

User Perception of Convenience and Visual Quality of Classroom Lectures in Makassar City

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ABSTRACT

The classroom environment needs to be well organized to allow active interaction between students and lecturers. The purpose of this study was to determine the comfort and visual quality of lecture classrooms based on user perceptions with the factors that form visual quality and the principles of visibility, ease of achievement, the flexibility of space, beauty, and visual comfort of building users. Methods The research uses a qualitative descriptive method. Analysis by describing and identifying every aspect that exists. The research approach used is deductive. Data analysis was carried out using the interactive model method to present statistical correlation and Likert scale data. The data analysis steps start from the data reduction stage, data presentation, and drawing conclusions and verification. The results of the study concluded that the forming factors of visual quality such as not using artificial light because it had an impact on shadows and heat in the room, the use of projector media (LCD) in the teaching and learning process, the atmosphere/impression of the visual quality of natural light, and the area and arrangement of the space became the dominant factor in providing comfortable perceptions for room users than for the most dominant class physical environment factors that provide comfortable perceptions, namely the comfort factor in learning related to room temperature, light, sound, and class density as well as beauty and aesthetic factors in the classroom—related to the arrangement of furniture in the classroom.

Keywords: Perception, Visual Comfort, Natural Light, Classroom, Makassar City

1. INTRODUCTION

The development of science and technology makes people realize that lighting is not the same as lighting. In lighting, visual clarity collaborates with aesthetic factors to create comfort. This situation is not necessarily visible to the naked eye but can be felt by anyone. Along with the awareness of visual comfort, the need for lighting also extends to residential spaces. However, the existence of light does not mean only pursuing visual aesthetics. Good lighting must increase energy efficiency, function effectiveness, and fulfil decorative aspects [1].

In several studies that discuss the intensity of lighting, Nurdiah [2] stated that the response to the quality of space found different results from the results of the analysis of the quantity of light. In an open office, it was found that the illumination value was low and unevenly distributed, and visually uncomfortable, but the space users felt quite satisfied. Meanwhile, in a private office with a very high level of illumination, space users feel normal—the habit of working in the lighting environment causes them to work.

Visual quality in the lecture classroom can have positive and negative impacts depending on the user and the factors that shape the visual quality in the lecture room. According to Aminah [3], effective learning can

start from a room climate that can create an exciting learning atmosphere. For this reason, it is necessary to pay attention to the arrangement and arrangement of space and its contents. The classroom environment needs to be well organized to allow active interaction between students and lecturers. Several principles need to be considered in managing the classroom's physical environment, including flexibility of view, ease of achievement, the flexibility of space, beauty, and comfort. Concerning comfort, visual quality is an important thing to pay attention to. Visual quality in lecture classrooms can be measured through user perception parameters to achieve ideal visual quality.

According to Suwarno [4], perception is the process of making judgments or building an impression about various things in the field based on one's senses. Perception of a place is often related to the visual, which is influenced by the impression captured by the sense of sight. Therefore, the visual quality of an ideal space becomes an essential factor in building the impression of a space.

Designing a Class physical environment to study significantly influences the learning outcomes. In addition, a supportive environment positively influences the achievement of learning objectives. Martha Kaudfeldt [5]. asserts that to create a conducive classroom physical

environment, several considerations of the influence of environmental stimuli, namely lighting, noise, visual stimuli, and temperature and air quality, are considered. In line with Sri Budyartati's opinion [6], fundamental problems in classroom management relate to the arrangement of the physical environment in which learning activities occur, classroom cleanliness, seating arrangements, ventilation, and lighting arrangements. These are some small things that teachers need to pay attention to organize a conducive classroom physical environment. Another thing that can support creating a conducive class physical environment [7].

Building B, Faculty of Engineering, University of Bosowa, is used for lectures, occupying the 2nd, 3rd, and 4th floors. This lecture floor is a theory class used for learning and teaching activities from 08.00 to 17.00 WITA. The 2nd, third, and 4th floors rooms consist of large and medium classes. The large classroom area is 64m², has a square shape, has 1 (one) entrance as access to enter the classroom, the left and right sides are the dividing walls, and on the backside is a window with a vertical strip of dead grass with a size of 120 cm x 100 cm. The orientation of the facade of the building faces North and South. The results of the observations identified that the flat surface of the facade with a vertical strip of glass causes glare in the lecture room, while on the south side, there is light shadowing during the day, which also causes glare in the room. Based on this, the purpose of this study is how the comfort and visual quality of the lecture room are based on the perception of the user (student) and the factors that affect the comfort of the classroom user.

