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Leveraging Correlates of Innovative Teacher Behaviour for Educational Development in Developing Societies

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Abstract The public system of elementary education in developing countries is often criticized for its poor performance, but a better understanding of the innovative teachers in this system who achieve their educational goals might offer insights for teacher development. What are the specific individual factors associated with the performance of such teachers? We draw on on-going work to identify the correlates of innovative work performance of government school teachers. It was hypothesized that intrinsic motivation and creative self-efficacy were high correlates of workplace innovative performance, openness to experience and proactivity, perceived job complexity and learning orientation of teachers were moderate correlates, and demographic factors were weak correlates. Three hundred and forty seven teachers were selected by systematic circular random sampling from 5650 teachers whose work had been peer-rated for innovativeness and performance. Intrinsic motivation of teachers was found to be the most significant correlate of innovative performance, along with qualification in a teacher eligibility test conducted by the government. All other factors did not seem to be critical. One implication for large-scale teacher training is the design of a model of professional development which relies on the principle of learning from the motivated teachers—those who have realized their educational goals, regardless of the constraints that are a feature of the more general educational context. This is best done through decentralized peer-driven teacher networks that seek to highlight the work of the innovative teachers as motivational triggers for the wider teaching community.

Keywords: *teacher-driven innovation, intrinsic motivation, self-efficacy, teacher eligibility test*

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1. Introduction

The role of innovative teachers in improving the performance of the public elementary schooling system in developing countries like India has been recognized in recent times [13]. This system continues to play a significant role in ensuring access to education to sizeable sections of the population of these countries. In India, estimates of the proportion of children attending government primary schools vary from 74 percent [33] to 67 percent [20]. However, the public system has been criticized for the poor quality of its education, especially for the disadvantage that children of socio-economically deprived communities face in matters of educational attainment [9,19]. It is in this context of poor performance that the work of innovative teachers who have achieved their educational goals in spite of the constraints that affect the teacher population as a whole, assumes significance. Ongoing work in India with government school teachers (the 'Educational Innovations Bank' project, www.inshodh.org), a freely-accessible forum for innovative teachers indicates that the incentive for innovation has to be located in the social value that the teachers' work creates [14]. However, the specific individual factors that are associated with the teachers' performance need to be better understood. More specifically, how important, in a developing country context, is an intrinsically motivated teacher? How important are other correlates of innovative behaviour that have been identified in literature: self-efficacy, a proactive personality, a learning orientation, openness to experience, perceived job complexity and some personal background characteristics like education? Understanding which factors are critical, and need to be addressed, is of practical importance given the increasing focus on large-scale teacher training as a means to promoting educational attainment in the public system [34].

2. Conceptual Framework

Work on the antecedents of workplace innovation done in developed country contexts has identified intrinsic motivation and creative self-efficacy as important predictors, some personality factors as moderately strong correlates, and demographic factors as weak correlates [16,23,28,37,46]. Studies of teacher-developed workplace innovations in schools, especially in developing country contexts, are rare— Ouyang [36] is a study of a single teacher in China and Chand [13] is an analysis of about 160 teacher-driven innovations; McGeown [32] studied teacher innovativeness as teachers' attitudes to, and

adoption of, external innovations, teachers' change-related values, and their participation in change-related activities. This paper seeks to add to this literature by testing whether the correlates of workplace innovative behaviour identified in developed country contexts hold in the public schooling contexts of developing societies.

2.1. Teacher-driven Workplace Innovation

Ongoing work at the Ravi J Matthai Centre for Educational Innovation on teacher-developed educational initiatives resulted in the rating of the work of 5650 teachers (as of June 1, 2015) by a team of expert teachers on the dimensions of innovativeness. The ratings resulted in the ranking of the teachers' work on an innovativeness scale, ranging from strongly innovative to weakly innovative. Teacher developed innovation was defined as an educational practice, a classroom method, a teaching-learning aid or an extra school action that is a "step-change" from previous practice that has managed an achievement [14,29]. The requirements of a workplace initiative to qualify as an innovation were developed in an earlier study [13] and included a novel or unique response to an educational problem, stages of development, trial, evaluation, modification and a set of results showing improvement. The innovativeness of the work was then rated on novelty in the activity, contextual difficulty (as indicated by school's history, location and socio-economic status of the village), scope and complexity of the activity, and the spread effect of the teacher's work. These definitions and criteria are in line with the requirements for characterizing workplace innovation, especially in public services [8,28,29,37,38].

