Developing and Validating a Questionnaire to Measure Some Factors of School Culture : A Psychometric Process

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Abstract

The purpose of this paper was to describe the process undertaken to evaluate the psychometric properties of a questionnaire developed to measure certain factors of school organization culture. Although various instruments are available to measure aspects of organization culture, instrument specific to measure school culture is limited. Factor analysis and construct validity tests (convergent validity and discriminant validity) were used to confirm the reliability and validity of the instrument. This study was non experimental, cross-sectional, and quantitative in nature. A questionnaire survey was conducted among 326 teachers in private and municipal schools in Mumbai. The response rate was 93%. Factor analysis of the 15 item instrument yielded a four-factor structure. The scale composite reliability values were found to be well above 0.7 and the average variance extracted values were also above the recommended value of 0.5. The study is an important contribution to the scarce research work in the field of school culture in India.

Keywords : convergent validity, discriminant validity, factor analysis, organization culture, primary school

JEL Classification : I200, I210, M000

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Organizational culture consists of a set of shared concepts that passes from a generation to another and practically is like an organization's personality (Hosseini, 2014). According to Schein (2004), culture plays a multifaceted role in shaping and stabilizing the present and provides a predictability in the behaviour of people and their actions. Researchers have given similar opinions with regards to importance of organizational culture across samples (Khan, 2016). Organizational culture provides a distinct identity to business and helps businesses gain a competitive advantage by relying on certain factors of organizational culture (Forehand & Von Gilmer, 1964 ; Hurn & Tomalin, 2013). Organizational culture has had different dimensions associated with its definition. Some studies have spoken about humane organizational culture characterized by employee friendly environment enabling an increase in quality of work life (Chalofsky & Griffin, 2005) ; while some spoke about a learning-culture in organizations to bring about successful change programs (Maria & Watkins, 2001). Many other studies considered basic assumptions, shared values and beliefs, and behavioural norms as aspects representing a common culture (Lepak, Takeuchi, Erhardt, &Colakoglu, 2006 ; Schein, 2004). There are various ways in which organization culture can be identified, namely, dress code, language, paralanguage, ceremonies, rituals, managerial styles, power index, and beliefs (Davies, Nutley, & Mannion, 2000 ; Ott, 1989 ; Schein, 1990).

There are a large number of instruments that have been used in various research studies to measure various aspects of culture. It has been seen that some instruments are very specific to certain organizations alone or to

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certain situations alone and hence, these cannot be used on a general level (Goll & Zeitz, 1991). Many instruments like the organizational culture inventory, the organizational culture profile (Cameron & Quinn, 2006) to assess person- organization fit (O'Reilly, Chatman, & Caldwell, 1991), or the competing values model (Quinn & Rohrbaugh, 1983) have been found to be applicable across situations.

Schools are the basic social institutions that help in the pupils' wider view of life and provide a young student with a variety of skills to hone. It is important that teachers understand the organization culture of their schools so as to enhance their performance (Tahir & Qadir, 2012; Zhu, Devos, & Li, 2011). New teachers are more prone to wavering in their decisions of remaining in the current school or in the profession itself, and hence, it is more important that they perceive the organizational culture to be conducive for their growth and decision of entering the occupation (Newmann & Wehlage, 1995).

