

The Effects of Computer Laboratory Seating Layout on Student's Performance

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Abstract: This study is to identify the effects of computer laboratory seating layout in social and physical environment aspect. This study is also to identify the correlation between preferred seating position and students' performance. The study's participants were students taking Computer Aided Design 1 and 2 at Mechanical Engineering Department of Politeknik Mukah. Through a lecturer administered questionnaire, students answered questions regarding the social and physical environment aspects. There are a total of 77 male and 33 female student involved in this study. The finding highlights that majority (> 70%) of the students preferred sitting in the first and middle row in the computer laboratory. The result shows that preferred seating position in the computer laboratory can affect the grade marks of Computer Aided Design 1 and 2. The results highlights that, students who sat on the last row received lower Grade (< 2.5) compared to those who sat on front and middle row. The distance between the lecturer and the students who sat on the last row in the computer laboratory indirectly affects the grade marks of student's performances. Lecturers need to be able to move throughout the classroom in order to provide guidance for their students. It can help lecturers design classroom seating plans that maximize student potential and minimize student distraction.

Key words: seating layout, student's performance, computer aided design (CAD)

1. Introduction

Does a person sitting in the front row do better than a person sitting in the last row of the computer laboratory? Every lecturer want the students' got the best grade in there are course. Seating preference depends on the interest level students have in the subject matter. If students are interested in the course, they tend to sit closer to the front of the room, and if they are not interested, they tend to sit towards the back (Kaufman, 2005, p. l). Is it fair to let students choose where they want to sit, if the front seats "guarantee" better performance?

The objectives of this study are to identify the effects of computer laboratory seating layout in social and physical environment aspect. The social environment refers to the way that a classroom environment influences or supports the interactions that occur among the students and lecturer. The physical environment can include the temperature of the room, lighting, physical space, seating arrangement (the physical arrangement of desks or tables) and student seating position (where the students sit within the computer laboratory seating arrangement).

This study is also to identify the correlation between preferred seating position and students' performance. The seating layout in computer laboratory in Mechanical Engineering Department of Politeknik Mukah is row

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seating. The designs are very small and compact which is includes 39 computers and the area around 32×16 square feet. The study's participants were students taking Computer Aided Design 1 (DJJ2062) and Computer Aided Design 2 (DJJ5062) in computer laboratory at Mechanical Engineering Department of Politeknik Mukah.

2. Methodology

The study population was students studying in Politeknik Mukah (PMU) Sarawak. Based on Krejcie and Morgan (1970) table, 103 students were randomly selected for this study. A total of 77 male and 33 female students respectively involved in this study. This questionnaire was adapted from previous similar research by Jessica (2004). The questionnaire was divided into three sections and used Likert Scales to answer the question. The first section contains questions on respondents' gender, the grade of DJJ2062 and DJJ5062 and preferred seating position computer laboratory. The second section contains questions concerning the social environment and the third section contains questions concerning the physical environment aspects. In order to understand whether the questions in this questionnaire all reliably measure the same latent variable (feeling of safety) (so a Likert scale could be constructed), a Cronbach's alpha was run on a sample size of 30 students. In this case, Cronbach's alpha coefficient is 0.76, which shows the questionnaire is reliable. This study was conducted through quantitative analysis aiming at determining the effects of computer laboratory seating layout in social and physical environment aspect. Descriptive statistics are used to determine measures of central tendency (mean) and mean score interpretation was used to interpret the mean score from output data study.

The simplest method for measuring the relationship existence between two variables is correlation analysis. Interpretation of the Pearson correlation coefficient was used to know the degree of relationship level between preferred seating positions and student's performance. The statistical hypothesis test for this p-value is:

H₀: There is no significant relationship between preferred seating positions and students' performance.

 H_1 : There is a statistically significant relationship between preferred seating positions and students' performance.

3. Result and Analysis

The result of the questionnaire is aiming to determine the effects of computer laboratory seating layout in social and physical environment aspect.

3.1 Students Preferred Sitting Row in Computer Laboratory

Table 1 presents the summary of student's preferred sitting row in the computer laboratory. The first row contains the sitting row from F1 to F14, middle row for M15 to M28 and last row for L29 to L39. The results highlight that majority (> 70%) of the students preferred sitting in the first and middle row in the computer laboratory.

	Male (N = 70)		Female (N = 33)	
Seating Row	Frequency	%	Frequency	%
Front	22	31.4	12	36.4
Middle	29	41.4	16	48.5
Last	19	27.1	5	15.2

 Table 1
 Students Preferred Sitting Row in Computer Laboratory

3.2 Descriptive Analysis on Effects of Seating Layout in Social and Physical Environment Aspect

One of the important factors for efficient teaching and learning process is involving the social environment of the particular classroom. This concept applies also for the computer laboratory. Thus, the questionnaire results involving the students on the effects of seating layout in social environment aspect are presented in Table 2.

