept we would like to measure. Suyanto (1988) states that the factor analysis is a study about dependency among variables to find smaller number of new variable sets than initial sets and to find which initial variables are common factors.

METHODOLOGY

STEPS IN DEVELOPING THE INSTRUMENT

The steps in developing the instrument for lecturers" performance at universities are as follow:

1. The development of conceptual and operational definition of the lecturers' performance variable as somebody's feeling or emotional psychological response with seven components as described above.
2. The drafting of the lecturers' performance items at universities as an assessment instrument based on semantic differential scale (draft 1 is obtained)
3. Piloting with experts as judges to select items based on median (Md) and interquartile range value (Q) because the Thurstone scale is used, followed by revision of draft 1, and draft 2 is obtained.
4. Piloting with university students at FKIP Unsyiah (Teacher Training and Education Faculty of Syiah Kuala University) followed by determining the construct validaty by using the factor analysis and alpha internal consistency, draft 3 is obtained.
5. Piloting with for the second time with university students at FKIP Unsyiah followed by determining the validity construct by using the factor analysis and alpha internal consistency and determining lecturers' performance assessment instrument manual. Finally, the objective, valid and reliable assessment instrument for the lecturers' performance is obtained.

The operational definitions and draft for development of assessment instrument for lecturers' performance at universities are as follows:

Operational Definitions. The Performance of lecturers in the field of education and teaching represent the performance achievement in performing their roles of teaching profession. The performance achievement is measured through the following aspects: (1) teaching planning, (2) teaching activities, (3) material mastery, (4) classroom management, (5) communication skill with student, (6) discipline, and (7) teaching evaluation. These seven aspects are assessed by students.

Lecturers' performance in education and teaching is a standard for performance unit in score obtained from lecturers on the implementation of their professional duties as teaching staff indicated from teaching plan, teaching activity, material mastery, class management, communication skill with students, discipline and grading the students learning performance measured based on the assessment conducted by the university students.

Instrument draft. In developing the assessment instrument for lecturers' performance in education and teaching, specifications for drafting of assessment instrument for lecturers' performance at universities are determined.

Every statement item in the instrument indicates a situation or feeling of university students. The statement items are complete with seven positive answers and seven negative answers. In this research, there are 118 statement items using continuum scores from 1 to 7. The initial draft and number distribution of the lecturers' performance assessment instrument items are presented in Table 1.

THE RESULT OF INSTRUMENT DEVELOPMENT

SELECTING STATEMENT ITEMS

In this try-out, 55 judges who are expert in education evaluation and instrument development were selected. They were asked to score each statements based on a psychological continuum. After the instrument was drafted, experts' opinions which is competence with the topic were asked and followed by calculating median (Md.), inter-quartil range (Q) because the instrument used Thurston scale continuum. The objective of assessment included the construct conversion relevance used as statement items.

TABLE 1. Draft Assessment Instrument for Lecturers' Performance

Dimension	Indicator	Item Number	Total
	1. Teaching Plan	1,2,3,4,5,6,7,8 Item no 3: The leacrurer explains the goal/objectives of the lecture.	8
	2. Teaching activities	9,10,11,12,13,14,15,16,17,18,19,20,21, 22,23,24,25,26,27,28, 29,30,31,32,33 Item no 28: At the early stage of the teaching process, the lecturer reviews the previous material.	25
	3. Material mastery	34,35,36,37,38,39,40,41,42,43,44,45,46 Item no 44: The lecturer responses to the questions asked by the students.	13
Education and Teaching	4. classroom management	47,48,49,50,51,52,53,54,55,56,57,58,59 60,61,62,63,64,65,66,67,68,69,70,71,72, 73,74,75, 76,77,78,79 Item no 51: The lecturer uses the discussion method for the material or knowledge required in depth understanding	33
	5. communication skill with students	80,81,82,83,84,85,86,87,88,89,90,91,92, 93,94,96,97 Item no 94: The lecturer appreciates any opinion expressed by the students	18
	6. Discipline	98,99,100,101,102,103,104,105,106,107,108 Item no 100: The lecturer finalizes his teaching process on the given schedule	11
	7. Teaching evaluation.	109,110,111,112,113,114,115,116,117,118 Item no 109: The lecturer objectively evaluates the students' performance	10
	Total		118

Based on the assessment conducted by the experts, we can conclude that 71 items was obtained and new instrument (draft 2) was designed .The detail is presented in Table 2 with change from old numbers to new numbers. The indicators for (1) teaching plan are 5 items, (2) teaching activities are 14 items, (3) material mastery are 8 items, (4) classroom management are 20 items, (5) communication skill with students are 12 items, (6) discipline are 5 items, and (7) grading are 7 items.

