

# Development of University Classroom Climate Inventory

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**Abstract**—Improving the quality of learning in universities can basically be done through a macro-scale approach or with a micro approach through improving the learning situation in the classroom. A macro approach has been largely done by creating national and regional policies. However, micro approaches, such as those undertaken by lecturers through classroom climate studies, have not been made a systematic effort to improve learning processes. The second approach requires the ability and willingness of self-evaluation of the lecturer; Ideally, this second approach should be more optimized as it is a college effort to provide service satisfaction to its internal customers, namely students. This study aims to develop and validate the classroom climate inventory for use in universities. The inventory consists of two forms, the actual and preferred form adapted from the Colleges and Universities Classroom Environment Inventory (CUCEI). The research was conducted on 1,244 undergraduate students from various universities in some provinces such West Sumatera, Riau and Gorontalo. From the analysis result, it can be concluded that both the actual and preferred form of college classroom climate are valid and reliable, so it can be used to conduct further research at universities.

**Keywords**—classroom climate; inventory; development; validation; university

## I. INTRODUCTION

Improving the quality of learning can be done both at the national, university level and at the classroom level. The micro approach at this class level allows the lecturers to make changes more intensively assisted by their students as 'internal customers' who truly feel the quality of the learning [1]. The study of classroom climate is a very specific study and has developed in developed countries such as America since 1979 [2], and developed in Australia [3]. From both sources, research on classroom climate developed into other countries such as Spain, the Netherlands, Canada [4], Singapore [5].

In Indonesia, classroom climate studies, especially in universities, have been carried out in very limited number. Some classroom climate studies are still very elementary, limited to exploratory studies [6], or correlational studies [7,8]. Such studies are carried out by students at the undergraduate, master and doctoral levels. The studies carried out by some researchers [9-12], were done in primary and secondary schools. For this purpose, research on classroom climate in universities in Indonesia is a necessity so that it does not lag

behind compared to what has been implemented in other countries.

Further studies on classroom climate cannot be separated from the notion that 'climate' is the quality of the classroom environment that is continuously experienced by lecturers, influencing behavior and based on collective perceptions of their behavior. Furthermore, it is added that the term 'climate' is like 'personality' in humans. Each class has a personality that is not the same as another class, even though the classes physically have the same form or architecture [13]. Moos [2] added that the classroom climate is like humans, some are very task-oriented, democratic, formal, open or closed [14].

The study of classroom climate is also inseparable from three general dimensions to measure the psychological and social environment, namely the dimensions of relationships, dimensions of growth and personal development (personal growth / development) and dimensions of system maintenance and change [2]. To complete these three dimensions, there are dimensions of the physical environment [15]. The four dimensions of the classroom climate can be broken down into a narrower range of scales. Included in the dimensions of the relationship are scale of personalization, and student cohesiveness. The related scale in the personal growth dimension is task orientation. The scales included in the dimensions of the maintenance and change system are innovation, and individualization. Some scales included in the dimensions of the physical environment such as resource adequacy and physical comfort. There are approximately 46 classroom climate scales that fall into the four dimensions mentioned above. These scales are taken from various classroom climate inventories that have been developed in various countries [14].

Research on the climate of higher education classes was inspired by a study conducted in 1986 [16]. This study was carried out in the framework of developing, validating, and using a university classroom climate inventory called College and University Classroom Environment Inventory (CUCEI). The inventory was used to determine the perception of students or lecturers about the seven psychosocial dimensions, namely: personalization, involvement, student cohesiveness, satisfaction, task orientation, innovation, and individualization. CUCEI was given to 372 students in 34 classes and 20 lecturers. The study was conducted to determine the reliability,

internal consistency and discriminant validity of the inventory used to measure the actual form and the expected climate class (preferred form). The application of research using CUCEI involves the relationship between student learning outcomes and classroom climate, suggesting that the classroom climate influences student learning outcomes. Other studies show that both students and lecturers prefer a classroom climate that is better than it actually is. The lecturers view that the classroom climate they create is more positive than what is perceived by students. CUCEI is expected to be applied in the future for research purposes and in order to improve the learning process in universities [16].

In subsequent developments, many experts have linked classroom climate to other variables [17]. For example, students actively express their opinions in class well, because they are influenced by their lecturers who motivate them to do so. On the contrary, students tend to be passive in class because the lecturers have never given an opportunity or because their classmates do not want to respect the opinions of other friends. Studies conducted [18-20], show a link between classroom climate and student learning motivation.

The study of the relationship between the classroom climate and student behavior has been carried out by Lewin which states that behavior is the result of personal relationships between people and the surrounding environment. This opinion emphasizes the importance of linking the environment with personality as forming factors for student behavior [14]. Classroom climate is also a factor that is always associated with student or student learning achievements. Studies conducted by various researchers show a link between classroom climate and learning achievement [12], [21] and student appearance [22], student performance [23], and school performance [24].

