Knowledge Management in Secondary Education: A Study on Perception of School Teachers in India

Arunima K V

Research Scholar
Dept of Business Administration
Mangalore University
Mangalagangothri
Karnataka

Dr P Pakkeerappa

Retd. Professor and Research Guide
Dept of Business Administration
Mangalore University
Mangalagangothri
Karnataka

Abstract

Knowledge Management (KM), being an effective tool of enhancing organizational performance, was widely implemented and evaluated in corporate organizations. But with regard to sectors like education where dissemination of knowledge is highly important, the scope of KM is not seriously explored, especially in developing countries like India. This study performs an exploratory factor analysis to identify the key factors of KM in secondary education in India. Out of the seven factors identified, Knowledge Dissemination, Knowledge Creation, Knowledge Application, Knowledge Up gradation are the Knowledge Processes and factors such as Shared Culture, Leadership support and Technology are Knowledge Enablers. The study further analyzed the perceptional differences of teachers about these factors based on their experience. It was observed that very young teachers and highly experienced teachers were more positive and enthusiastic about the KM practices in schools. This empirical study clearly specifies the areas of KM that could be focused better to enhance the academic performance of secondary schools.

Keywords: Knowledge Management, Secondary Education, Perception, School Teachers, India

Introduction

Knowledge Management (KM) has been a practice constantly researched, implemented and revised by organizations across the world in the past two decades with the core objective of improving the organizational performance. The increasing impact of digitization has greatly improved the access to new knowledge and thereby innovations and hence KM plays an inevitable role in all the sectors irrespective of being service or manufacturing. Majority of the researches on KM has been exploring its impact in the corporate world and certain sectors like education which is highly knowledge centric remains comparatively less researched. Education sector basically include primary level to higher education where a systematic and structured management is inevitable, but unfortunately found to be lacking. Many international literatures have discussed about this scenario and have often mentioned its impact on the skill development and employability of youth. But the problem remains unsolved in majority of the developing countries, as the education at primary and secondary level limits to a regular tinkering process rather than developing the knowledge of the students through practical exposures and application of concepts learned. Much initiative has been taken at

the international and national levels to ensure the quality of education in schools through rigorous training and instructions given to the teachers. UNESCO (EFA Global Monitoring report 2015)has clearly specified that the quality of secondary education would be of prime importance among the Millenium Sustainability Goals.KM in secondary schools includes not only a set of knowledge enablers like infrastructure, technology and people but also include a set of processes where knowledge is created ,disseminated and applied appropriately. This study tries to explore the major factors of KM in secondary education and also identifies the perception of the school teachers on these factors, as teachers are the major knowledge workers in the field. This would enable to prioritize the KM practices in schools based on the key factors of KM and accordingly revise the existing system for better academic performance.

Literature Review

NonakaI kujuro (1995) popularized the notion of "tacit" knowledge - the valuable and highly subjective insights and intuitions that are difficult to capture and share because people carry them in their heads; and "explicit" knowledge – valuable information that can be shared. The organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge. This concept is highly relevant in education , especially schools as the knowledge is continuously transformed from tacit to explicit and vice versa among the teachers and students. This transformation happens through interdependent processes of knowledge creation, knowledge storage and retrieval, knowledge transfer, and knowledge application. At any point of time, an organization and its members can be involved in multiple knowledge management process chains(Alavi and Leinder, 2001).It includes technology, techniques, and people and their interaction which as "preconditions" to enhance the KM processes that allow an organization to manage its knowledge effectively(Gold H A et al., (2001), Offsey S (1997), Bhatt G D (2001), Hassan and Crawford (2003). Khedhauria and Jamal (2015) says that the critical role of team members' learning orientation in increasing knowledge sourcing, reuse and creation; group knowledge sourcing and repositories are more appropriate to increase knowledge reuse. The Internet is more effective to increase knowledge creation and knowledge reuse and increases knowledge creation among team members with a strong learning orientation. Kumar M (2014)found that in the present organizational cultural ethos and good IT system, expectancy free and non bossy leadership practices help the organization to identify and create knowledge.The majororganizational aspects resulting in ongoing organizational learning are IT infrastructure, Organizational Policies, Knowledge

