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To Study the Impact of Mediating Role of the Learning Strategies between the Knowledge Characteristics of a Job and Employee Innovation Process

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Abstract

This study explains conceptual model that elucidates how work based learning strategies are playing mediating role between the knowledge characteristics of a job and employee innovation process. Knowledge characteristics of job are playing role as independent variable and the key component of this variable is problem solving. . The work based learning strategies is mediating variable and the key factor of this variable is cognitive learning strategies. The dependent variable is innovation process. A survey methodology is adapted for this research. Population frame is the software engineers. Simple random sampling technique is used. The questionnaire is used as a research instrument. For analyzing the data, apart from descriptive statistics, the regression analysis is conducted for testing hypotheses. The result shows that problem solving has positive impact on the innovation process during direct relationship. The problem solving also has positive impact on the innovation process through the mediation of cognitive learning strategies.

Keywords: Performance; Learning strategies; Organization

Introduction

The research in the domain of Job Design is trying to develop the mechanisms through which knowledge characteristics of a job has positively effect on the output of the employees in the form of innovative behavior, well-being and performance. The work based learning strategies has been suggested as one type of mechanism [1]. The knowledge characteristics of a job and work based learning strategies mechanism encourages the employees to learn about the job and enable them to perform effectively and efficiently. The previous studies findings support that the employee outcomes are task performance [2] and well-being [3,4] due to the mechanism between the job design and work based learning strategies. This mechanism also helps the employee in the idea generation, promotion and implementation within the organizations [5]. The job design represents the characteristics of the job. Knowledge characteristic of a job is a part of job design. It is important to identify the effect of knowledge characteristics on the innovation process via direct or through mediating role of work based learning strategies. After the identification of this affect, the organizations can improve or promote the employee innovation process by coalescing knowledge characteristics with interference to enhance work based learning strategies. The previous studies support directly the relationship of problem solving [6] and skill variety with the employee learning. The employee learning is directly associated with innovation [7]. The results of these studies did not elaborate the mechanism through which job design affect the employee innovation process. This article proposes a mechanism; it explains the knowledge characteristics effect on the innovation through work based learning strategies. The key component of the knowledge characteristics of a job is problem solving. Problem solving engrosses innovating idea, generating idea, solving non routine problems, and preventing from error [8]. The key component of the work based learning strategies is cognitive learning strategy and behavioral learning strategy. The employee uses this learning strategy to get and organize the knowledge [9]. Cognitive learning strategies elaborate the new information in the light of existing information and originate the principal, creating scheme and key issues. The employee innovation process consists of three different categories. First is idea generation, the concept of idea generation is similar with the concept of creativity. The idea generation in the innovation process should reflect newness and originality. The next in innovation process is idea promotion. This stage proposes the new ideas to employees and organization and getting the support of the idea. The final stage of the innovation process is idea implementation. In this stage new ideas are amalgamated within the organizational process (Figure 1).

Theory and Hypotheses Development

The problem solving effect on cognitive learning strategies and innovation

Knowledge characteristics are the part of job design. The first part of conceptual model explains the relationship between the knowledge characteristics and work based learning strategies. This model proposes that problem solving will recognize the use of cognitive work based learning strategies. The problems are obstacles for employees to attain goals and task performance. Due to this, the employees deploy the different skills and problem solving techniques through work based learning strategies. The work based learning strategies did not provide surety of the solution of problem. Problem solving is commonly regarded as most significant cognitive activity in the professional context. The familiar educational settings are required for learning to solve the problems [10]. The employees learn from the past precedence's, events, situations and happenings when an employee's identify similarities of the current problem with the previous ones. The old problem gives the solution pattern of the new problem. This sort of solution guides the individual's to creativity [11]. Psychological theory

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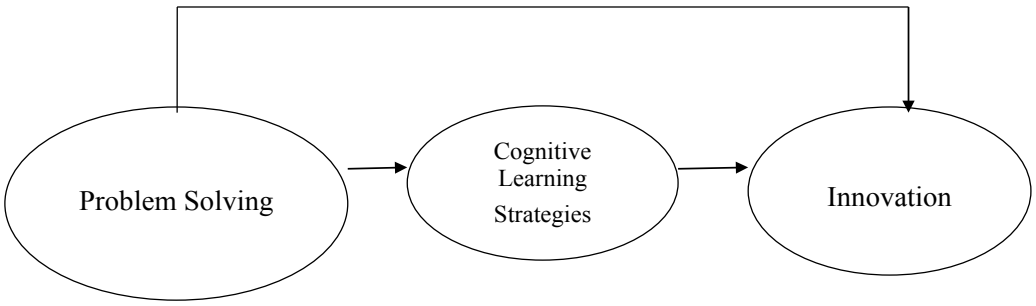