A 2015 report by the UNESCO Institute of Statistics (UIS) has suggested that India is only second to Nigeria in terms of acute teacher shortage, and this translates to India wanting 3,70,000 new teachers for just primary education (Akash, 2016). Teaching is a profession taken by those who genuinely find it to be a vocation. It is very important that teachers feel loyal towards the school and contribute their best to the development of the school and pupils alike. Procedural justice refers to perceptions of employees about the transparency and fairness in various procedures that determine outcomes (Barsky & Kaplan, 2007). Procedural justice has been suggested to affect organizational outcomes in the Western context (Pillai, Williams, & Tan, 2001) but has not been studied to a large extent in the context of Indian primary school teachers. Trust implies the act of believing someone and being believed by the other party. When there is an environment of trust, people will be willing to take risks because they are certain about the predictability of the others' actions (Kane - Urrabazo, 2006). Empowerment implies the power given to employees by their authorities to make decisions and participate in the problem-solving process. When employees are empowered, they are more enthused to be involved in various issues of the organization and develop a positive attitude, which in turn enables the achievement of goals in a better fashion (Laschinger, Finegan, Shamian, & Casier, 2000). Every employee occupies a specific role in the group and responds to expectations of others through certain behaviours. Social support is perceived when individuals experience help from others and have access to tangible resources like materials, information, or intangible resources like empathy, information, care, appreciation, and help (Viswesvaran, Sanchez, & Fisher, 1999).

Social support as a job resource is excellent for coping as well as good performance. Studies in the recent past in the Indian context include: comparison of organizational culture between firms of the private and public sector (Rana & Garg, 2011), studies concerning the relationship between organization culture and job satisfaction in the automobile sector (Kulkarni, Kumar, & Janakiram, 2009), and studies that have explored the relationship of organizational culture and industrial relations (Roy, 2012). There are very few studies that have delved into exploring aspects of school culture and developing a questionnaire for the same in the Indian context.

Problem Statement

Although factors describing culture are present in research work, there is still skepticism on a precise definition of organization culture and the various aspects of the same. Although there are many instruments to measure organizational culture, researchers are constantly in search for a specific instrument to measure school culture (Maslowski, 2006; Scott, Mannion, Davies, & Marshall, 2003). The alarming shortage of teachers in schools in India strikes a frightening picture for the future. Teachers essentially spend a lonely time once they enter their classrooms and once outside, they are prone to multitasking.

Teachers are responsible for the all-round development of their students. Once they are out of their classrooms, they are answerable to the principal regarding progress of the students, answerable to the headmistress regarding completion of syllabus, exam work and booklet assessments, and are answerable to the innumerable number of parent queries on various aspects ranging from "how well is my ward doing in class? " to "what should I do

teacher, my son/daughter does not listen to anybody at home?" Teachers have to patiently answer these various queries. Teachers cannot carry their emotional baggage from home to school but the vice versa always remains true. Even at home, they have to keep thinking about the next day's schedule, structure of the class session, counseling any student for behavioural issues, and so on. On a vacation, most of the teachers spend time assessing answer sheets, setting time tables for the next term, planning for the subjects to be handled the next term, and devising methods to make their class interesting. Thus, there are times when a teacher would like to discuss these problems with colleagues, seek their ideas or inputs in the matter, and it is important that teachers perceive co-worker support, interpersonal trust, empowerment, and procedural fairness and transparency in the system so that they continue to remain on the job and are satisfied.

Empirical research of developing and validating a questionnaire to measure some factors of school culture in India is very limited. Also, understanding differences among municipal school and private school teachers with regard to interpersonal trust, empowerment, co-worker support, and procedural justice have been studied very sparsely in the Indian context.

Research Aim

The purpose of this study is to develop a questionnaire to assess some aspects of school culture, namely, procedural justice, empowerment, co-worker support, and interpersonal trust. The study further aims to explore whether there are differences in the scores of various aspects of culture mentioned among municipal school teachers and private school teachers.

Methodology

(1) Research Design : The study focuses on teachers' perceptions of aspects of organization culture, namely, procedural justice, empowerment, co-worker support, and interpersonal trust. This study is non - experimental, cross-sectional, and quantitative in nature. A survey research was conducted to collect information from school teachers. A questionnaire was used as the survey instrument for the said purpose.

(2) Sampling : The target population of the study included primary school teachers from municipal and private schools in Mumbai, India. The sample eligibility criterion was teachers' ability to read and write English. Schools were clustered according to geographic administrative zones of Mumbai, and two clusters were selected at random. Schools were selected at random from these clusters. All teachers of the selected schools responded to the questionnaire. I collected the responses personally. The study was conducted between June - December 2016. I distributed 350 questionnaires of which 326 were returned, yielding a 93% response rate.