sharing practices, and Motivation to share.(Shanab, Haddad and Knight(2014), Wang and Noe(2010), Morfett, McAdam and Parkinson(2003)).Harkins and Moravec(2011) explain that the dynamic knowledge development and application framework would be based on three paradigms namely mechanical (conservatively repetitive), evolutionary (self-organizing), and teleogenic (purposively creative).All these KM practices are found to highly relevant in private and public organizations , but the public organizations have further challenges on this regard. Arora E(2011) in the study, focus on knowledge management in the public sector. Common challenges and concerns that affect public sectors worldwide are identified as: driving efficiencies across all public services; improving accountability; making informed decisions; enhancing partnerships with stakeholders; capturing the knowledge of an ageing workforce, and; improving overall performance. Goel, Sharma and Rastogi (2010), with respect to a public sector Indian company, found that knowledge and experience resides with the individual; sharing is relationship based; communication is inadequate across functions and rewards and recognition for contribution to KM are missing. The same is applicable with government schools as well. In the education sector, there has been little research or discussion of knowledge management as a strategy for improving organizational practice, program implementation, teaching and learning (Fullan, 2001). In discussing strategies to improve school's academic capacities, knowledge management is now intensively applied to the educational setting. As a disseminator of knowledge, every school needs to practice knowledge management in order to redesign and updated schools knowledge practices as part of their professional development process and internal training in enhancing teacher's performances (Lokman et al., 2003).School knowledge management is a set of relatively new organizational activities that make use of knowledge as an important resource to improve organizational behaviour, decisions, student learning, teaching processes and collegial relationships that enable schools to improve their overall performance(Cheng, 2015) Leadership support is very important in this perspective and leaders need to know their schools' overall intellectual capital, not only on an individual level, but with regard to whole school structure and culture (Hargreaves , 1999; Lokman et al.,2003). Identified problems in secondary schools are Unawareness of knowledge as a key intangible asset of schools, Lack of principal's leadership to guide, KM implementation in schools, Failure to equip teachers with practical knowledge by promoting knowledge sharing, Unsystematic document management system with little functionalities in searching and retrieval(Kai Wing Chu, 2016). Most importantly teachers

should be aware of importance of creating new knowledge as part of positive process of enhancing their new creativity and skills. Acquiring new knowledge is apparently paramount in order to enhance the school's academic performance. The internal transfer of knowledge is a process of sharing knowledge internally between in-service teachers through seminars, workshop and professional development (Lokman et al., 2003). Another problem in terms of the implementation of KM according to Dixon (2000) is related to teachers unwillingness to share their tacit knowledge. The readiness of teachers to gain new knowledge is very low due to the lack of support and encouragement from certain parties (Azman, 2003). Strong elements of teacher collaboration and mutual support offer the potential benefits of raising teacher confidence, facilitating teacher learning and embedding improvements in professional practice within the classroom(Rhodes and Beneicke, 2002). However, in many schools it is known that teacher collaboration is not prevalent (Harris,2001) and management intervention may be necessary to enable mutual teacher support to flourish. Newmann, King & Young (2000) explain five components of KM in schools: individual teacher knowledge, skills and dispositions, professional learning community (across teachers), program coherence, technical resources, and principal leadership. Information sharing, teamwork and collaborative learning have been important curricular developments over the past few decades. Students are the most important stakeholders at schools and colleges. The information needs of teachers , faculty, staff, and administrators are increasing rapidly with little end in sight(Petrides and Nodines, 2003).A further challenge for teachers in accommodating the information age is the use of technologies, which may give rise to resistance (Haughey,2006).Reynolds (2005), in a study done in New Zealand and Australian schools, aimed to see the success of adapting KM at school level and found that KM is beneficial to teachers and students to enhance performance and is further solidified with the advancement of technology and communication possessed by these countries. At the same time a study by Zhen, Wen, Rong, Wen, and Yuan (2009) proved to be on the other side of the story where it was found that the main problems faced by teachers in implementing KM in Taiwanese schools were insufficient teaching and learning time and weak infrastructure planning such as scarce funding and limited technology.Chu , Wang and Yen (2011) conducted a study on KM in Japanese Schools which was based on the Rodrigues and Pai(2005) Model on KM in education which suggest about the eight dimensions namely Leadership and support. Technology Infrastructure, Knowledge Creation, Acquisition and Learning, Dissemination and Transfer, Application and Exploitation, People competency and

Shared culture. AbSamad et., al (2014) identified factors such as mission and vision, school strategy, school culture, intellectual model, learning organization, leadership management, teamwork and learning community, knowledge sharing, new knowledge generation, and digital advancement, have significant relationships with the understanding of knowledge management in high performing schools of Malaysia.Studies on KM in schools were conducted in Malaysia (Awang et al.,2011) , Japan (Chu, Wang and Yen, 2011) and Taiwan (Lee et al.,2010) but such researches in Indian context were found to be less explored. Although many of the variables derived from the literatures were also applicable in Indian context of secondary education, an exploratory factor analysis is required to identify the more relevant factors that contribute to effective KM practices in Indian government schools.