2. METHODS

The research was conducted using qualitative methods. Sugiyono [8] suggests that qualitative research as a research method based on the philosophy of post-positivism, is used to examine the condition of natural objects, where the researcher is the key instrument, the data collection technique is triangulation, the data analysis is inductive or qualitative, and the results of qualitative research are more emphasize meaning rather than generalization. Qualitative analysis is based on the respondent's questionnaire information related to the perception of visual comfort in the natural lighting of the lecture classroom to bring up various information about the perceptions of each user of the lecture room regarding the visual quality that they think is ideal.

The research object is Building B, Faculty of Engineering, University of Bosowa, which consists of 3 floors, functioning as lecture classrooms. The location of the classrooms consists of large and medium classrooms. Data collection was carried out by distributing questionnaires to students who carried out teaching and learning activities in the classroom and distributing questionnaires through the google form format. The total

number of respondents was 90 respondents divided based on gender, age, and generation characteristics.

The questions on the questionnaire use open-ended questions to get various data. The questions were divided into three groups: the respondent's data, a description of the ideal visual quality in the lecture room, and the impact of the ideal visual quality on the continuity of teaching and learning activities in the lecture room.

Data analysis using analytical methods was processed using a Likert scale by distributing the questionnaire results in tables, diagrams, and graphs. The results of this analysis are used to determine the closeness between the factors forming the visual quality and the physical environmental factors of the class based on the perceived level of comfort. The categories of visual forming factors and class physical environmental factors given to respondents using space are shown in Table 1.

Table 1. Factors Forming Visual Quality

No	Questions about visual quality forming factors
1	Lecture room area and arrangement
2	Current seat layout
3	Natural lighting quality
4	When the lights are turned off, the visual quality of natural lighting
5	Atmosphere/impression visual quality
6	Projector screen (LCD) visual display quality
7	Use of curtains or wallpaper.
8	In general, the natural lighting atmosphere of the lecture classroom

Table 2. Factors of the physical class environment

No	Questions about the physical environment of the class
1	Visibility
2	Accessibility
3	Flexibility
4	Comfort
5	Beauty and aesthetics

To find out how the response of classroom users based on the factors that form the visual quality and the physical environment of the classroom based on the results of questionnaires and interviews, it was analyzed using a simple distribution and Likert scale through descriptive statistical analysis. The Likert scale measures attitudes, opinions, and perceptions of a person or group of people about social phenomena. With a Likert scale, the variables to be measured are translated into variable indicators. Then the indicator is used as a starting point for compiling instrument items in the form of statements or questions. The answers to each instrument item using a Likert scale have levels from very positive to very negative, which can be in the form of sentences, and for

quantitative purposes, the answers can be scored as follows:

- a. Very Comfortable/Very Good (SB) a score of 5.
- b. Comfortable/Good (B) scored 4.
- c. Comfortable / Good (CB) a score of 3.
- d. Less Comfortable/Not Good (KB) a score of 2.
- e. Uncomfortable/Unfavorable (TB) a score of 1.

When responding to questions from the questionnaire, respondents gave their level of agreement to the questions and gave answers following the factors forming the visual quality so that an analysis of the perception of visual comfort was obtained based on the average score and percentage.

3. RESULTS AND DISCUSSION

Floors 2, 3, and 4 are the lecture floors of the Faculty of Engineering, University of Bosowa. This lecture floor is a theory class used for learning and teaching activities from 08.00 to 17.00 WITA. The 2nd, third, and 4th floors rooms consist of large classrooms and medium classes, so there are 15 large lecture halls and 15 medium lecture halls. The large classroom area is 64m², while the medium-sized classroom is 40m² having a square shape, has 1 (one) entrance as access to enter the classroom, the left and right sides are the dividing walls, and on the backside (North) are windows. With a vertical strip of finished glass size of 120 cm x 100 cm. The horizontal arrangement of lecture chairs with a row of 7 chairs so that the total number of seats is 50 chairs while the medium classroom is 30 chairs. On this floor, the liaison between the classrooms is in a hallway with a width of 2 meters.

Based on the questionnaire results distributed with 90 students, the respondents were divided into three characteristics, namely gender, age, and class; 53% male respondents and 47% female respondents. The age of the respondents varies with the range between 19 - 22 years, and the class of respondents starts from the class of 2018 - 2021. They are dominated by the class of 2020 (35%).