Figure 1: Theoretical model.

explains that problem solving leads to students for gaining knowledge and learns about thinking strategies. The learning due to the problem solving assists the students for developing learning strategies. The problem solving inventing theory explains knowledge base, practical methodology, technology according to model and tool sets for problem solving and developing new ideas. This theory consists of first, specific problems convert into general problem, second is finding the typical solution of general problems and third is get the solution of specific problem from converting the typical solution into specific solution [12]. This theory examines the challenges about the problems where innovation is needed. This theory applied in different categories of industries, including process development [13,14], eco-innovation [15], and service innovation (Table 1) [16].

H_1: Problem solving has positive impact on the Innovation.

The cognitive learning strategies effect on innovation

The learning strategies encourage knowledge acquisition for job context and task. The cognitive learning strategies assume dual procedure models of cognition. One is Intentional mode and second is analytical mode of cognition. These modes motivate to learn the new rules, facts and knowledge of organization [17,18]. Cognitive work based learning strategies is considered as example of premeditated and intentional approaches of thoughts in which effort and time deliberately spent on topic. The cognitive work based learning strategies encourage the employees to knowledge acquisition and elaborate new information by investigating the implications of novel information from the existing knowledge. The consequences of cognitive work based learning strategies on knowledge gaining have considered in the circumstances of everyday work. Knowledge acquisition in workplace setting and training has been linked with experimental application strategies [19]. The theoretical and experimental evidence proposes that cognitive work based learning strategies endorse the knowledge acquisition or gaining. It is suggested that knowledge acquisition through work based learning strategies develops potential to generate and create novel and useful ideas [20]. Many theoretical perceptions encourage this idea. Amabile's [21] componential theory explains knowledge acquisition is a fundamental element to develop new ideas and increase potential of peoples or employees to amalgamate information for generating new different ways. The potential of the peoples or employees intensify by organized knowledge according to common principles comparatively unrelated information [22]. An insinuation from cognitive load theory explains that the enhancement in knowledge helps to decrease the burden on working memory when present situation demonstrated as problem solving and learning. This theory can be applied to relevant cognitive activities, such as find solution of problem or create a new idea [23]. Both theories suggest that the relevant domain knowledge acquisition has positive relationship between the creativity. The results of empirical studies show that expert employees (higher level of knowledge) are more innovative and create new ideas than employees who have less knowledge [24]. The researcher argued in this study that job characteristics manipulate cognitive work based learning strategies. The cognitive work based learning strategies effect on the innovation process. The job design has effect on the innovation. Pervious results of empirical studies show that the job design has relation with task performance. The skill utilization plays a mediating role between the relationship of job design and well-being of employees.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.499[a]	0.249	0.236	0.52731
2	0.552[b]	0.305	0.281	0.51155

[a]Predictors: (Constant), PS.

[b]Predictors: (Constant), PS, CLS.

Table 1: Model summary.

H_2: Problem solving has positive impact on the Innovation through mediation role of cognitive learning strategies.

Research Methodology

The research approach is quantitative. Quantitative research is essential about collecting numerical data to explain a particular phenomenon. A survey methodology is adapted for this research. Population frame is the software engineers. Simple random sampling technique is used and unit of analysis is individual. The sample size is calculated with the help of statistical formula. The data for this research will be gathered using a questionnaire. For analyzing the data, apart from descriptive statistics, the traditional statistic for testing hypotheses will be used.

Measures

The developed scale of Barkman and Machtmes [25] is used to measure the problem solving. The total items of the scale are 24. The response point of scale consists of five points used (1=Never, 5=Always). The developed scale of Holman et al. [26] is used to measure the Cognitive learning strategies. The total items of the scale are 8. The response point of scale consists of five points used (1=Not a lot, 5=A great deal). The developed scale of Holman et al. is used to measure the Innovation. The total items of the scale are 9. The response point of scale consists of five points used (1=Not a lot, 5=A great deal).