2.2. Correlates of Workplace Innovative Behaviour

Hammond et. al. [28] identify intrinsic motivation as one of the main factors associated with individual workplace innovation. An intrinsically motivated state is conducive to creativity, whereas an extrinsically motivated state may be detrimental [1,2]. People are said to be intrinsically motivated to engage in a particular task if they view their task engagement as motivated primarily by their own interest and involvement in the task. Bandura [10] cited strong self-efficacy as a necessary condition for creative productivity and the discovery of "new knowledge." Tierney and Farmer [42] extend the concept to creative self-efficacy, a person's ability to be creative at work, and note that it predicts employee creativity more than mere confidence to do a job well.

Learning orientation, as a relatively new concept, focuses on the acquisition of knowledge and developing processing strategies that facilitate mastery of challenging tasks [25]. Skill development associated with learning orientation implies an intrinsic interest in understanding a task and mastery in its performance, in order to develop competence [21,22,45]. Individuals with a positive learning orientation look forward to challenges that provide them with learning opportunities and enhancement of knowledge and skills [7,5,26].

Learning orientation may also be related to openness to experience—the extent to which an individual is imaginative, sensitive to aesthetics, curious, independent in thinking, and amenable to new ideas, experiences and perspectives [15,30,31]. People with higher openness to experience have a variety of feelings, thoughts, perspectives which help them to be adaptable to changing circumstances and think and come up with innovative ideas at the workplace [31].

Two other factors identified in literature are proactive behaviour and perceived job complexity. Proactive behaviours are associated with positive individual and organizational outcomes, such as enhanced salaries, promotions and awards, higher performance [40,41,43,44]. People high on proactivity are relatively unconstrained by situational impediments and are able to achieve effective changes, solve problems, look for opportunities as compared to people low in proactivity who are passive and less reactive [10]. Design of jobs affects employee creativity and innovation at work [3,27,35]. Complex, challenging jobs (i.e., those characterized by high levels of autonomy, skill variety, identity, significance, and feedback) are expected to support and encourage higher levels of motivation and creativity than are relatively simple, routine jobs [17,27]. When jobs are complex and challenging, individuals are likely to be excited about their work activities and interested in completing these activities in the absence of external controls or constraints.

Hammond, et al. [28] identify certain background demographic variables, such as educational status, gender and age, as weak predictors of innovative behaviour. We include these factors in the present study, but add another background variable, qualification in the Teacher Eligibility Test, a test for teachers that is administered by the provincial government in the province where this study was undertaken.

Based on the above review, it was hypothesized that: (1) intrinsic motivation and self-efficacy would be strongly correlated to innovative performance of teachers; (2) learning orientation, openness to experience, proactive behaviour, perceived job complexity would be moderately correlated with innovative performance of teachers; and (3) demographic variables would be weakly correlated with innovative performance of teachers.

3. Methods, Measures and Analytical Procedures

The 5,650 teachers from government elementary (grades 1 to 8) schools in the province of Gujarat, in western India, who had been rated on their innovativeness, were ranked in descending order by their innovation scores, and 350 of them selected using the circular systematic random sampling method. Three teachers turned out to be outliers, and in order to ensure normality of the dependent variable, these three teachers were dropped, leaving 347 in the sample. Apart from the variables listed earlier, the background demographic variables considered included age, gender, educational qualification, caste (a marker of social identity indicating membership in a particular social category, and used to identify people eligible for affirmative action in education and employment; individuals belong to certain castes or tribes listed in the Indian Constitution, and to social groups called Other Backward Classes, are eligible for such affirmative action), and Teacher Eligibility Test status (qualified or not in a test run by the provincial

government). The profile of the 347 teachers is given in Table 1.