3.1. Space User's Perception of Visual Quality Forming Factors

The content analysis stage of the question is based on the respondents' answers regarding the visual quality that makes users feel comfortable in the lecture room, as shown in the graphic image.

The first stage of the frequency distribution analysis was carried out on 90 student respondents to answer the factors that form the ideal visual quality for users in the lecture room. From the results of the distribution, the analysis found the dominant factor can be seen in Figure 1, and It is known that the category that has the highest frequency is visual quality when the lights are turned off based on a questionnaire of 90 respondents surveyed, 25 student respondents (27.78%) think that when the lights

are turned off in lectures, the visual quality of natural lighting is very comfortable. This is based on that when the lights are turned on, the atmosphere in the room becomes hot and then spacious, and the arrangement of the room is 14 (15.56%) followed by the visual atmosphere of the classroom by 12 (13.33%), the visual quality when projector turned on. by 10 (11.11%), and the quality of natural lighting by nine respondents (10%).

The least chosen factor is the arrangement of room chairs by 7 (7.78%) followed by curtains by 5 (5.56%). The second stage of the frequency distribution analysis was carried out on 90 student respondents to answer each factor forming the ideal visual quality for users in the lecture room. This analysis then produces eight distribution charts analyzed using a Likert scale, as shown in Figure 3.

Based on the Likert scale analysis on the visual comfort response of classroom users, it was found that it was slightly different, although not significant from the first stage of the frequency distribution analysis, this can be seen in the visual quality forming factors based on the sequence of questions with the area and the observance of the furniture layout explaining the placement of teaching media so that it is easily accessible neat and symmetrical seating arrangements, as well as modern and adequate space facilities. Of the three things, respondents tend not to pay attention to the size of the room and the layout of the furniture. Based on the weight value and the frequency of the Likert scale assessment, the average value and percentage with the qualification "comfortable" are 3.10 - 4.00 (61.00 - 80.00%). The quality of visual comfort is based on the perception of classroom users.

In this study, users' perceptions of visual quality were more open and varied. In addition to lighting, respondents expressed other factors regarding furniture, space, use of curtains, and atmosphere/impression of space. Most of the respondents' perception of visual comfort said that visual quality is essential in influencing the continuity of teaching and learning activities.

All visual quality factors, directly and indirectly, have a relationship with user response. Without using artificial light, the visual quality factor is the most dominant in forming the quality of light intensity in space. The impact caused by using artificial light is that the atmosphere in the room becomes hot, and there is a shadow effect in the space. This finding is supported by research by Gou [9], which states that there is a change in students' feelings when they are in a learning environment with natural and artificial lighting. Students' moods increased when they were in a learning environment with natural lighting compared to when in a learning environment with artificial lighting. This shows the importance of designing appropriate lighting in the learning environment to support learning comfort, especially from a psychological perspective of students.

Then the forming factor of visual quality during the teaching and learning process, namely the use of a projector (LCD), is the most dominant in forming light quality. This is due to the emotional response and attitude (affective) to feel comfortable in lecture activities. The area of the room and the arrangement of furniture are also important things in improving the learning atmosphere in the room. The use of curtains has a low frequency because it impacts the quality of light in the room. The

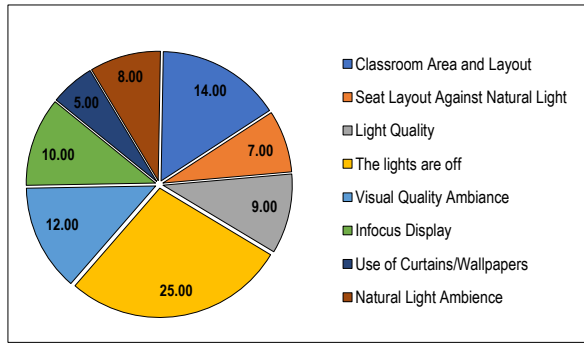


Figure 1. Graph of Frequency Distribution of Visual Quality Forming Factor

factor with the dominant frequency has a close relationship, namely lighting as a factor forming visual quality and affective response as the impact of visual quality on lecture room users. This shows that the ideal visual quality can be a positive or negative impact depending on the user and the factors that shape the visual quality of the space.