(3) Instrument : The questionnaire consisted of 15 self-report items representing interpersonal trust, procedural justice, co-worker support, and empowerment, which were framed with reference to the literature review. Examples of items are,

- ↳ **Interpersonal Trust :** "Teachers trust each other in this school,"
- ↳ **Procedural Justice :** "Teachers are treated fairly in this school,"
- ↳ **Co-worker Support :** "Teachers readily ask for help from colleagues,"
- ↳ **Empowerment :** "Teachers are allowed to participate in decision making."

Responses were recorded on a 5 - point Likert scale ranging from 1= *'Strongly disagree'* to 5= *'Strongly agree'*.

(4) Sample Description : The sample consisted of primary school teachers from both private as well as municipal schools of Mumbai. It was observed that 71% of the sample respondents were women, 76% were married, and 60% held a graduation degree. The average age of the respondents in the sample was around 39 years and the average work experience was around 13 years. The respondents had two children on an average.

Data Analysis and Results

SPSS 19 was used for analysis of data.

(1) Methods to Establish Reliability and Validity of the Questionnaire : The methods used to validate the organizational culture questionnaire are : Factor analysis, construct validity (convergent and discriminant validity tests), and reliability tests (scale composite reliability).

(2) Factor Analysis : Factor analysis is a strong statistical method used during questionnaire development to club items into common factors and allow the researcher to interpret each factor based on item loading onto the factor (Bryman & Cramer, 2011). Initially, the factorability of the 15 items was examined. The Kaiser-Meyer-Olkin measure of sampling adequacy was .769, above the commonly recommended value of 0.6, and Bartlett's test of

Table 1. Factor Loadings and Communalities Based on a Principal Component Analysis with Oblimin Rotation for 15 Items of the Organization Culture Scale (*n* = 326)

Items	Interpersonal Trust	Procedural Justice	Co-worker Support	Empowerment	Communalities
Teachers trust each other in this school.	0.751				0.605
Teachers speak well of their colleagues in the school.	0.677				0.469
Teachers cooperate well with each other in the school.	0.650				0.466
Teachers listen to each other with an open mind.	0.582				0.518
Teachers rely on colleagues' advice for solving work related problems.	0.545				0.402
Teachers are treated fairly in this school.		0.818			0.668
All teachers are bound by the same rules and regulations.		0.666			0.515
Teachers are allowed to freely discuss and question before a decision is made.		0.658			0.524
Teachers respect their colleagues irrespective of their race, ethnicity, and other backgrounds.			-0.732		0.552
Teachers readily ask for help from colleagues.			-0.694		0.531
Teachers enjoy working together.			-0.655		0.490
Teachers resolve conflicts in a positive way.			-0.575		0.523
Teachers are allowed to participate in decision making.				-0.767	0.612
Authorities use a friendly approach rather than power to influence teachers.				-0.739	0.563
Teachers are permitted to take decisions they feel is right with regards to their work.				-0.581	0.484

spheritity was significant (χ^2 (105) = 911.972, $p < .01$). The diagonals of the anti-image correlation matrix were also all over 0.5. Finally, the communalities were all above 0.3 (see Table 1), further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable with all 15 items.

Principal component analysis was used because the primary purpose was to identify and compute composite scores for the factors underlying the organization culture questionnaire. Initial Eigen values indicated that the first

Table 2. Descriptive Statistics for the Organization Culture Scale (n = 326)

	Number of Items	Mean (SD)	Skewness	Kurtosis
Interpersonal Trust	5	20.852 (2.134)	- 1.713	7.130
Procedural justice	3	13.435 (1.225)	-0.244	-1.018
Co-worker support	4	16.625 (1.928)	-1.354	3.217
Empowerment	3	12.309 (1.562)	-1.892	7.442

Table 3. Convergent Validity for Organization Culture Scale (n = 326)