Table 1.

Demographic Detail	Frequency	Percentage
Sex		
Male	244	70.3
Female	103	29.7
Caste		
General	145	41.8
Scheduled Caste	42	12.1
Scheduled Tribe	20	5.8
Other Backward Classes	140	40.3
Educational Qualification		
Primary Teachers' Certificate	109	31.4
Graduate degree	102	29.4
Postgraduate degree	129	37.2
Doctorate	6	1.7
Teacher Eligibility Test		
Yes	137	39.5
No	208	59.9

Intrinsic motivation was measured using the 15-item Work Preference Inventory, WPI, [6]. The items cover (a) self-determination (preference for choice and autonomy), (b) competence (mastery orientation and preference for challenge), (c) task involvement (task absorption and flow), (d) curiosity (preference for complexity), and (e) interest (enjoyment and fun). Scores are computed as simple means of the relevant scale items. The reliability of the WPI for the data set, as measured by Cronbach alpha was 0.70. Creative self-efficacy was measured by Tierney and Farmer's [42] four-item measure, which measures employees' beliefs in their ability to be creative in their work. The items were scored as the sum of all the items. The reliability for the scale was 0.830.

Employee learning orientation was measured with Elliot and Church's [24] six-item learning orientation to work settings, with the result coded as the mean of all six items The Cronbach alpha for this scale was 0.76. To measure openness to experience, the relevant items from the Big Five Inventory, a self-report inventory designed to measure the Big Five dimensions, consisting of short phrases with relatively accessible vocabulary, has been used [12]. The reliability value for this scale was 0.74. A shortened 10-item version of the Proactive Personality Scale, PPS, [11], developed by Seibert et al. [39] for a large sample of business and engineering students, was used to measure individual differences in the inclination to take action and change the environment. The reliability, as measured by Cronbach alpha, was 0.87. Perceived job complexity was measured using the 21-item shortened version of Job Diagnostic Survey [27]. This instrument measures the degree to which jobs are designed to enhance work motivation and job satisfaction, assess affective reactions of individuals to their jobs, and measures readiness to respond to jobs with high potential. Various dimensions like skill variety, task identity, task significance, autonomy, feedback and various affective reactions to the job are measured. The items are scored as a sum of each job skill using the formula provided by Hackerman and Oldham [27]. The Cronbach alpha was 0.73.

The measures were administered personally by a trained team of data collectors in July 2015. Teachers were asked to ensure that they had answered all the questions before they returned the questionnaires, and so missing data was not a problem. The data was checked to ensure that it met the requirements for multiple regression analytical procedures. The dependent variable was checked for normality. All the six variables of interest were checked using scatter plots and p-p plots which indicate normal distribution. The data also showed homoscedasticity and no multi collinearity (Table 4), with VIF<10 and tolerance (T) >0.1.

Hierarchical regression analysis was used to analyse the relationship between teacher innovation and the hypothesized correlates. Gender, caste, work experience (as a proxy for age), educational qualification and TET status, were entered in the first level, since they were hypothesized to have weak effects. Employee learning orientation, openness to experience, proactive personality, and perceived job complexity, were entered in the second level, and finally intrinsic motivation and self-efficacy were added in the third level of hierarchical regression.

4. Results

Table 2 shows the percent of variability in the dependent variable as accounted for by all the predicted variables, through the R^2 change. It can be observed that the percent variability went up from 1.4 percent to 20.3 percent. The ANOVA (Table 3), reveals that the first model (with only the demographic variables) is not a significant model, but on adding all the other variables in models 2 and 3, significance is achieved (p=0.000). Table 4 shows how many of the predictors are statistically significant. It can be inferred from this table that in model 1, none of the demographic variables is significant but in model 2, TET status is significant. However, in level 3, only TET status and intrinsic motivation are identified to be significant correlates of teacher workplace innovative behaviour.