Demographic statistics

In the gender statistics it can be observed that both male and female participated as respondents. Male and female respondents are 49 and

11 out of total 60 valid responses i.e. 81.7% and 18.3% respectively. The reflection of male dominance is visible from the statistics. Both married and single respondents participated in the survey. Married and single respondents are 12 and 48 out of total 60 valid responses i.e. 20% and 80% respectively. The reflection of single dominance is visible from the statistics. The respondent's age divided in the four groups; first group falls between the 21-30 years old, the second group falls between the 31-40 years old, the third group falls between the 41-50 years old and lastly greater than 50 years old. The age of 50 respondents fall between the 21-30 years old which is 83.3% of the total respondents. The age of 7 respondents fall between the 31-40 years old which is11.7% of total respondents. The age of 3 respondents fall between the 31-40 years old which is 5% of total respondents. The result shows that majority of respondent's falls in 21-30 years old group. The respondent's qualification divided in the two groups; first group has 16 years education and second group has above 16 years education. The 39 respondents have 16 years education which is 65% of the total respondents. The 21 respondents have above 16 years education which is 35% of total respondents. The majority of respondents have 16 years education. The respondents were categorized into five categories on the basis of salary. First category was less than 20, second category is 21-40, third was 41-60, fourth was 61-80 and 81-100 thousands rupees salary of respondents. The majority of respondents get less than 20 thousand salaries. This survey envisaged on a sample of people having different length of experiences. It was important to analyze the data from view point of experience of respondents. The majority of respondents have up to five years' experience.

Testing assumptions of regression

The regression analysis is based on specific assumptions. The assumptions of regression are linearity, multi co-linearity, normality and homoscedasticity. The assumption of normality examined through the graphical technique by histogram. The assumptions of linearity and homoscedasticity examined through scatter plots diagram. The assumption of the multi co-linearity examined through the correlation matrix.

Regression analysis

The purpose of regression analysis is to check the relationship between the independent variables with dependent variable. In the regression analysis examined the individual impact of the independent variable on the dependent variable, quality of the goodness of the model, significance of the model and strength of the relationship between the independent variables and dependent variable.

- The R^2=0.25 of model 1 indicates that the problem solving predictor explains 25% variance in Innovation.
- The R^2=0.305 of model 2 indicates that the problem solving predictor explains 30.5% variance in Innovation.
- The p<0.05 shows that at least one variable plays significant role in the both model.

The p value for PS<0.05 which shows significant relationship between PS and IN and is interpretable. It means significant positive relationship exists between PS and IN (β=0.428, p<0.05) showing IN will increase by 0.428 units for every one unit increase in PS, keeping all other predictors constant in model 1. The p value for PS<0.05 which shows significant relationship between PS and IN and is interpretable. It means significant positive relationship exists between PS and IN (β=0.359, p<0.05) showing IN will increase by 0.359 units for every one unit increase in PS, keeping all other predictors constant in model 2. The p value for CLS<0.05 which shows significant relationship between CLS and IN and is interpretable. It means significant positive relationship exists between PS and IN (β=0.223, p<0.05) showing IN will increase by 0.223 units for every one unit increase in PS, keeping all other predictors constant in model 2 (Tables 2 and 3).

Conclusion

This research tested a conceptual model of the knowledge characteristics (problem solving) learning mechanism (cognitive learning strategies) in relation to innovation. The result shows that problem solving has positive impact on the innovation process during direct relationship. The problem solving also has positive impact on the innovation process through the mediation of cognitive learning

Model		Sum of Squares	D_f	Mean Square	F	Sig.
1	Regression	5.339	1	5.339	19.2	0.000[a]
	Residual	16.127	58	0.278		
	Total	21.466	59			
2	Regression	6.55	2	3.275	12.514	0.000[b]
	Residual	14.916	57	0.262		
	Total	21.466	59			

[a]Predictors: (Constant), PS.

[b]Predictors: (Constant), PS, CLS.

[c]Dependent Variable: I.

Table 2: ANOVA[c].

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	Constant	2.011	0.378		5.318	0.000
	PS	0.428	0.098	0.499	4.382	0.000
2	Constant	1.492	0.439		3.396	0.001
	PS	0.359	0.1	0.418	3.587	0.001
	CLS	0.223	0.104	0.251	2.151	0.036

[a]Dependent Variable: IN.

Table 3: Coefficients[a].

strategies. This model confirms the mediating relationship of cognitive learning strategies between the problem solving and innovation. This conceptual model can guide future research in this particular area, which could focus on the wider set of variables related to the knowledge characteristics for improving innovation in organization.

