The Influence of Workstations and Ergonomic Work Postures on Employee Job Satisfaction in the Academic Library

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Abstract

This study focuses on workstations, work postures, and employee job satisfaction in the Brawijaya University Library. This study aims to determine the influence of workstations and ergonomics work posture on employee job satisfaction in the library. The research method used a quantitative approach. The sampling technique is total sampling with a total of 45 library staff from 5 departments in the library. This study uses multiple linear regression analysis techniques. The study results are the influence of workstations and ergonomic work posture on employee job satisfaction, with the t-test values for both variables being 2.899 > 2.018 and 3.050 > 2.018, respectively. Based on the results of the R2 test that has been carried out above, the results of the R test of this study are the Workstation variable (X1), Work Posture (X2), simultaneously having an effect of 0.674 or 67.4% on the Job Satisfaction variable (Y). This means that the independent variable provides 67.4% of the information needed to predict and explain the variation of the dependent variable. At the same time, 32.6% is influenced by other factors or variables that are not examined.

Keywords: Library Workstations, Work Posture, Job Satisfaction, Ergonomic, Developing Countries, Academic Library, Higher Education.

Introduction

Employee job satisfaction is one of the most critical components that every organization needs special attention. Employee job satisfaction is one of the many factors that can determine the success of an organization (Schroeder, 2008). The comfortable working environment is one element that increases employee job satisfaction in the library. The room in a library building should be designed as comfortable and safe as possible because a comfortable and safe building condition can affect the psychological state of a person in the library building (Metcalf, 1965).

Good construction and building areas can make individuals feel safe, comfortable, and more productive when carrying out their work, and vice versa. If the design is not correct, it can make the individual feel helpless and will make him stressed (Yanuarista, 2013). Ergonomic workstations are work-oriented work areas directly related to human interaction with physical equipment. Workstations are used to determine how the environment or work area can be designed and adapted to workers. This is useful for preventing various health problems and increasing efficiency, in other words, making work suitable for workers rather than forcing workers to adapt to their work.

Work posture is the arrangement of body posture when carrying out work. When doing his job, it is better if the posture is done naturally to minimize the incidence of musculoskeletal injuries. The movement of body organs while doing work determines a good work posture (Dewi, Tarwaka, Erg & Dwi Astuti, 2015). It is essential to implement workstations, ergonomic work postures, and spatial planning in the library, as these factors can address some of the issues that have been previously discussed. Another study conducted by the Institute of Science and Technology (AKPRIND) in 2019 concluded that workstations have a relevant effect on employee job satisfaction where a significance value of 0.05 is obtained, and it is stated that an increase in one unit of workstations can increase job satisfaction by 0.326. Employees who quickly experience fatigue when carrying out their duties will affect the results of work that employees have carried out, resulting in a decrease in work results and not following the desired achievement (Susihono, 2012). Based on research that has been done previously by Kusumawati (2011), the results show that users experience several complaints, including 27.5% of the neck, 17.5% of the back, 15% of the waist, 7.5% of the legs, 20% of the shoulders. And thighs by 12.5%.

The phenomenon in the condition of workstations in the Universitas Brawijaya Library is almost all forms of tables and work equipment. However, some chairs made of iron cannot be rearranged according to user needs, and some available chairs can be re-used, providing chairs that can be adjusted. Rework can make it easier for employees to mix work positions according to their wishes. Workstations are lined up with each other, and no barriers prevent employees from interacting with their co-workers. This is to the principle of an ergonomic workstation where it is not complicated for employees to interact with their co-workers, the height of tables and chairs tends to be the same, there is no particular difference for employees who have a large body size, and employees who have a small body size, this causes some problems for employees who have a large body size. Several organizations and libraries have designed their work environment with several ergonomic implementation steps to provide appropriate workstations and work postures to increase employee job satisfaction. Based on the phenomena previously mentioned, it can be inferred that the UB library has not fully adhered to the ergonomic principles in designing appropriate workstations and work facilities.

Literature Review

A workstation is a workspace that is oriented towards work related to human interaction with physical equipment. McGorry et al. (2004) state that workstation design from an ergonomic perspective can significantly increase employee productivity and minimize stress caused by an unsupportive workspace. According to Wingjosoebroto (2000), several aspects must be considered in designing an ergonomic workstation: user anthropometry, method improvements, and facility layout settings.

