

An empirical study of analyzing impact of seasonal changes on performance of manual work

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Abstract: Humidity conditions and temperature level constitute important part of surroundings which determine productivity level of human resource engaged in manual work. The performance and productivity of human resource often gets affected with the change in humidity level and temperature level. The weather conditions in India considerably varies across different parts of the country as well as changes quite significantly during a year also. With these facts at the background, the present study has been conducted to examine the impact of change in seasonal /weather conditions on the performance of workforce engaged in manual work. The outcome of the study would be useful for many employers hiring people for manual work as it would enlighten them with the necessary changes to be made at their workplace for improving performance and productivity of their workers. The opinion of workers engaged in manual work regarding impact of seasonal conditions such as temperature and humidity on their performance were sought using a convenience sampling method. The data collected during the course of study was subjected to non parametric tests – Freidman Anova and Wilcoxon Signed Rank test and meaningful interpretations were made.

Introduction

Productivity and performance of manual work largely depends on the surrounding of working conditions. Realizing the importance of surroundings on the performance level of employees, most of the employers in India have updated their office infrastructure and made the surroundings conducive for employees to work for long hours without getting fatigue. Though, such changes have been effected for employees engaged with desk work but such requirement are lacking in factories and closed compartments where employees are engaged in some kind of manual activity. It has been observed that maintenance of appropriate humidity level and temperature level can help in improving performance of employees besides maintaining their physical fitness and health.

Research Methodology

The opinion of workers engaged in manual activity such as plumber, labour, cooking, mechanic ,etc were sought regarding their inquisitiveness to perform their job and their performance level during different seasons in a year . The four periods for which their responses were sought include March , June , October and December. They were suggested to express their performance level on the scale of 0 – 10 with ‘0’ being the least and ‘10’ as maximum. The responses of the twenty workers were sought , as shown below in table 1:

Respondent	March	June	Oct	Dec
1	8	6	8	6
2	8	6	8	6
3	7	6	8	6
4	7	6	7	6
5	8	7	7	6
6	8	6	7	6
7	9	7	7	6
8	7	6	7	6
9	7	6	7	6
10	7	7	7	6
11	8	6	8	6
12	8	6	8	5
13	9	7	8	5

14	8	6	8	6
15	9	6	8	5
16	8	6	8	6
17	9	7	8	5
18	8	6	8	6
19	8	7	7	5
20	9	6	7	6

Table 1: Rating of Performance level assigned on the scale of 0 to 10

It can be observed from the above table that most of the respondent assigned low scores for the months of June and December where as higher scores are assigned for the month of March and October. As the sample for the study has been chosen from the region of Delhi and NCR , the weather conditions are at their extreme during the month of June (peak summer) and December (peak winter). Thus, broadly it can be concluded that productivity or performance level gets affected with the change of seasonal conditions and it does not remain same throught out the entire year. As the data collected is non parametric in nature and has been conducted on same set of respondents, Freidman Anova test was used to examine the statistically significant difference in the scores assigned by respondents followed by Wilcoxon Sign ranked test to examine the difference between two sets.

Analysis and Interpretation of data

The descriptive statistics of the responses given by different workers is given in table 2:

	N	Mean	Std. Dev.	Min	Max
ProdMarch	20	8.0000	.72548	7.00	9.00
ProdJune	20	6.3000	.47016	6.00	7.00
ProdOct	20	7.5500	.51042	7.00	8.00
PrdDec	20	5.7500	.44426	5.00	6.00

Table 2: Descriptive Statistics

It can be observed that mean values and standard deviation of all the four periods are different which shows that the productivity level of the respondents varies with the period. In order to examine, if these differences are statistically different or not, Freidman Anova test was employed on the available data and the output of the same is shown below in table 3:

Friedman Test

Ranks		Test Statistics ^a	
	Mean Rank		
ProdMarch	3.65	N	20
ProdJune	1.83	Chi-Square	52.544
ProdOct	3.23	Df	3
PrdDec	1.30	Asymp. Sig.	.000

Table 3: SPSS output of Freidman Test

As can be observed from the output shown in table 3 , p-value is less than 0.05 which indicates that our hypothesis that there is no significant difference among productivity level over different period gets rejected and statistically confirms that there is significance difference in productivity level at different period. The mean ranks for the month of March and October are higher than mean ranks of June and December which reflects that productivity level during these months are better than the month of June and December. In order to further analyse the data, difference in the productivity level during the month of March and October was examined using Wilcoxon Signed Rank test.

The output of the same is shown below in table 4:

		Ranks		
		N	Mean Rank	Sum of Ranks
ProdOct - ProdMarch	Negative Ranks	8 ^a	5.13	41.00
	Positive Ranks	1 ^b	4.00	4.00
	Ties	11 ^c		
	Total	20		

a. ProdOct < ProdMarch

b. ProdOct > ProdMarch

c. ProdOct = ProdMarch

Test Statistics ^a	
ProdOct – ProdMarch	
Z	-2.310 ^b
Asymp. Sig. (2-tailed)	.021

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 4: SPSS output of Wilcoxon Singed Rank Test comparing productivity of Oct and March.

The output shown in table 4 reflects that there is no significance difference between productivity level for the month of October and March as the p-value is greater than 0.05. The productivity level for Oct and March has been equal in case of 11 respondents, productivity level for the month of Oct was observed to be less than March in case of 8 respondents whereas only one respondent assigned higher level for October than March. On the similar lines, the difference in productivity level of June and December was analysed using Wilcoxon Signed Rank test , the output for the same is shown below in table 5.

Wilcoxon Signed Ranks Test

		Ranks		
		N	Mean Rank	Sum of Ranks
PrdDec - ProdJune	Negative Ranks	8 ^a	4.50	36.00
	Positive Ranks	0 ^b	.00	.00
	Ties	12 ^c		
	Total	20		

a. PrdDec < ProdJune

b. PrdDec > ProdJune

c. PrdDec = ProdJune

Test Statistics ^a	
PrdDec - ProdJune	
Z	-2.598 ^b
Asymp. Sig. (2-tailed)	.009

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 5: SPSS output of Wilcoxon Singed Rank Test comparing productivity of Dec and June.

The output shown in table 5 reflects that there is significance difference between productivity level for the month of December and June as the p-value is less than 0.05. The productivity level for December and June has been equal in case of 12 respondents, productivity level for the month of December was observed to be less than June in case of 8 respondents whereas no respondent reported higher productivity level for December than June.

Conclusion

The study concludes that seasonal or weather changes in the working environment significantly impacts the performance of manual activity. It is therefore necessary for companies to maintain appropriate humidity level and temperature level at their working place so as to enhance the productivity and performance of their employees. Such a provision would enable employees to perform their duties in a more comfortable manner. The annual schedule of the work shall be planned keeping in view the changes in seasons and higher commitments shall not be expected from the employees, on field work, during the period of peak winters and summers. The schedule of activities shall be aligned in tandem with the seasonal changes particularly those engaged in external activities involving field jobs, survey studies, etc.

References

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