The conclusion of some of the studies mentioned above is that student learning achievement is also determined by the quality of the classroom climate in which they study. A further implication of the study is that student learning achievement can be improved by creating a conducive and better classroom climate.

This article reports on the implementation of the development and validation of a standardized university classroom climate inventory. The results of the development of the inventory are expected to be used to improve the classroom climate, and are expected to be an initiation for the development of a more conducive college classroom climate in Indonesia.

## II. METHODS

This research is a stage of developing and validating the university classroom climate inventory. The steps taken in the framework of developing and validating the classroom climate inventories are as follows.

### A. *Selecting the Standardized Classroom Environment Inventory*

The inventory used in this study is adaptation and development in the Indonesian language from the latest

versions of the English-language classroom climate inventory (Colleges and Universities Classroom Environment Inventory) developed in Canada and Australia [4]. The initial version of the CUCEI was developed in 1986 [16]. The scales that will be developed include personalization, innovation, Student cohesiveness, Task orientation, Individualization, Cooperation, and Equity. These seven scales were developed respectively into 7 questions, so that in total they became 49 questions.

### B. *Translating CUCEI into Indonesian*

CUCEI is a university classroom climate inventory that is still in English. For this reason, the researcher asked for help from a teacher with an English bachelor degree to translate the inventory into Indonesian.

### C. *Reduce and CUCEI with Some Items*

To perfect the inventory, the researchers added three more scales, namely Competitiveness, Resource Adequacy and Physical Comfort. The final form of this university classroom climate inventory is 60 items that are framed into 10 scales and grouped into 4 dimensions.

### D. *Make the Inventory into Two Versions*

The inventory that was developed consisted of classroom climate inventories experienced by students (actual climate) and classroom climate inventories desired by students (preferred form). The classroom climate inventory 'actual form' is used to capture the actual classroom climate data that has been experienced by the teacher, while the 'preferred form' is used to find out the desired college climate or coveted by students (as a pre-test).

### E. *Review New Inventories with A Focus on the Level of Readability*

After the inventory adapted from English and its additions in Indonesian are combined, the results of the language transfer and merger are then requested for language validation by a Master of Education Science lecturer with a master's degree in English. From the results of the language validation, the researcher then steps to the next stage.

### F. *Test the Validity and Reliability of Inventories in the Field*

Both forms of classroom climate inventories were developed and validated to 1,244 undergraduate students spread across several faculties and universities in Padang and Padang Pariaman, West Sumatera, in Pekanbaru Riau, and in Gorontalo Province.

## III. RESULT AND DISCUSSION

### A. *Results of the Actual Form Questionnaire Data Analysis*

The results of data analysis on the classroom climate inventory are actually form as follows.

1) *Factor analysis results:* The results of factor analysis of the actual form classroom climate inventory showed that the Kaiser Meyer Olkin (KMO) factor 1 was 0.767, factor 2 was 0.705, factor 3 was 0.745, factor 4 was 0.753, factor 5 was

0.736, factor 6 was 0.710, factor 7 is 0.756, factor 8 is 0.713, factor 9 is 0.829, factor 10 is 0.788. On the basis of these findings indicate that the factors in the classroom climate inventory are actually form valid because it has met the limit > 0.50. The results of the factor analysis of the actual form of the classroom climate inventory can be seen in the attachment.

2) *Reliability Analysis Results:* The results of the reliability analysis of the 60 items from the Actual Form classroom climate inventory can be seen that the reliability of the classroom climate inventory is actually high form with the Cornbach Alpha results which are generally valued at more than .930.

**B. Results of the Preferred Form Questionnaire Data Analysis**

The results of data analysis for the classroom climate inventory are preferred form as follows:

1) *Factor analysis results:* The results of factor analysis of the actual form classroom climate inventory showed that the Kaiser Meyer Olkin (KMO) factor 1 was 0.700, factor 2 was 0.648, factor 3 was 0.716, factor 4 was 0.690, factor 5 was 0.672, factor 6 was 0.690, factor 7 is 0.688, factor 8 is 0.694, factor 9 is 0.754, factor 10 is 0.700. On the basis of these findings indicate that the factors in the classroom climate gauge preferred form is valid because it has met the limit > 0.50. The results of the factor analysis of the classroom climate inventory are preferred complete form can be seen in the attachment.

2) *Reliability analysis results:* The results of the reliability analysis of the 60 items from the Preferred Form classroom climate inventory can be seen that the reliability of the classroom climate inventory is actually high form with the Cornbach Alpha result which is generally valued at more than .930.

From the results of the factor analysis it can be concluded that the items that make up the factor (as a scale), both in the

classroom climate inventory which is actually (actual form) and desired (preferred form) are highly correlated, ranging from 705 to 829. Thus, the points from each of these scales can be concluded as a unit that forms a factor supported by empirical evidence.