Anthropometry is the science that deals with measuring the dimensions of the human body. The design of workstations and work facilities following the anthropometry of workers will help workers get a comfortable and safe work posture. In this case, the anthropometry in question is the suitability of the workstation with the size of the worker's body. The need for data concerning the dimensions of the human body can support the product design process, which is intended to achieve compatibility between the product and the people who will use it. Some indicators of user anthropometry are (1) providing sufficient space for all staff, (2) chair and desk height should be suitable with leg length, (3) providing enough space for long legs to stretch them, (4) providing leg support to avoid hanging leg, (5) give space for big size staff, (6) give enough space for staff with big hand.

It concerns improving methods or working methods by emphasizing ergonomic principles to provide increased efficiency and work productivity. It aims to increase worker productivity by improving work-related things, such as rearranging worktables and chairs so that workers can change positions anytime. Two things must be considered with method improvement: (1) choose an adjustable desk and chair, and (2) ensure all stuff is reachable.

They are setting the layout of the facilities needed in an activity that aims to find efficient work movements and the arrangement of material handling movements. The controller must be within the optimum range. Work equipment must be placed in the employee's work area so that when the employee takes the goods, it does not require much energy even to change positions. The placement layout is appropriately arranged to avoid any potential hazards to the employee. The indicators of layout setting are (1) put kinds of stuff in a reachable position, (2) put important stuff in a top or high position, so staff don't need to bend down, (3) keep the stuff and equipment in front of the seating area, (4) put control panel in a place between shoulder and torso, (5) avoid put stuff higher that shoulder, (6) put monitor under eye level.

Work posture is an action workers take (Nurmianto, 2004). Work posture is an arrangement of body posture while working. When working, posture should be done naturally to minimize injury. Good posture is determined by the body's organs while working. According to Nurmianto (2004), there are three classifications of attitudes at work: sitting work attitude, standing work attitude, and sitting working attitude standing.

Sitting working posture muscles experience static muscle loading. The sitting posture has several advantages, namely, the load on the legs is less so that energy consumption and the need for blood circulation can be reduced. Another advantage of the sitting posture is that it reduces the static load on the legs and reduces energy consumption. There are some indicators of sitting working posture, namely: (1) working hour duration, (2) supporting sitting working posture, (3) the availability of foot bench, (4) the appropriateness of desk height and posture, (5) chair is not stress causes, (6) the bend and bow intensity.

A standing work attitude is an alert attitude, both physically and mentally, carried out quickly, strongly, and thoroughly. This working attitude is an attitude that is often done at work. When working, the human body's weight will be supported by one or both legs when standing. Legs aligned straight at a distance under the hip bone will prevent the foot from slipping. Furthermore, the standing work posture deals with (1) standing for a long duration, (2) sufficient foot support, and (3) involving physical activities.

A sitting-standing work attitude combines a working attitude, sitting and standing. This aims to reduce fatigue caused by being forced to work in one position. Applying this work attitude provides an advantage where the pressure on the spine and waist is 30% lower than in

the working position of sitting or standing alone. There are six indicators of a sitting-standing work attitude: (1) the height of the station is suitable for sitting-standing work posture, (2) working hour duration, (3) dealing with repetitive work, (4) needs various position movement, (5) correct work posture, (6) needs lifting movement.

Prihatsanti (2010) states that job satisfaction is an attitude or feeling of satisfaction experienced by employees at work that has been achieved in terms of surviving with themselves and the work environment, which involves intrinsic and extrinsic satisfaction. In this study, the author uses Luthan, Zhu and Avolio's theory (2006), which argues that three crucial factors are closely related to job satisfaction. The three factors are the work itself, co-workers, and working conditions. The following are essential factors in terms of job satisfaction, according to Luthan et al. (2006):

1. The work itself, the mental aspect of work that determines job satisfaction, which will contribute to job satisfaction. High job demands that are not matched with the abilities of each individual will cause frustration and job dissatisfaction.