TABLE 2. Detail of Item Distribution for Performance Assessment
Questionnaires (draft 2)

Lecturers' Performance Indicators	Number of Items	Initial numbers	New Numbers
1. Teaching Plan	5	1, 2, 3, 5, 7	1, 2, 3, 4, 5,
2. Teaching activities	14	9, 10, 12, 13, 18, 21, 24, 26, 27, 28, 29, 31, 32, 33	6. 7, 8, 9, 10, 11, 12,13, 14, 15, 16, 17, 18, 19
3. Material mastery	8	37, 38, 39, 40, 41, 42, 44, 45	20, 21, 22, 23, 24, 25, 26, 27
4. Classroom management	20	47, 48, 50, 51, 52, 55, 58, 59, 62, 63, 64, 66, 67, 68, 69, 70, 72, 73, 74, 79	28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47
5. Communication skill with students	12	80, 82, 83, 85, 87, 88, 91, 92, 94, 95, 96, 97,	48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58,59
6. Discipline	5	98, 99, 100, 101, 102,	60, 61, 62, 63, 64
7. Teaching evaluation.	7	109, 110, 111, 112, 113, 114, 117	65, 66, 67, 68, 69, 70, 71
Total	71		

DETERMINING THE CONSTRUCT VALIDITY

First Pilot Study At the first pilot, the instrument used was the assessment instrument for the lecturers' performance (draft 2) and piloted with 510 FKIP Unsyiah students. The construct validity was analyzed by using the factor analysis. The computation of data obtained from the first pilot shows Kaiser Meyer Olkin regarding the measure of sampling adequacy (KMO MSA) of 0.913 with the significance of 0.000. 0.913 is higher than 0.5 and the significance of 0.000 is smaller than 0.05. According to Norusis (1993), this result is good. Bartlett test data for test of sphericity shows that Chi Square is 14362,65 with degree of freedom of 2485 and the significance at 0.000. It means that the correlation matrix is not identitied matrix so that the factor analysis can be used. In Table anti image correlation (AIC), the MSA value is under 0.50, that is for item number 1, 27, 35, and 70 so that for the next process the items were not included.

The extraction by using PCA (Principal Component Analysis) method shows result the numbers presented in the table of communalities for item 1 is 0.661. This result indicated variance from item or variable 1 which can be explained by

the factor. At the table of total variance explained, there were 71 items included into an the factor analysis and the eigen values greater than 1 (≥ 1) are 16 factors, more than previously estimated, 7 factors. After 31 items were taken out, which left 40 items and the analysis result from the items for KMO MSA is 0.933. Besides that, the Bartlett's test of Sphericity is 7609,987 at degree of freedom of 780 with significant level of 0.000. Therefore, the correlation matrix obtained is not an identitied matrix.

At the table of total variance explained, from 40 items included into the factor analysis resulted the eigen values greater than 1 (≥ 1) are 7 factors, in compliance with the estimated indicator. Therefore, we can conclude that the assessment instrument for lecturers' performance is valid according to the construct validity. Besides that, there was factor content variance which can describe the lecturers' performance variance. The cumulative content for the 7 factors are 51.769% variances. Furthermore, the scree plot shows the *total variance explained* table in graphical appearance. The scree plot shows how the eigen values which were used to determine the number of used factors tend to decrease. (See Figure 1). At rotated component matrix after 24 rotations or iterations, it shows that no items passed the factor of "cut off point" less than 0.30 (< 0.30). The highest factor content is at item 31 which is 0.736 and the lowest one is at item 20 which is 0.356. Therefore, all statement items are valid.
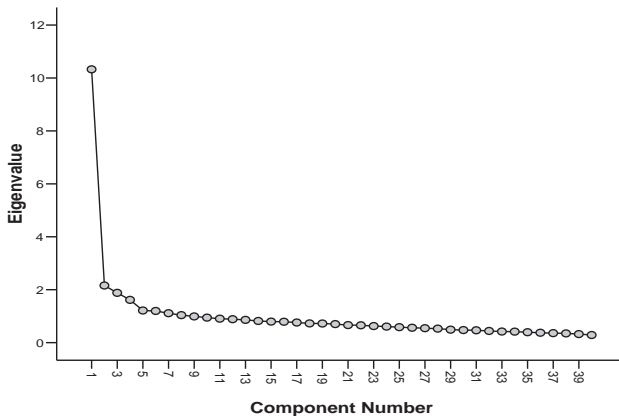