From the results of the analysis using Alpha Cronbach it is also known that the items of the classroom climate inventory, both for the actual classroom climate (actual form) and desired (preferred form) are above 0.70. Thus, overall it can be said that Actual classroom climate inventories and reliable form reliable for use.

**IV. DISCUSSION**

The results show that the KMO value of each factor is generally above 0.705. The Anti image correlation produces a high correlation coefficient for each scale or factor. Thus, it can be said that the classroom climate inventory, both the actual and the preferred form, can be used to capture information about the university's climate. Some researchers have already used the classroom climate instrument to improve better classroom climate [25,26].

Given the importance of the class climate that can be used as an indicator to predict student academic activities [27], and the results of the validation of college classroom climate instrument are convincing, the instrument can be used to measure classroom climate by lecturers in the university, which can then be used to improve certain indicators of the classroom climate that need to be improved. For example, Hadiyanto et al. have used a classroom climate instrument to detect and subsequently make improvements to the 'cohesiveness' and 'innovation' scales in the relevant classes through classroom climate improvement action research [28]. Changes and differences of classroom climate scores between actual and preferred, before and after improvement treatment can be seen in the following graph.

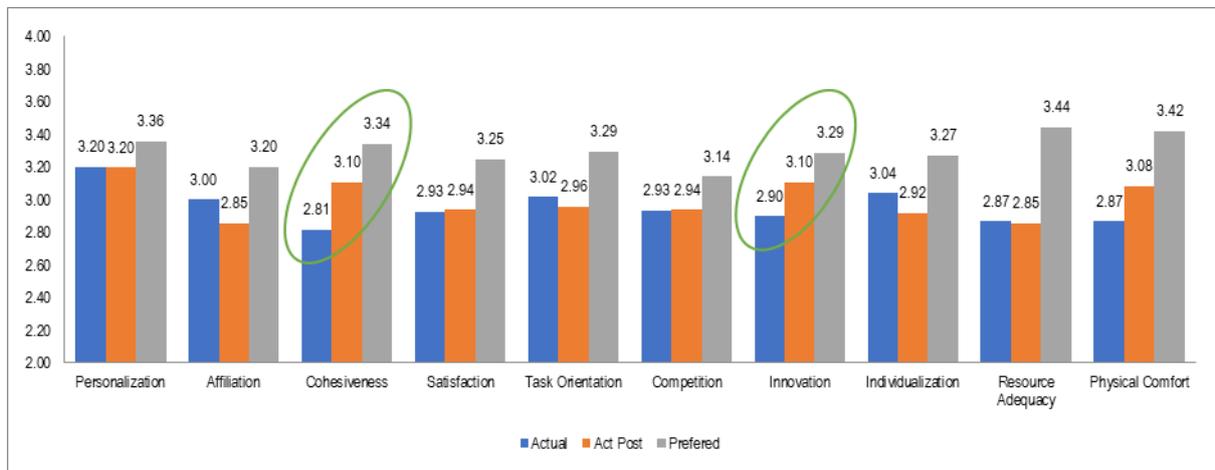


Fig. 1. Actual (pre-test and post-test) and preferred classroom climate on subject of educational administration and supervision.

From the graph it can be seen that there are quite striking differences on certain scales between the actual and the preferred scales. On the basis of these conditions, researchers chose to improve the scale of 'cohesiveness' and 'innovation'. After carrying out improvement treatment on these two scales for approximately eight weeks, a post test was conducted and the results were obtained that the two scales were better approaching the climate preferred by students. Based on these symptoms and steps, the process carried out by Hadiyanto et al. can be disseminated and carried out by other lecturers in various universities to improve certain scales of the classroom climate [29].

## V. CONCLUSION

Based on the findings of this study, the conclusions of this study are:

- The grouping of items into a certain scale (factor) designed by classroom climate experts has been fully in accordance with the test in the field. Question items in general have been on the scales designed in the study. The KMO coefficient has shown  $> 0.500$ , as a minimum criterion for receiving questions on a scale or factor.
- The items in each school climate measuring scale, both the 'actual and preferred forms', have a high reliability coefficient because all items are  $> 0.70$ .
- In general, the classroom climate inventories both 'actual and preferred form' developed in this study can be used to capture data on classroom climate in universities in the wider population.

Based on the findings of the results and discussion of this study, it can be seen that both the actual and preferred classroom climate inventories developed in this study are valid and reliable. Even so, in order to sharpen the analysis and for the sake of the continuation of the research step, analysis is still needed such as internal consistency and discriminant validity. Thus, the inventory can be used by researchers, or educational administrators by implementing the steps that have been stated in this study.

Based on the findings and from this study, it can be seen that both the actual and preferred classroom climate inventories developed in this study are valid and reliable. Thus, the inventory can be used by researchers, or educational administrators by implementing the steps that have been stated in this study.

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