Construct	Items	Factor loading	Variance	Error	SCR	AVE
Interpersonal Trust	Teachers trust each other in this school.	0.654	0.427	0.346	0.86	0.56
	Teachers speak well of their colleagues in the school.	0.69	0.4761	0.31		
	Teachers cooperate well with each other in the school.	0.671	0.450	0.329		
	Teachers listen to each other with an open mind.	0.689	0.474	0.311		
	Teachers rely on colleagues' advice for solving work related problems.	0.622	0.386	0.378		
Procedural Justice	Teachers are treated fairly in this school.	0.769	0.591	0.231	0.86	0.681
	All teachers are bound by the same rules and regulations.	0.719	0.516	0.281		
	Teachers are allowed to freely discuss and question before a decision is made.	0.74	0.547	0.26		
Co-worker Support	Teachers respect their colleagues, irrespective of their race, ethnicity, and other backgrounds.	0.759	0.576	0.241	0.874	0.636
	Teachers readily ask for help from colleagues.	0.72	0.518	0.28		
	Teachers enjoy working together.	0.676	0.456	0.324		
	Teachers resolve conflicts in a positive way.	0.689	0.474	0.311		
Empowerment	Teachers are allowed to participate in decision making.	0.776	0.602	0.224	0.87	0.69
	Authorities use a friendly approach rather than power to influence teachers.	0.73	0.532	0.27		
	Teachers are permitted to take decisions they feel is right with regards to their work.	0.742	0.550	0.258		

Table 4. Discriminant Validity for Organization Culture Scale (n = 326)

Component	Interpersonal Trust	Procedural Justice	Co-worker Support	Empowerment
Interpersonal Trust	**0.681**			
Procedural justice	0.2**	**0.591**		
Co-worker support	0.428**	0.211**	**0.671**	
Empowerment	0.289**	0.272**	0.323**	**0.60**

Diagonal entries are Cronbach alpha coefficients : others are Pearson's correlation coefficient

** correlations are significant at 0.01 levels

four factors explained 24.442%, 10.639%, 9.154%, and 8.582% of the variance, respectively. The four-factor solution (see Table 1) which explained 52.81% of the variance was preferred because of : (a) the 'leveling off' of Eigen values on the scree plot after four factors; and (b) the difficulty of interpreting subsequent factors. There was little difference between the four factor varimax and oblimin solutions. Thus, both solutions were examined in subsequent analyses before deciding to use an oblimin rotation for the final solution. There were no cross loadings observed in the final structure.

The descriptive statistics for each of the four factors have been given in the Table 2. Convergent validity is established for the scale as it can be seen from the Table 3 that the standardized factor loading of each item is above 0.5, the scale composite reliability *(SCR)* is above 0.7, and the average variance extracted *(AVE)* is also above 0.5 (Fornell & Larcker, 1981). Discriminant validity (see Table 4) is also established as correlations between the factors are smaller than the Cronbach's alpha values in the corresponding row and column (Andaleeb & Conway, 2006 ; Gaski & Nevin,1985; Iyer, 2017; Richey, Genchev, & Daugherty, 2005).

(3) Independent Samples *t* - Test : The research study further aims to understand differences in teachers' scores on various aspects of organizational culture in municipal and private schools. An independent samples *t* - test was conducted to explore the above. The sample was checked for a few assumptions before conducting the *t*-tests.

(i) The dependent variables (interpersonal trust, procedural justice, co-worker support, and empowerment) are all measured on a continuous scale.

(ii) The independent variable has two categorical independent groups (Type of schools : municipal, private).

(iii) There is independence of observations with every participant belonging to only a single group. Care was taken during the design phase itself to avoid any duplication of membership.

(iv) The dependent variables were checked for normality.