References

1. Parker SK, Wall TD, Cordery JL (2001) Future work design research and practice: Towards an elaborated model of work design. Journal of Occupational and Organizational Psychology 74: 413-440.
2. Wall TD, Jackson PR, Davids K (1992) Operator work design and robotics system behavior: A serendipitous field study. Journal of Applied Psychology 77: 353-362.
3. Holman DJ, Wall TD (2002) Work characteristics, learning-related outcomes, and strain: a test of competing direct effects, mediated, and moderated models. Journal of Occupational Health Psychology 7: 283-301.
4. Taris TW, Kompier MAJ, De Lange AH, Schaufeli WB, Schreurs PJG (2003) Learning new behavior patterns: A longitudinal test of Karasek's active learning hypothesis among Dutch teachers. Work and Stress 17: 1-20.
5. Rank J (2004) Three Avenues for Future Research on Creativity, Innovation, and Initiative. Applied Psychology 41: 108-528.
6. Hmelo-Silver CE (2004) Problem-Based Learning: What and how do Students Learn. Educational Psychology Review 16: 235-266.
7. Janssen O (2000) Job Demands, Perceptions of Effort-Reward Fairness and Innovative Work Behaviour. Journal of Occupational and Organizational Psychology 73: 287-302.
8. Morgeson FP, Humphrey SE (2006) The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. Journal of Applied Psychology 91: 1321-1339.
9. Holman D, Epitropaki O, Fernie S (2001) Understanding learning strategies in the workplace: A factor analytic investigation. Journal of Occupational and Organizational Psychology 74: 675-681.
10. Janssen O, Van Yperen NW (2004) Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. Academy of Management Journal 47: 368-384.
11. Hargadon AB, Bechky B (2006) When collections of creatives become creative collectives: A field study of problem solving at work. Organization Science 17: 484-500.
12. Wang CH (2015) Using the theory of inventive problem solving to brainstorm innovative ideas for assessing varieties of phone-cameras. Computers and Industrial Engineering 85: 227-234.
13. Sheu DD, Hou CT (2013) TRIZ-based trimming for process-machine improvements: Slit-valve innovative redesign. Computers and Industrial Engineering 66: 555-556.
14. Yeh CH, Huang JCY, Yu CK (2011) Integration of four-phase QFD and TRIZ in product R&D: A notebook case study. Research in Engineering Design 22: 125-141.
15. Chai K, Zhang J, Tan K (2005) A TRIZ-Based Method for New Service Design. Journal of Service Research 8: 48-66.
16. Su CT, Lin CS (2008) A case study on the application of Fuzzy QFD in TRIZ for service quality improvement. Quality & Quantity 42: 563-578.
17. Craik FIM (2002) Levels of processing: Past, present and future? Memory 10: 305-318.
18. Smith ER, DeCoster J (2000) Dual-process model in social and cognitive psychology: Conceptual integration and links to underlying memory system. Personality and Social Psychology Review 4: 108-131.
19. Sonnentag S, Kleine B (2000) Deliberate practice at work: A study with insurance agents. Journal of Occupational and organisational psychology 73: 87-102.
20. Zhang F, Yang M, Liu W (2014) Using integrated quality function deployment and theory of innovation problem solving approach for ergonomic product design. Computers and Industrial Engineering 76: 60-74.
21. Amabile TM (1983) The social psychology of creativity: A componential conceptualization. Journal of Personality and Social Psychology 45: 357-376.
22. Amabile TM (1988) A model of creativity and innovation in organizations. In: Staw BM, Cummins LL (eds.) Research in organizational behavior. Greenwich, CT: JAI Press, Vol. 10, pp: 123-167.
23. Renkl A, Atkinson RK (2003) Structuring the transition from example study to problem solving in cognitive skill acquisition: A cognitive load perspective. Educational Psychologist 38: 15-22.
24. Christiaans H, Venselaar K (2005) Creativity in design engineering and the role of knowledge: Modelling the expert. International Journal of Technology and Design Education 15: 217-236.
25. Barkman S, Machtmes K (2002) Four-fold: A research model for designing and evaluating the impact of youth development programs. News and Views 4: 4-6.
26. Holman D, Totterdell P, Axtell C, Stride C, Port R, et al. (2012) Job Design and the Employee Innovation Process: The Mediating Role of Learning Strategies. Journal of Business and Psychology 27: 177-191.