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.116[a]	.014	-.001	10.38562	.014	.932	5	340	.460	
2	.341[b]	.116	.093	9.88854	.103	9.760	4	336	.000	
3	.450[c]	.203	.176	9.42001	.087	18.128	2	334	.000	.608

It can be observed from models 2 and 3 that teachers who have qualified for the TET have a significant effect on innovation as compared to any other demographic variables. Also, in model 2, teachers' employee learning orientation has a significant effect on innovation. However, on adding intrinsic motivation of teachers in model 3, employee learning orientation is not significant anymore. Self-determination theory [18] identifies intrinsic motivation as performing an activity for an inherent satisfaction rather than for a separable consequence.

Intrinsically motivated teachers are able to engage in teaching activities with a full sense of volition along with self-determination to challenge their existing capabilities. Table 4 clearly represents this idea by showing that teachers high in motivation have the autonomy and competence to perform their activities with skill that enhances their innovative performance.

Table 3.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	502.587	5	100.517	0.932	.460[b]
	Residual	36672.8	340	107.861		
	Total	37175.4	345			
2	Regression	4320.2	9	480.022	4.909	.000[c]
	Residual	32855.2	336	97.783		
	Total	37175.4	345			
3	Regression	7537.35	11	685.214	7.722	.000[d]
	Residual	29638	334	88.737		
	Total	37175.4	345			

Table 4.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	S.E.	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	54.05	2.95		18.30	0.00	48.24	59.86					
	Sex	-0.32	1.25	-0.01	-0.26	0.80	-2.78	2.14	-0.03	-0.01	-0.01	0.95	1.05
	Caste	-0.26	0.42	-0.03	-0.61	0.54	-1.08	0.57	-0.04	-0.03	-0.03	0.93	1.07
	Education	1.27	0.82	0.11	1.54	0.12	-0.35	2.89	0.03	0.08	0.08	0.61	1.64
	TET	1.80	1.29	0.09	1.40	0.16	-0.74	4.35	0.06	0.08	0.08	0.74	1.35
	Work Experience	0.08	0.08	0.06	0.94	0.35	-0.08	0.24	0.04	0.05	0.05	0.64	1.57
2	(Constant)	14.79	6.94		2.13	0.03	1.14	28.44					
	Sex	-0.43	1.19	-0.02	-0.36	0.72	-2.78	1.92	-0.03	-0.02	-0.02	0.95	1.06
	Caste	-0.01	0.41	0.00	-0.01	0.99	-0.80	0.79	-0.04	0.00	0.00	0.91	1.10
	Education	1.23	0.79	0.10	1.56	0.12	-0.32	2.78	0.03	0.09	0.08	0.61	1.65
	TET	2.86	1.25	0.14	2.29	0.02	0.40	5.31	0.06	0.12	0.12	0.72	1.39
	Work Experience	0.06	0.08	0.05	0.81	0.42	-0.09	0.22	0.04	0.04	0.04	0.63	1.60
	Proactive personality	0.03	0.09	0.02	0.32	0.75	-0.15	0.20	0.20	0.02	0.02	0.64	1.55
	Employee Learning Orientation	2.99	1.15	0.19	2.59	0.01	0.72	5.26	0.28	0.14	0.13	0.52	1.94
	Openness to experience	0.27	0.16	0.12	1.70	0.09	-0.04	0.58	0.26	0.09	0.09	0.55	1.83
	Perceived job complexity	0.41	0.35	0.07	1.16	0.25	-0.28	1.10	0.22	0.06	0.06	0.72	1.39
3	(Constant)	-0.70	7.28		-0.10	0.92	-15.02	13.63					
	Sex	-1.12	1.15	-0.05	-0.98	0.33	-3.37	1.13	-0.03	-0.05	-0.05	0.94	1.07
	Caste	0.22	0.39	0.03	0.56	0.58	-0.55	0.98	-0.04	0.03	0.03	0.90	1.11
	Education	1.32	0.75	0.11	1.76	0.08	-0.16	2.79	0.03	0.10	0.09	0.61	1.65
	TET	2.52	1.19	0.12	2.12	0.04	0.18	4.86	0.06	0.12	0.10	0.72	1.39
	Work Experience	0.05	0.08	0.04	0.60	0.55	-0.10	0.19	0.04	0.03	0.03	0.62	1.61
	Proactive personality	-0.07	0.09	-0.05	-0.74	0.46	-0.24	0.11	0.20	-0.04	-0.04	0.58	1.72
	Employee Learning Orientation	1.45	1.19	0.09	1.22	0.22	-0.89	3.78	0.28	0.07	0.06	0.44	2.25
	Openness to experience	0.12	0.16	0.05	0.75	0.45	-0.20	0.44	0.26	0.04	0.04	0.47	2.12
	Perceived job complexity	0.26	0.34	0.04	0.75	0.46	-0.42	0.93	0.22	0.04	0.04	0.68	1.47
	Intrinsic Motivation	13.52	2.25	0.39	6.02	0.00	9.10	17.95	0.42	0.31	0.29	0.56	1.79
	Self-efficacy	-0.74	1.00	-0.06	-0.74	0.46	-2.70	1.22	0.25	-0.04	-0.04	0.37	2.67