FIGURE 1. Scree Plot of First Try-Out

A number of items changed at this stage. The items from discipline, communication, and grading combined so that the position of items distribution changed. Consequently, the factor names changed a little but they were still parts of estimated factors. The factors which changed at this stage were factor 4 (teaching strategy) and factor 5 (methodology mastery) which previously were the classroom management factor. The component plot in rotated space which is the result of factor rotation in three dimensions is presented in Figure 2.
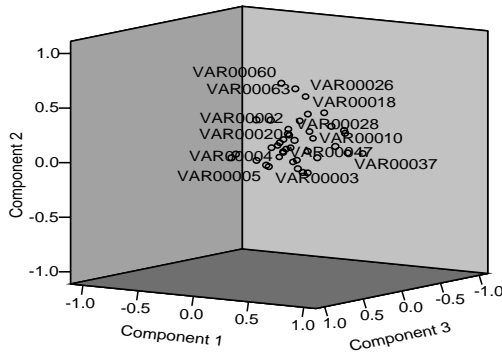
FIGURE 2. Component Plot in Rotated Space of First Try-Out

Computation using confirmatory approach was conducted by using Maximum Likelihood (ML) method to test the relevance of *goodness of fit test* which resulted the index of 952,062 with degree of freedom of 521 and probability 0.000. Therefore, the factor distributed multivariance normal. With χ^2 result = 952,062 > χ^2 table = 649,69 with degree of freedom f 521 and significant level of 0.000, we can conclude that at this first try-out the assessment instrument for the lecturers' performance which has been developed has good construct validity.

Second Pilot Study. At the second try-out, the instrument resulted from the first try-out with 40 item questions was used. This instrument was then called the assessment instrument for lecturers' performance at universities (draft 3) which was tried-out to 260 FKIP Unsyiah students. The construct validity was analyzed by using the factor analysis. For the data computation results from the second try-out, the Kaiser Meyer Olkin concerning measure of sampling adequacy (KMO MSA) was 0.894 which can be considered good according to Norusis (1993). Based on the Bartlett test used for sphericity test, the Chi Square obtained was 3854,488, at the degree of freedom of 595 with significance of $0.000 < 0.05$. Therefore, the correlation matrix obtained was not identity matrix.

At table of total variance explained from 40 items in factor analysis resulted the eigen values of 10 factors, greater than on the review of literature which is 7 factors. After taking out 9 items, in which 31 items left, the KMO MSA obtained from the analysis result was 0.899. This value is also considered in good category. Besides that, Bartlett's test of Sphericity obtained was 4397.690 at the degree of freedom of 630 with significance level of 0.000. For the result, the correlation matrix resulted was not identity matrix; therefore, the factor analysis could be continued.

At table of variance explained from 31 items included into the factor analysis resulted that the eigen values of above 1 were 7 factors, in compliance with the estimated indicator. Therefore, we can conclude that the assessment instrument for the lecturers' performance at universities is valid based on the construct validity. Besides that, there was factor content variance which can describe that there were the lecturers' performance variances. The content for the first factors was 30.861%, the second one was 6.412%, the third one was 4.803%, and the fourth one was 4.007%, the fifth one was 3.730%, the sixth one was 3.388% and the seventh one was 3.130%, so that all factors was 56.331% variances. The scree plot shows how the eigen values which were used to determine the number of used factors tend to decrease. See Figure 3.
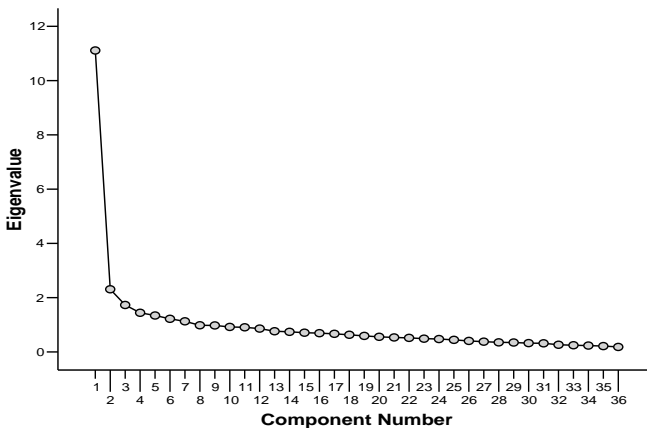

