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*Full Length Research Paper*

# Relationship of ergonomic toward the concentration of student learning at Junior High School X in Banjarbaru

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Anthropometry is one part of that support Ergonomics, especially the design of an apparatus based on the principles of Ergonomics. Ergonomics is the science, technology and art to combine tools, work methods and environment on the ability, skill and human limits in order to obtain working conditions and healthy environment, safe, comfortable and efficient in order to achieve optimal productivity. This study aimed to the relationship between the level of ergonomic chairs with a concentration level of student learning at the X junior high school in Banjarbaru. Survey research methods, by cross sectional were analyzed descriptively and analytically. The population of all students in the seventh grade in X junior high school 190 were students. Sample of 82 students randomly selected using systematic random sampling technique. Consists of class VII as much as 5 classes. Each class of 16 students taken obtained from the calculation 82 divided by 5 classes. The average number of students for each class were 38 students. For the sample interval was 2, obtained from the calculation of 38 students divided by 16 students. Figures initial sample was first class attendance VIIa, and subsequent sample numbers plus the numbers were multiples of the free 2. Independent variable was ergonomics level seats. The dependent variable was the level of concentration of the student's learning. Tools and Materials Research Termohyrometer, Lux Meter, Sound Level Meter, Metlin, Anthropometer sets, triangular ruler, Bathroom scale, chair ottoman with a size of 40 X40 X40 cm for men, and 35 x35 x35 cm for women, stationery, Questionnaire, Form anthropometric data. Results that 56% seats or 6:29 that students used an ergonomic chair. Students who had a good concentration of as many as 84 students or 51.85%, and students who had poor concentration 78 students or 48.15%. Chi Square test that there was a significant relationship between the level of ergonomic chairs with a concentration level of student learning at X junior high school Banjarbaru. Students who use ergonomic chairs, in concentrations higher than students using unergonomics seat. Suggestions doing research in the field of ergonomics by using different variables such as students level of fatigue, subjective complaints or comfortable.

**Keywords:** Ergonomy, Anthropometry, Concentration

## INTRODUCTION

Learning is also a work activity that needs to be managed with the ergonomic approach. Learning ergonomics approach to balance between the demands of the task (workload) and capacity (ability, skill and limitations) of

students so that they can learn effectively, convenient, safe, healthy and efficient and achieved the highest achievement. Capacity of students to receive assignments and learning environment that is not

ergonomically vary depending on the ability, skill and limitations of each. The body will try to adapt to these changes. When the body is unable to adapt to it will cause the quality of health disorders, such as musculoskeletal disorders increases, increased fatigue and boredom increased. Health impacts will affect the outcomes of the learning process.

Preliminary survey dated August 25, 2014 to 150 students in the junior X Banjarbaru, by filling out the questionnaire in the know complaints as much as 60% of the students feel comfortable learning in the classroom was in use. A total of 72.38% was often sleepy during class, 52.38% feel dizzy, 91.42% when the concentration was not studied, 82.85% feel tired and lethargic, 38.09% feel pain and stiffness in the back, 12.38 % felt arm pain, 22.85% neck and shoulder pain, 16.19% hand sore and stiff, 28.57%, anxiety, tingling in the feet 21.90%, 7.62% legs felt heavy, and 24, 76% out of balance when standing up after sitting for a long time.

## RESEARCH OBJECTIVES

Knowing the relationship by measuring the level of ergonomic chairs, concentration of student learning, and relationship with the seat ergonomics ergonomics at junior level in X junior high school Banjarbaru.

## METHODS STUDY DESIGN

The study was a survey with a cross sectional study approach, the research data were analyzed descriptively and analytically. Population and Sample entire seventh grade students in X junior school Banjarbaru about 190 students. Sample calculation formulas, in order to obtain 82 students (Notoatmodjo, 2005). Randomly selected using systematic random sampling technique. Consist of class VII as much as 5 classes. Each class of 16 students taken obtained from the calculation 82 divided by 5 classes. The average number of students per class was 38 students. For sample interval was 2, obtained from the calculation of 38 students divided by 16 students. Figures initial sample was first class attendance VII a, and subsequent sample number plus a multiple number 2. The independent variables were the level of the seat ergonomics. Indicated ergonomic chair if appropriate size seat height 34-45cm, length 42cm cushion and seat width of 39-44 cm. Declared not ergonomic, if the size did not match the size of the chair seat height 34-45cm, length 42cm cushion and seat width 39-44 cm. Bound variable was the concentration level of student learning. Tools and Materials Research was termohyrometer, Lux Meter, Sound Level Meter, metlin, anthropometer sets, triangular ruler, bathroom scale, chair ottoman with a size of 40x40x40 cm for men, and 35 x35 x35 cm for women, stationery, questionnaire, form

anthropometric data. Data retrieval techniques were:

- 1) Measurement of the physical environment, including measurement of lighting, noise, temperature and humidity,
- 2) Perform anthropometric measurements of students by:
  - a. Considering the weight of the respondents,
  - b. To measure the student body, which included the measurement in a standing position, namely height, shoulder height, elbow height, hip height, fathoms, arm length, upper arm length, forearm length. While in a seated position, covering high sitting, sitting elbow height, knee height sitting, sitting hip height, length of the upper leg, lower leg length, and distance curve of the knee.
- 3) Take measurements ergonomic chairs, which included seat height, seat width, length and lumbar support cushion,
- 4) Record the results of measurements on a sheet measuring data,
- 5) Measure the concentration levels of student learning using a questionnaire.

Measurement of the concentration levels of student learning was done by filling out the questionnaire, which included 15 items about the four possible answers, which was often, yes, sometimes and not. Answers often got scores 4, yes got a value is 3, sometimes the value is 2, and if its no the value is 1. Furthermore, the amount of the value obtained from each of the respondents were classified into good concentration when scored 20-34, while the concentration of ugly when it scored 35-60.

## RESULTS AND DISCUSSION

Here are the results of measuring the level of ergonomic chairs used class VII as follows:

Based on the results of questionnaires and interviews, it is known that students feel the complaints such as stiff in the shoulders, pain in the back and fatigue when sitting for a long time in the chair. Students who do not sit in a ergonomic chair can have a concentration of good or bad, can be influenced by both factors internal and external factors. Students who do not sit on the seat ergonomics can have good concentration, since the students to feel comfortable sitting in a long time and be able to follow or observe any material submitted by teachers. Due to concentration determined by convenience or inconvenience learning environment, one only whether or not the student is comfortable sitting on the chair used.

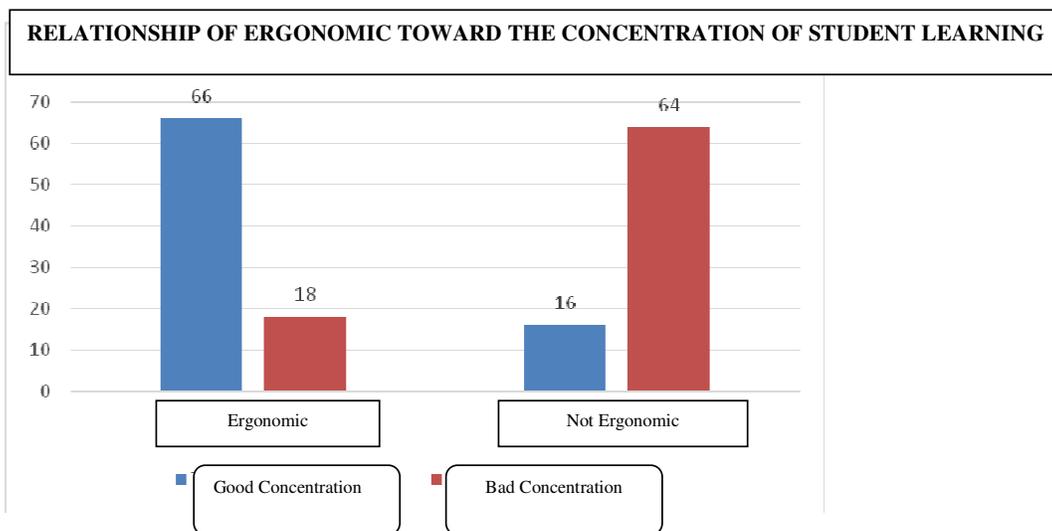
In addition to ergonomic chairs and measurement measuring concentration levels, as well as measurement of variables that allow can be one of the factors causing the decline in the concentration of student learning, namely temperature, humidity, lighting and noise. Based on the measurement results at VII room class temperature about 28 °C, this is in accordance with a