2. Colleagues, having excellent and effective co-workers can help employees complete their work with pleasure. Colleagues who not only contribute to the continuation of the current work process but are also expected to be able to meet their social needs (if working in one room).

3. Working conditions: These are conditions related to work equipment, spatial planning, work postures, and others. The simplest things that can increase employee job satisfaction are clean workspace conditions, appropriate lighting, appropriate room temperature, work equipment that can facilitate employee work and are comfortable and safe, and flexible tables and chairs that enable employees to rearrange according to their wishes. Workspace conditions that consider ergonomic principles can meet the physical needs of employees and can satisfy employees. On the other hand, if the workspace is too hot and noisy or the workstation is unsuitable, the work cannot be completed optimally. The absence of good working conditions will harm workers' mental and physical well-being.
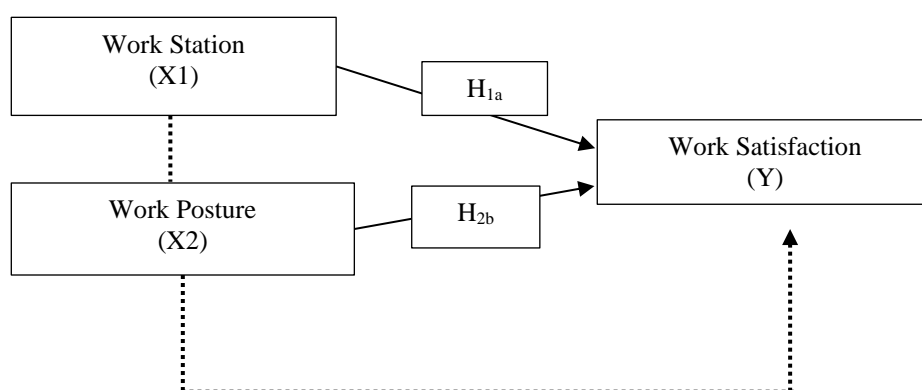

Figure 1. Research Framework

Materials and Methods

This research uses quantitative research methods with an explanatory approach. Data collection was carried out through the distribution of closed questionnaires. Answers are divided into five levels: 1. Strongly disagree 2. Disagree 3. Moderately agree 4. Agree 5.

Strongly agree. The population in this study are all employees who work in the Brawijaya University Library, which includes the field of administration, development, cooperation, technical services, information technology, and user services, totaling 45 people, with characteristics including age, gender, and library staff. The sampling technique used in this study is a total sampling technique where all individuals in a population are given the same opportunity to be selected as sample members. The reason for using complete sampling is that the total population is less than 100, so the entire population will be sampled. In this study, researchers took a sample of 45 people. The electronic questionnaires were distributed to all library staff via WhatsApp or e-mail. There are 23 questions from the workstation variable, 20 from the work posture variable, and ten from the job satisfaction.

The analysis technique is analyzing data in the form of statistical data. This activity is part of the follow-up to data processing activities. The data generated is the answer to the questionnaire filled in by the respondents.

The hypotheses in this study include:

H0a: The workstation has no partial effect on employee job satisfaction.

H1a: Workstations have a partial effect on employee job satisfaction.

H0b: Work posture has no partial effect on employee job satisfaction.

H1b: There is a partial effect of work posture on employee job satisfaction.

H0c: Workstation and ergonomics work posture have no simultaneous effect on employee job satisfaction.

H1c: Workstation and ergonomics work posture simultaneously have an effect on employee job satisfaction.

Results

The workstation variable is the second-largest influence in determining employee job satisfaction in the Brawijaya University Library. It is proven by the findings and data analysis that the significant value of the influence of workstations on employee job satisfaction, obtaining a value of 2.899 > 2.018, where this value is the second highest influence value when compared to other variables, which means that the application of work stations at the Brawijaya University Library is classified as good. This means that the higher the value of the workstation variable followed by an increase in job satisfaction, and vice versa if the smaller the value of the workstation variable, the smaller the level of employee job satisfaction. This is proven by the data in Table 1, which shows high user satisfaction with the workstation at the UB Library, with an average score of 3.72, included in the high category. This is aligned with the statement of Das and Behara (1955), which states that a good workstation design will result in greater productivity by optimizing efficiency with minimum human costs.