FIGURE 3. Scree Plot of the Second Try-Out

The component plot in rotated space which is the result of factor rotation is presented in three dimensions. See Figure 4. Computation using Maximum Likelihood (ML) method to test the relevance of *goodness of fit test* which resulted the index of 664,287 with degree of freedom of 398 and probability 0.000. Therefore, the factor distributed normally. With χ^2 result = 664,287 > χ^2 table = 511,57 with degree of freedom f 398 and significant level of 0.01 %, we can conclude that at this second try-out the assessment instrument for the lecturers' performance which has been developed has good construct validity.

Determining Reliability. The reliability of assessment instrument for the lecturers' performance was calculated by using the internal alpha Cronbach consistency formula. The calculated was conducted by using SPSS version 13.0 for Windows. Based on the first pilot data computation, the coefficient was 0.931 and for the second was 0.934.
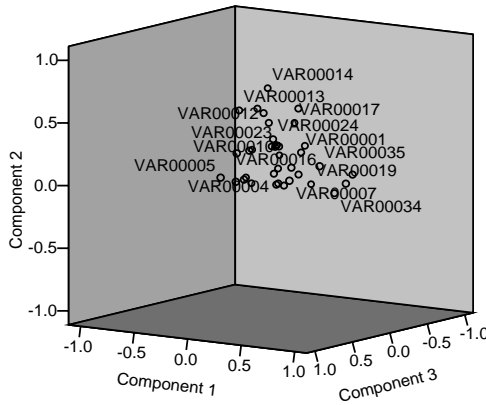
FIGURE 4. Component Plot in Rotated Space in the Second Try-Out.

DISCUSSION

Based on the two pilot studies using factor analysis, the result are in compliance with the estimated theory, seven factors: (1) teaching plan, (2) teaching activity, (3) material mastery, (4) teaching strategy, (5) methodology mastery, (6) class-room management, and (7) communication skill with students, discipline, and grading ability. The reliability calculation of instrument internal consistency resulted coefficient of 0,931 for the first pilot and 0,934 for the second. Therefore, the statement items in the assessment instrument for lecturers' performance which has been developed has high internal consistency.

Table 3 summarizes the pilot studies which used the factor analysis, exploration approach (PCA and confirmatory approach ML). The confirmatory method using the Maximum likelihood resulted goodness of fit test model X^2 which had adequate probability with the degree of freedom = 521 and 398 and significance level $\alpha = 0,01$ %. Besides that, the calculation results of instrument reliability are also presented.

TABLE 3. Summary of Factor Analysis Results

Pilot Study	Factor extraction	% Cumulative	Construct Validity Goodness of fit test	Item verification	Reliability (α)
Empirical I	7	51.8	$X^2 = 952.062$ df = 521 p = 0.000	from 71 items, 40 items were selected	- 0.9
Empirical II	7	56.3	$X^2 = 664.287$ df = 398 p = 0.000	From 40 items, 31 items were selected	0.9

CONCLUSSION

The construct validity test by using factor analysis exploration method at the first pilot and seven factors were successfully extracted which is in compliance with the estimated theory l. The factors are (1) teaching plan, (2) teaching activity, (3) material mastery, (4) teaching strategy, (5) methodology mastery, (6) class-room management, and (7) communication skill with students, discipline, and grading ability. Although some factor names are different to the estimated ones, they are still part of the theory. The seventh factors were obtained after taking out 31 items which left 40 statement items. For the second pilot by using the confirmatory method, seven factors were obtained after dropping out four items, which left 36 statement items. The calculation reliability coefficient which was analyzed by using the alpha Cronbach formula showed the coefficient of 0.931 for the first pilot and 0.934 for the second one.

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Yusrizal
Jurusan Pendidikan Fisika
Fakultas Keguruan & Ilmu Pendidikan
Universitas Syiah Kuala 23111
Aceh, Indonesia