1. Relation between Ergonomics chair level and Concentration Students level  
**Table 1.** Frequency Distribution Ergonomic Chair level in X Junior High School Students in Banjarbaru

No	Ergonomic level	Total	Percentage (%)
1	Ergonomic	56	68.29
2	Not Ergonomic	26	31.71
Total		82	100.00

**Table 2.** Frequency Distribution Concentration Level Student Learning at X junior High School in Banjarbaru

No	Concentrate level	Total	Percentage (%)
1	Good	53	64.63
2	Bad	29	35.37
Total		82	100.00



**Graph 1.** Relationship between the level of ergonomic chairs with concentration levels for students at Junior High School X in Banjarbaru.

standard that is 18-28°C. While the results of measurements of humidity chamber at 66% of class VII. This means that the humidity of the room is not yet qualified, in accordance with the standards of the humidity is 40% -60%. The results of lighting measurements of VII class is 166.5 lux, means that they are eligible. Based on the Ministry of Health No. 1405 / Men.Kes. / SK / XI / 2002 on Conditions of Work Environmental Health Office and Industry, that the temperature: 18-28°C, humidity: 40-60%, lighting intensity 100lux. Noise level of VII classroom was 61,8 dB, meaning that the noise in the classroom VII did not qualify. Based on the Ministry of Health Regulation No. 718 / Men.Kes. / Per / XI / 1987 on Health-Related Noise, noise level of education that places the maximum allowed 55 dB. Respondents in this study were students of class

VII as much as 82 students. Measuring seat ergonomics level was done by adjusting the size of the seat with anthropometric measure student. The size of the seat covers seat height, width and length of the seat cushion. Seat height adjustable to the length of the leg, the width of the seat adjusted to the width of the hips, while the length of the cushion adjusted to the distance curve of the knee.

Based on the results of measurements of the concentration levels of students in 82 students of X junior high school in Banjarbaru, it was known that as many as 53 students or 64.63%, had good concentration, and a total of 29 students or 35.37% had poor concentration. Measuring the level of ergonomic chairs and concentration levels of student learning can be seen that the students who sit in ergonomic chairs and had a good

concentration of as many as 66 students, while having poor concentration as many as 18 students. Students who did not sit on the seat ergonomics but had good concentration of as many as 16 students, while students who did not sit on the seat ergonomics and had poor concentration as many as 64 students.

Based on Chi Square test with  $\alpha = 0.05$ ,  $p$  value =  $0.000 < \alpha = 0.05$  means there is a significant relationship between ergonomic chair with a concentration level of student learning. This is in line with the research of Dhewi (2009), that there was a significant correlation between the status of ergonomic chairs and desks to tailor the level of fatigue. This study suggests that tailors used ergonomic chair was not exhaustion level was higher than the tailor who used ergonomic chairs.

Concentration is largely determined by whether or not a comfortable learning atmosphere or the climate. One of them was whether or not students were comfortable when sitting receive the subject matter of teachers. The uncomfotability will make learning impaired concentration. Sitting comfort is absolutely required students to absorb the lessons from teacher. Based on the research of experts was found that a maximum of the students felt comfortable in the chair is only 20 to 30 minutes, the next time was a sense of discomfort.

Research from Ismail (2007) that there was an increase in labor productivity between before or after used the chair and desk ergonomics, i.e. from 11.47 cart / day to 13.45 cart / day (17.26%). Moreover, it was known as much as 85% workers often complain of pain in the back, arms and legs. But after workers using ergonomic chairs no more complaining of pain in the back, arms and legs. In this connection, it is essential to the procurement and use of an ergonomic chair that gives a sense of comfort to the students at the time of study.

## CONCLUSION

Based on Chi Square test states that there was a significant relationship between the level of ergonomic chairs with concentration levels for students at X junior high school Banjarbaru that used ergonomic chair, in concentrations higher than students who did not use seat ergonomics.

## SUGGESTION

The School can improve student seat used with a measure seat height = 42cm, width = 36cm seat length = 42cm cushion and backrest = 54cm. Conduct further research with different variables such as students level of fatigue, subjective complaints or comfort.

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