Table 1
Workstation Variables Result

X1	Average Score	Category
Anthropometry	3.74	High
Method improvement	3.70	High
Facility layout sertting	3.72	High
Average	**3.72**	**High**

The work posture variable is the variable with the biggest or dominant influence. The findings and data analysis prove that the significant effect of work posture on employee job satisfaction obtained a value of 3.050 > 2.018. This means that the higher the value of the work posture variable, it will be followed by increased employee job satisfaction.

Based on the data in Table 2, the work posture variable has a moderate perception of the respondents. This can be seen from employee satisfaction with work posture, which has an average score of 3.27. Sitting work attitude is a moderate indicator based on the findings of the data in Table 2, with an average score of 3.33, which falls into the medium category. The element that occupies the highest score is "My chair is not a source of stress for me " with a score of 3.88, which is included in the high category. This is comparable to research conducted by Setyowati et al. (2018), which showed that the work stress experienced by employees after using an ergonomic chair decreased by 16.24%. The decrease was partly due to work chairs with backrests and armrests and the proper use of leg support to provide comfort. In line with Setyawati (2000), batik workers with ergonomic seats have an impact on reducing work stress on the subject, and in line with Kusuma (2004), lower work stress will lead to increased work performance.

Table 2
Work Posture Variables result

X2	Score	Category
Sitting Posture	3.33	Moderate
Standing Posture	2.93	Moderate
Sitting and Standing Posture	3.56	High
Average	**3.27**	**Moderate**

Workstations and Work Postures at Brawijaya University Library

With a total average score of 3.49, workstations and work postures at the Universitas Brawijaya Library are in the high category. This includes workstations, user anthropometry, method improvements, facility layout, and work postures, including sitting work postures, standing work attitudes, and sitting working attitudes. In the workstation and work posture at the Brawijaya University Library, the workstation variable becomes the variable with the highest score of 3.72. Then, it was followed by the work posture variable with a score of 3.72, which is included in the medium category. The average score of both variables reached a value of 3.49, which is included in the high category. So, it can be seen that the data findings illustrate that workstations and work postures in the Brawijaya University Library are the variables that most satisfy employees' work.

The validity test used the product-moment correlation method with the SPSS software version 22. The question is valid when the value of r count > r table. The r table is from (n=100, with a significant value of 0.05), so the r table is 0.9294. The result of the validity test is in Table 3.

Table 3
Validity Test

Questions	Pearson Correlation	Coeficient correlationvalue	Result
Work Station (X1)			
X1	0.726	0.294	Valid
X2	0.507	0.294	Valid
X3	0.621	0.294	Valid
X4	0.423	0.294	Valid
X5	0.691	0.294	Valid
X6	0.707	0.294	Valid
X7	0.538	0.294	Valid
X8	0.707	0.294	Valid
X9	0.821	0.294	Valid
X10	0.615	0.294	Valid
X11	0.699	0.294	Valid
X12	0.695	0.294	Valid
X13	0.708	0.294	Valid
X14	0.771	0.294	Valid
X15	0.731	0.294	Valid
X16	0.629	0.294	Valid
X17	0.806	0.294	Valid
X18	0.556	0.294	Valid
X19	0.723	0.294	Valid
X20	0.564	0.294	Valid
X21	0.575	0.294	Valid
X22	0.604	0.294	Valid
X23	0.401	0.294	Valid
Work Posture (X2)			
X24	0.539	0.294	Valid
X25	0.770	0.294	Valid
X26	0.543	0.294	Valid
X27	0.580	0.294	Valid
X28	0.718	0.294	Valid
X29	0.549	0.294	Valid
X30	0.663	0.294	Valid
X31	0.439	0.294	Valid
X32	0.524	0.294	Valid
X33	0.517	0.294	Valid
X34	0.699	0.294	Valid
X35	0.439	0.294	Valid
X36	0.455	0.294	Valid
X37	0.539	0.294	Valid
X38	0.808	0.294	Valid
X39	0.524	0.294	Valid
X40	0.691	0.294	Valid
X41	0.602	0.294	Valid
X42	0.648	0.294	Valid

Based on the results of the T-test that has been carried out above, the decision-making on the T-test in this study is the variable (X1), namely the workstation affects the job satisfaction variable (Y), and the variable (X2) work posture affects the job satisfaction variable (Y), the details are as follows (Table 4):

In the first analysis, the t-test value for the effect of X1 on Y is 2.899. Where the t value is 2.899 > 2.018, it can be concluded that H1a is accepted that there is an effect of the X1 variable on the Y variable.