5. Discussion

This paper sought to establish whether the antecedents of workplace innovation identified in developed country contexts were equally applicable to developing country contexts. One unique feature of the study reported here is its operationalization of innovative work performance. Rather than relying on supervisor ratings or self-assessments, the peer-ratings of the actual work done by teachers were used to construct the variable of innovative workplace behaviour. The literature cited earlier had identified intrinsic motivation and self-efficacy as significant correlates, some personality factors as moderately strong, and demographic factors as weak correlates. This study identifies intrinsic motivation as the single most important correlate of innovative workplace behaviour, thus supporting the argument that creativity, and innovation, are enhanced by intrinsic motivation [4]; teachers who display innovative workplace behaviour are more intrinsically motivated. However, creative self-efficacy does not seem to play the hypothesized significant role it was expected to. Perhaps, in the difficult contexts in which government schools operate, which call for a lot of experimentation and trial and error—for instance in ensuring regular attendance, getting children of certain socio-economically marginalized groups which have been traditionally excluded from education, and making the physical environment of schooling less intimidating—having a motivated teacher is more critical.

Other factors predicted to be moderate correlates, proactive personality, learning orientation, openness to experience and perceived job complexity, seem to be not critical. Having a motivated teacher overrides all other factors. As predicted, gender, work experience or age, and educational qualifications, were not significant as correlates. However, qualification in the TET (Teacher Eligibility Test) is a significant predictor. TET is a government-run examination for teachers, which is now mandatory for people seeking employment in government elementary schools. That is, the new teachers who are now employed in government schools will be TET-qualified. The test is aimed at improving standards in teaching, and should serve to identify teachers who are likely to be innovative. Combined with high intrinsic motivation, a good TET score should identify those teachers who can be role models for the wider teaching community, as innovators and teacher trainers.

6. Conclusion

Given the importance of motivation in innovative workplace performance, and hence improved educational outcomes, the single most important implication of this study for large-scale teacher training is the design of a model of professional development which relies on the principle of learning from the motivated teachers—those who have realized their educational goals, regardless of the constraints that are a feature of the more general educational context. This is best done through decentralized peer-driven teacher networks that seek to highlight the work of the innovative teachers as motivational triggers for the wider teaching community. Providing teachers an environment to showcase their autonomy, allowing them to solve new, difficult and complex problems, not just for augmenting their motivation levels, but for triggering off similar experiments in other contexts of deprivation, is a task for the administrators in charge of teacher development. Such an approach should complement the current training centre-based instructional models that inform teacher training in developing countries.

It should be recognized that much of the variation in innovative workplace behaviour remains unexplained. Motivation is no doubt a critical factor, but there seem to be other factors that are yet to be conceptualized. Further studies should focus on identifying these factors and exploring the role of motivation and a qualifying test in other contexts where government schools continue to play a critical role in educational development.

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