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Enable one to one interaction among students	15.5	10.7		42.7	31.1	3.6
Enable to give opinions during presentation	5.8	17.5	1.9	44.7	30.1	3.8
Enable to discuss during the practical task	7.8			41.7	50.5	4.3
Enable to ask the question during class	13.6	24.3	1.9	38.8	21.4	3.3
Enable to help each other		10.7	2.9	28.2	58.3	4.3
Enable to work in groups within discussion		3.9	4.9	45.6	45.6	4.3
Enable to give their opinions during discussion	1.9	21.4		59.2	17.5	3.7
Enable to answer the lecturers questions	24.3	49.5			26.2	3.8
Enable to doing movement and talk during the class	17.5	25.2		36.9	20.4	3.2
Enable to work at their own place	13.6	22.3	1.9	36.9	25.2	3.4

 Table 2
 Analysis on Effects of Seating Layout in Social Environment Aspect

There was moderate high (3.7) in mean score for analysis on effects computer laboratory seating layout in social environment aspect. The result highlights that majority (> 70%) of students are using (agree and strongly agree) the one to one interaction among students, give opinions during presentation, discuss during the practical task, ask the question during class, help each other, work in groups within discussion, and give their opinions during discussion. Majority (> 70%) (strongly disagree and disagree) of students has indicated that they enable to answer the lecturers questions during the teaching and learning process.

Another factor which is related with the seating layout in computer laboratory is the physical environment aspects. There was average mean score (3.4) for analysis on effects computer laboratory seating layout in physical environment aspect. The result in Table 3 highlights that (> 30%) of students (disagree) regarding that the computer laboratory have appropriate room temperature, problem viewing of projection screen during lectures, computer tables provide adequate workspace to write and table arrangement allows teacher to see the students. Majority (> 60%) (strongly disagree and disagree) of students has indicated that computer laboratory have good lighting, seating arrangement allows for ease of movement and adequate aisle width between the desks.

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Appropriate room temperature	19.4	32		34	14.6	2.9
Good lighting	1.9	17.5		63.1	17.5	3.8
Seating arrangement allows for ease of movement	3.9	22.3	1.9	36.9	35	3.8
Problem viewing of projection screen during lectures	7.8	36.9		46.6	8.7	3.1
Computer tables provide adequate workspace to write	1.9	36.9	3.9	33	24.3	3.4
Table arrangement allows teacher to see the students		32		44.7	23.3	3.6
Adequate aisle width between the desks	3.9	25.2	1.9	54.4	14.6	3.5

 Table 3 Analysis on Effects of Seating Layout in Physical Environment Aspect

3.3 Analysis of Correlation between Preferred Seating Position and Student's Performance

The students result performance for Computer Aided Design 1 (DJJ2062) and Computer Aided Design 2 (DJJ5062) which is taught in the computer laboratory is highlighted in Table 4. The result shows that 76.5% students in front raw get the excellent grade for DJJ2062. Meanwhile, there are a 12.5% of last row students who pass this course. And in term of excellent grade, the students in front raw and middle row perform better compared to the last row students.

Status	Crada	DJJ2062			DJJ5062			
Status	Grade	Front	Middle	Last	Front	Middle	Last	
	A+	0	0	0	17.6	0	0	
Excellent	А	70.6	33.3	0	29.4	28.9	29.2	
	A-	5.9	13.3	0	8.8	22.2	4.2	
	B+	14.7	17.8	29.2	11.8	17.8	25	
Credit	В	8.8	28.9	41.7	29.4	28.9	16.7	
	В-	0	4.4	0	2.9	0	12.5	
Dogo	C+	0	2.2	12.5	0	0	8.3	
rass	С	0	0	16.7	0	2.2	4.2	

Table 7 Students Grade Marks	Table 4	Students	Grade	Marks
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A Pearson Correlation test showed that the relationship between preferred seating position and student's performance (Grade Marks of DJJ2062) are statistically significant, r = 0.616, p = 0.000. There was a moderate positive correlation between the preferred seating position and student's performance. There was negligible correlation between preferred seating position and student's performance (Grade Marks of DJJ5062), r = 0.244, p = 0.013. These finding can be related to the results from Table 1 and Table 2, which indicates that the students preferred sitting in the last row have lower performance in term of grade marks compared to the first row students.

4. Conclusion

The finding highlights that majority (> 70%) of the students preferred sitting in the first and middle row in the computer laboratory. The students also strongly agree and agree that the computer laboratory seating layout affect the social and physical environment aspect. Further analysis also shows a significant relationship between preferred seating position and students' performance. The results highlights that, students who sat on the last row received lower grade compared to those who sat on front and middle row.

The students who sat on first and middle row performed better than the students sat on the last row. This phenomenon can be related to the current seating layout which is adapted to conventional seating layout (straight row). Previous research has highlighted that the conventional seating layout constraint the interaction between the lecturer and student (Ogunsola-Bandele, 2002). The distance between the lecturer and the students who sat on the last row in the computer laboratory indirectly affects the grade marks of student's performances. Lecturers need to be able to move throughout the classroom in order to provide guidance for their students.

In conclusion, a student sitting near the front of the class is different from students sitting farther away. By Brian J. M. (2007), understanding how an environment affects students can help teachers foster a comfortable and supportive environment for the success of their students. The different seating arrangements can give benefits to student learning. Seating students in rows has been found to double on task behavior of students and reduce

inappropriate behavior (Wannarka & Ruhl, 2008; Bicard et al., 2012). Students sitting near the front of the class demonstrate higher motivation and participation results received much higher achievement scores than students sitting farther away. This information can help teachers design classroom seating plans that maximize student potential and minimize student distraction.

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