In the second analysis, the t-test value for the effect of X2 on Y is 3.050. Where the t value is 3.050 > 2.018, it can be concluded that H1b is accepted that there is an effect of the X2 variable on the Y variable.

Table 4
T-test result

Coefficients						
Model		**UnstandardizedCoefficients**		**StandardizedCoefficients**	**t**	**Sig**
		B	**Std. Error**	**Beta**		
1	Constant	-1.186	4.030		-0.294	0.770
	X1	0.225	0.078	0.425	2.899	0.006
	X2	0.243	0.080	0.447	3.050	0.004

Data source: questionnaire result

Based on the results of the F test that has been carried out (Table 5), it can be concluded that the Workstation (X1) and Work Posture (X2) simultaneously affect Job Satisfaction (Y). The decision was obtained from the calculation results obtained from F count .000 < 0.05, which means that the variable (X) simultaneously affects the variable (Y).

Table 5
F test Result

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig**
1	Regression	1667.565	2	833.783	46.472	.000[b]
	Residual	753.546	42	17.942		
	Total	2421.111	44			
a. Dependent variable: Job satisfaction						
b. Predictors: (constant), work posture, workstations						

Data source: questionnaire result

Based on the results of the R^2 test that has been carried out (Table 6), the results of the R test of this study are the Workstation variable (X1), Work Posture (X2), simultaneously having an effect of 0.674 or 67.4% on the Job Satisfaction variable (Y). This means that the independent variable provides 67.4% of the information needed to predict and explain the variation of the dependent variable. While 32.6% is influenced by other factors or variables that are not examined.

Table 6
R^2 test Result

Model Summary				
Model	R^2	R Square	Adjusted RSquare	Std. Error ofthe Estimate
1	.830ª	.689	.674	4.23575
a.	Predictors: (Constant), work posture, workstations, job satisfaction			

Data source: questionnaire result

Discussion

Workstation at Brawijaya University

The workstation variable is the second largest factor in determining employee job satisfaction at the Brawijaya University Library. This is proven by the findings and data analysis, which shows the significant value of the influence of workstations on employee job satisfaction, obtaining a value of 2.899 > 2.018, where this value is the second highest influence value when compared with other variables, which means that the implementation of workstations in the Brawijaya University Library is classified as good. This means that the higher the value of the workstation variable, an increase will follow this in job satisfaction and vice versa, if the value of the workstation variable is lower, a lower level of employee job satisfaction will follow it. This is proven by the data in Table 1, which shows high user satisfaction with workstations in the Brawijaya University Library, with an average score of 3.72, included in the high category.

Ojo, Bailey, Chater and Hewson (2018) and Cao, Liu, Zhu and Ma (2016) stated that poor workstation design can reduce performance and create health problems such as musculoskeletal disorders. According to reports from previous studies, there is a strong correlation between unergonomic work processes and one of the causes of most work-related illnesses (Prabarukmi & Widajati, 2020). Table 1, proves that the user's anthropometric indicators have a total average value of 3.74 in the high category. This results from respondents' responses to the suitability of user anthropometry, which is directly proportional to employee job satisfaction. This is in accordance with previous research conducted by (Daiva, Budiman & Nurhayati, 2019), which was carried out at university students stating that table measurements had met the user's anthropometry, namely the table's width and the participant's height. As Pheasant, (2018) said, anthropometry is the most important branch of ergonomics.

The facility layout arrangement indicator has the second-highest average score. As many as 82.2% of respondents were satisfied with the workstation being designed so as not to lean on sharp edges. This is in contrast to research conducted by Anjum, Ashcroft and Paul (2004) found that relatively many employees were dissatisfied with the arrangement of equipment in their office: For chair furniture, 16% of respondents said they were not satisfied with the existing chairs, while 56% of respondents said they were very satisfied with the existing chair furniture and the remaining 28% of respondents said they were quite satisfied.