It can be seen from the Table 2 that maximum absolute values of skewness and kurtosis of variables in the data are 1.892 and 7.442, respectively. It has been suggested in previous studies that when absolute values of skewness and kurtosis are less than 2 and 7, respectively, the data is assumed to be normally distributed (Curran, West, & Finch, 1996 ; Kim, 2013). It can be observed that components of interpersonal trust and empowerment are substantially non-normal in their distribution. In view of this, the non-parametric Mann Whitney U test is used with regards interpersonal trust and empowerment instead of independent *t*-tests.

(4) Differences in Teachers' Scores on Various Aspects of Organizational Culture in Municipal and Private Schools : The Levene's test for equality of variances shows that there is homogeneity of variances (since significance values are greater than 0.05, equal variances are assumed) that renders the data amenable for *t* - test (see Table 5).

An independent samples *t* - test was conducted to compare the procedural justice scores for teachers of municipal and private schools in Mumbai. There was no significant difference in scores for municipal school teachers $(M = 13.47, SD = 1.19)$ and private school teachers $[M = 13.39, SD = 1.25; t(324) = 0.558, p = 0.577]$.

An independent samples *t* - test was conducted to compare the co-worker support scores for teachers of municipal and private schools in Mumbai. There was a significant difference in scores for municipal school teachers $(M = 16.84, SD = 1.83)$ and private school teachers $[M = 16.42, SD = 1.99 ; t(324) = 1.97, p = 0.05]$. The magnitude of differences in means was small (eta squared = 0.011).

The Mann Whitney U test was conducted to explore differences in interpersonal trust scores and empowerment scores for teachers of private and municipal schools. It can be seen from the Table 6 that the *Z* value for

Table 5. Independent Samples *t* - tests (*n* = 326)

Component	Levene's test for equality of variances		t-test for equality of means	
	F	*Sig*	*T*	*Sig. (2 tailed)*
Procedural Justice	1.671	0.197	0.558	0.577
Co-worker support	2.406	0.122	1.97	0.05

Table 6. Mann Whitney U Test Statistics (*n* = 326)

	Interpersonal trust	Empowerment
Mann Whitney U	9986	12707
Z	-3.944	-.695
Asymp.Sig.(2-tailed)	0.000	0.487

interpersonal trust is -3.94 with a significance value of $p < 0.005$ and *Z* value for empowerment is -0.7 (rounded) with a significance of $p = 0.487$. Thus, it can be observed that there is a statistically significant difference in the interpersonal trust scores of teachers from municipal schools and private schools, but no statistically significant difference is observed in empowerment scores of municipal school teachers and private school teachers.

Discussion

The integrity and strength of a research process are dependent on the accuracy of the instrument used to measure the various aspects of a complex phenomenon like organization culture. The results of the factor analysis as well as construct validity (convergent validity and discriminant validity) show that the above questionnaire is a reasonably accurate measure of aspects of interpersonal trust, procedural justice, co-worker support, and empowerment. Although the Cronbach alpha values are hovering around 0.59 - 0.68, the scale composite reliability is well above 0.7 for all the factors ; hence, reliability is also adequate to measure some factors of organization culture in schools. Thus, the questionnaire developed possesses both validity as well as reliability for further use.

Further analysis shows that there are significant differences in the interpersonal trust scores and co-worker support scores of municipal school teachers and private school teachers. The mean scores of municipal school teachers on interpersonal trust and co-worker support are higher than the corresponding scores of private school teachers.

Municipal schools are schools run by the Brihanmumbai Municipal Corporation (BMC) to provide primary education at a low cost. BMC also provides free notebooks, uniforms, shoes, flavoured milk, midday meals to umbrellas and raincoats as incentives for students to enroll themselves and relieve parents of the financial burden of these daily school items. Despite all this, the drop our rates are very high in municipal schools (Raghunath, 2014). The municipal schools traditionally cater to students who belong to economically and socially backward classes who are not very conversant with English, but prefer the local language or their mother tongue. The students of these schools very typically stay in slums or a make shift dwelling and their parents are either casual labourers, unemployed individuals, alcoholics, or single parents. In such cases, education takes a secondary priority but daily earnings become more important for the parent/s. Students enrolling in private schools belong to the middle or upper-middle class and have reasonably decent social and economic backgrounds and parentage. Municipal school teachers have various non teaching duties like census, disaster relief, and election work throughout the year in addition to their regular routine tasks of the school. So, those teachers who are on duty (all teachers are invariably involved in some non teaching duty) during such times need to take the help of their