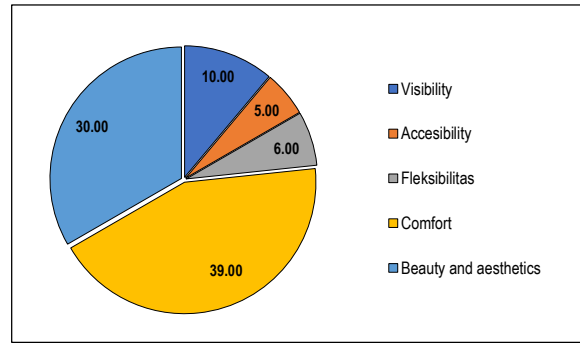


Figure 2. Graph of the frequency distribution of physical class environmental factors

3.2. Space User's Perception of Class Physical Environmental Factors

Fundamental issues in classroom management relate to the physical environment in which learning activities occur, classroom cleanliness, seating arrangements, ventilation, and lighting arrangements. These are some small things that educators need to pay attention to organize a conducive classroom physical environment. Several principles need to be considered by lecturers in managing the physical environment of the class, as stated by Loisell in Winataputra [10], namely: (1) Visibility (Wideness of View). Visibility means the placement and arrangement of items in the classroom that do not interfere with the student's view. (2) Accessibility (Easy to Achieve). Spatial planning must make it easier for students to reach or take things needed during the learning process.

The distance between seats must be sufficient for students to pass to move quickly and do not disturb other students who are working. (3) Flexibility. Objects in the classroom should be easy to arrange, move, and adapt to learning activities. Such as seating arrangements that need to be changed if the learning process uses the method of discussion and group work. (4) Comfort. Class comfort is related to room temperature, light, sound, and class density. (5) Beauty and aesthetics. This beauty principle relates to the lecturer's efforts to arrange a pleasant and conducive classroom for learning activities. Beautiful and pleasant classrooms can positively affect students' attitudes, and behavior towards the learning activities carried out.

The arrangement of lecture chairs on the lecture halls on the 2nd, 3rd, and 4th floors horizontally with a row of 7 chairs so that the total number of chairs is 50 chairs while the medium classroom is 30 chairs equipped with whiteboard infrastructure, lecturer desks, and projector (LCD). On this floor, the liaison between the classrooms is in a hallway with a width of 2m. The transportation used to get to the classroom is the elevator (2 pieces) and the regular stairs. Each classroom is equipped with an air conditioning system in AC and artificial lighting in lights (LED). The density of the room (spacious) with the arrangement of chairs and furniture has referred to the rules of Higher Education and the institutional accreditation form.

Based on the frequency distribution and Likert scale analysis results to answer the factors of the ideal class physical environment for users in the lecture room. From the distribution analysis results, the dominant factor can be seen in Figure 2, and it is known that the category that has the highest frequency is comfort. Comfort concerns temperature (temperature), noise, and room density. Based on the questionnaire of 90 respondents surveyed, 39 student respondents (43.33%) thought that they felt comfortable carrying out the learning process in the classroom if there was no noise, and the room temperature was not too hot, followed by the beauty and aesthetics of the room by 30 respondents (33.33%), as well as the freedom of view meaning that they can freely look at the lecturer, objects, or ongoing activities. In addition, lecturers must look at all students during learning activities.