The method improvement indicator is one of the indicators with a score in the high category with an average score of 3.70. Method improvement involves improving methods or ways of working by emphasizing the principles of movement economy to increase work efficiency and productivity. This aims to increase worker productivity by improving work-related things, such as using worktables and chairs that can be rearranged so that workers can change positions at

any time. This is comparable to the statement (Wijana, Nala, Tirtayasa & Sutajaya, 2009) that furniture quality can also determine the physical comfort of space users. Ergonomic furniture can reduce boredom and complaints of body aches. The total average score obtained by the Workstations in the Method Improvement dimension of 3.70 means that method improvements at the workstations in the Brawijaya University Library can be considered high. This is by previous research conducted in the city of Yogyakarta.

Work Posture at Brawijaya University

The data in Table 2 shows that the work posture variable has a moderate perception from respondents. This can be seen from employee satisfaction with work posture, which has an average score of 3.27. This figure is the second highest value compared to other variables, meaning that the work posture variable plays less of a role in job satisfaction for Brawijaya University Library employees). Therefore, Miles (2000) believes additional costs to buy ergonomic tables and chairs can increase employee productivity for 5 months.

Sitting work attitude is a medium indicator based on data findings in Table 2 with an average score of 3.33, which is included in the medium category. The element with the highest score is found in the statement My chair is not a source of stress for me, with a score of 3.88 which is in the high category. This is comparable to research conducted by Setyowati, et al (2018), which showed that work stress experienced by employees after using ergonomic chairs decreased by 16.24%. This decrease is partly due to the use of work chairs with backrests, armrests and appropriate leg support to provide comfort. So, in line with Setyawati (2000), batik workers with ergonomic seating have an impact on reducing work stress on subjects, and in line with Kusuma (2004) lower work stress will lead to increased work performance.

Based on the data findings found, standing work attitude is an indicator with a score of 2.93 which is included in the moderate category in determining the level of satisfaction that determines employee job satisfaction. My job statement involves standing for a long time in the same position for a long period, earning 3.62. the percentage of respondents who answered in the affirmative reached a value of 53.3%. This means that respondents have to stand for long periods, meaning they feel less satisfied with their standing work attitude. This is comparable to Dewi et al, (2015) statement that good working posture is largely determined by the body's organs while working. Standing work posture is an alert attitude, both physically and mentally, so work activities must be carried out quickly, strongly, and thoroughly, which can cause fatigue, pain, and fractures in the back muscles (Santoso, 2013). This is one of the reasons why standing work posture is less dominant in determining employee job satisfaction. Several things need to be considered related to body posture, including reducing as much as possible the need for operators to work in a bent posture frequently and for long periods. Apart from that, when operators easily experience fatigue, the results of the work carried out by the operator will also decrease and not be as expected (Susihono, 2017).

Apart from the indicators of sitting work attitude and standing work attitude, based on the data findings in Table 2, employees have a high level of satisfaction. This is proven by the average score of 3.56, included in the high category. This means that the sit-to-stand work attitude at the Brawijaya University Library is running well. Variations in sitting and standing work attitudes dominate in determining employee job satisfaction. This is because the sit-to-stand work posture combines both work attitudes to reduce muscle fatigue when forced into a working position. This is supported by Tarwaka and Bakrie's (2010) statement, which states

that implementing a sit-to-stand work posture provides benefits in the industrial sector, where the pressure on the spine and waist is 30% lower compared to a sitting or standing work position.

Conclusion

This research has revealed that workstations, work equipment design and working posture conditions are aspects of ergonomics that contribute significantly to achieving higher job satisfaction for employees or library staff. Meanwhile, this research partially shows that workstation and work posture significantly affect the job satisfaction variable. Some aspects need improvement, such as sitting posture using an adjustable chair and table, foot bench, and back support. Another aspect is adjusting the monitor position so that is comfortable for the eyes. This research gives practical contributions to academic library design and layout. This result also provides examples of aspects that must be considered when designing a healthy library layout and design. This research is conducted in one academic library. Hence, the results still need to be tested in other libraries to conduct the next research in different types of libraries.

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