colleagues in order to balance their sessions or exchange classes with one another or to share sessions with them. This requires a lot of relational trust as well as cooperation among the teachers, and possibly, this is the reason why interpersonal trust and co-worker support scores are higher among municipal school teachers. Private school teachers do not have these non teaching duties.

The municipal school teachers in Mumbai receive pay scales that range from 10,000 INR to 16000 INR and while these are applicable to private schools too, it is very rare that private school teachers are paid as much as their unionized municipal counterparts (Mukherji, 2007). Municipal school teachers are unionized and this automatically brings in camaraderie and trust between them as they all are together for various causes taken up by the union for their benefits. These unions are strong enough to actively intervene in matters affecting pay, security, and governance that are sadly lacking among private school teachers. Interpersonal trust may possibly be higher in municipal teachers due to the fact that all are members of a union and realize that being together is the only way to get things the way they want it. There is a huge difference as far teaching is concerned in municipal and private schools. Despite being paid lesser, active teaching happens in private schools as compared to more instances of absenteeism and absence of teachers from classrooms in municipal schools in India (Kingdon & Mohammed, 2003; Weiner, 1990). This can be attributed partly to the fact that private schools employ teachers on a contract for a period of 2-3 years. The ultimate aim of these contract teachers is to somehow get into a permanent position in the schools. Many of these teachers are not fully qualified and also have lesser training than regular teachers of the schools. So, it may be possible that every teacher is trying to get the better of the other in an attempt to ensure that they remain ahead in the race for obtaining a permanent position in the schools. This can also be explained in terms of conservation of resources theory (Hobfoll, 2001), where an individual tries to protect those resources that he/she perceives to be most valuable to him/her (Mayo, Sanchez, Pastor, & Rodriguez, 2012).

In a situation where teachers are vying with one another for a permanency in position, contractual teachers would not accept the support offered by colleagues lest it makes them look inferior and incapable of handling the job, thereby endangering their chances of permanency in the organization. Permanent teachers, on the other hand, would not take help from the contractual teachers lest it enhances the latter's visibility in terms of capabilities and competencies. The above reasons could possibly explain the difference in co-worker support scores and interpersonal trust scores among municipal and private school teachers.

Policy Implications

The school culture instrument has practical applications. A validated instrument provides an important tool for assessing the culture in primary schools, allowing authorities to take necessary steps in order to improve the culture and enhance teacher involvement in school activities. The scales could be used to assess the overall culture of the school or can be used at a specific dimension level, for example, using a sub-scale of one of the four dimensions of culture. If the school finds itself lacking in any of the dimensions, it could do a detailed analysis and take necessary corrective steps to improve the same. The four dimensions and the 15 items can be used by schools in a proactive manner in order to design policies for the schools.

Conclusion

The purpose of this study was to develop and validate an instrument that can be used to measure some aspects of school culture, namely, interpersonal trust, procedural justice, co-worker support, and empowerment in schools. The results of this study will contribute to the existing knowledge on culture in schools and enable future researchers to conduct empirical studies that can improvise and build on the measurement of school culture. The

results of the current study also provide new opportunities for school authorities, wherein they can use the measurement instrument to assess the cultural fitness of their schools for better performance of teachers.

Limitations of the Study and Scope for Further Research

This study has been conducted on teachers in Mumbai and hence is constrained by geography. It is recommended that the study can be conducted in various schools in India, rural as well as urban, in order to support the generalizability of the questionnaire. Future research can study the differences in various aspects of organization culture with respect to urban and rural schools in India. Outcome variables like commitment, organization citizenship behaviour, intentions to quit the job, and job satisfaction can also be considered in future research.

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