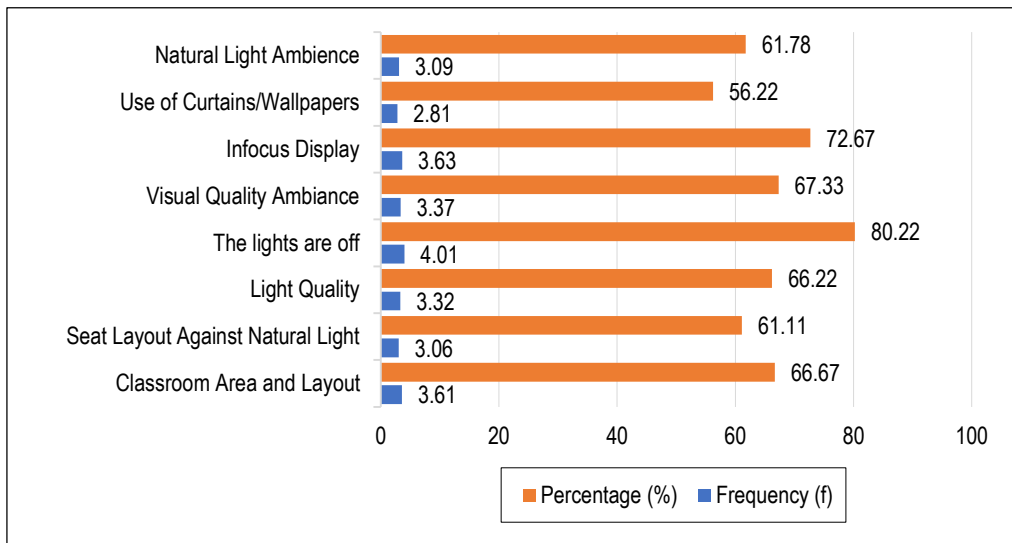


Figure 3. Likert scale graph of visual quality forming factors

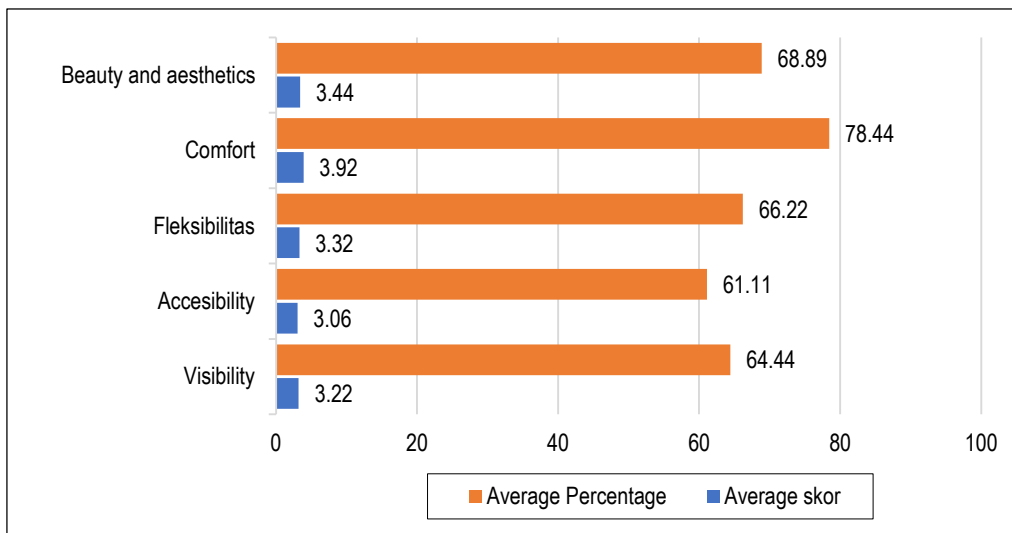


Figure 4. Likert scale graph of physical environmental factors class

The least chosen factor is the flexibility of room chair arrangement by six respondents (6.67%), followed by five respondents' room accessibility for easy access (5.56%). The second stage of the frequency distribution analysis was carried out on 90 student respondents to answer each of the ideal physical environmental factors for users in the lecture room. This analysis then produced five frequency distribution charts based on the respondents' statements which were analyzed using a Likert scale as shown in Figure 4.

Based on the results of the Likert scale analysis on the comfort response and visual quality of classroom users, it can be seen on the class environment factor based on the sequence of questions with the flexibility of view, the comfort of the classroom, flexibility, and beauty are things that the respondents significantly notice. At the same time, the indicator of easy access to the room the

respondents do not question. Based on the weight value and the average rating frequency, the Likert scale obtained an average value of 3.392 and a percentage of 67.82%, so it is in the "comfortable" classification 3.10 - 4.00 (61.00 - 80.00%) visual quality and comfort based on perception classroom users.

4. CONCLUSION

The findings of the factors that form visual quality based on user perception are in harmony with the existing theory. In the IESNA standard [11], glare, shadow, and flicker factors need to be avoided to get a good visual quality of space. User perception also states the same, namely, lighting as a dominant factor affecting visual quality. Forming visual quality based on measurements adjusted to the 2001 SNI standard [12].

The perception of classroom users is based on the factors that form the visual quality and physical environment of the classroom in the lecture building on the 2nd, 3rd, and 4th floors of the Faculty of Engineering, Bosowa University based on the analysis results in the comfortable category for carrying out teaching and learning activities.

Research on user perceptions of visual quality is essential because good visual quality causes the room's comfort level to increase and affects user activities. Further research is needed on the visual concept of the ideal lecture room to obtain results that can be applied empirically. This study was limited to the visual forming factors and the classroom's physical environment. It is hoped that in the future, research on perceptions of visual quality and comfort in lecture rooms will use external factors and internal factors in the building and can also involve more diverse respondents or respondents who are more limited (specifically in certain student groups) so that the results obtained can represent user perceptions of various types of user characteristics and the location of the lecture hall.

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