Objectives of the study

The key objectives of the study are:

1. To perform an exploratory factor analysis to identify the key factors of KM in secondary education

2. To analyze the perception of government school teachers on the various KM practices followed in secondary education.

Methodology

The study is empirical in nature done with the support of a structured questionnaire. The sample includes the teachers of government schools in Kasargod district of Kerala state. Kerala is a south Indian state with high Human Development Index and high rate of literacy compared to other Indian states and therefore education is given prime importance by the state government. The district has a total of 90 government secondary schools with an average of 10 to 13 teachers in the secondary classes. A sample of 174 teachers responded to the questionnaire, based on a stratified random sampling method.The total sample was divided into 3 strata based on geographical location namely, rural, semi-urban and urban schools. The data collection was done personally by the researcher and the questionnaire responses were ensured to be honest and complete.

The questionnaire included two sections where first section included questions on school location and respondent's personal information such as qualification, years of experience in teaching, subject taught and priorities in teaching. The second section included likert scale questions on KM practices followed in schools. The items (variables) were on knowledge processes and enablers. A total of 20 items were identified from literatures on KM in

education, most of which were conducted in Asian countries like Japan, Malaysia and Taiwan. In order to make sure that these variables are relevant in Indian educational context, expert opinion of teachers were considered through a Delphi Method. The Delphi Method was chosen as it allows communication amongthe invited experts to take place so that new ideas canbe brought in,

beyond the currently known or believed(Iqbal and Young, 2009). Opinion of 10 government school teachers of more than 15 years of experience were considered and 15 KM variables were finalized for the study. These variables were analyzed using five point likert scale ranging from "strongly disagree" to "strongly agree". The list of variable are stated in Table 1.

Table 1: The Knowledge Management Variable s in secondary education

Item	Variables
1	Management and leadership support
2	Principal's Coordination of activities
3	Useof Information and Communication Technology
4	Freedom to develop lesson plans
5	Regular update of subject knowledge
6	Seminars,Workshops and Trainings
7	Support of fellowteachers
8	Innovative methods in teaching
9	Considering the feedback and suggestions from students
10	Collaborative environment for open discussion
11	Access to alumni
12	Technology oriented evaluation and reporting
13	Evaluation of Teaching Methodology
14	Self satisfaction of skills to make students understand
15	New teachers are supported

Data Analysis

Data was analyzed using exploratory factor analysis in SPSS v.20, to identify the key factors of KM in secondary education based on the interrelated variables. A Principal Component Analysis with varimax rotation is adopted for this. Exploratory factor analysis requires certain basic assumptions to be satisfied namely multivariate normality and sampling adequacy (Grimm and Yarnold, 1995;

George and Mallery, 1999; Lattinet al., 2003). Bartlett's test of sphericity can be used to measure the multivariate normality of the variables. In addition, it tests whether the correlation matrix is an identity matrix (i.e., a spherical set of multivariate data) (George and Mallery, 1999; Lattinet al., 2003). The Kaiser-Meyer-Olkin (KMO) test can measure whether the distribution of values is adequate for conducting factor analysis (George and Mallery, 1999).

Table 2:KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.610
Bartlett's Test of Sphericity	Approx. Chi-Square	579.819
	df	105
	Sig.	.000

Table 2 shows that the KMO measure is 0.61, which is higher than the accepted threshold of 0.5, which indicates that the distribution of values is adequate for factor analysis. The Bartlett's test of sphericity has a significant value <0.05 which indicates that the data is multivariate normal. Hence the data satisfies the basic assumption for factor analysis.

Principal Component Analysis with varimax rotation is used to extract the factors from the given set of variables. These factors were extracted based of their Eigen values and generally for factor analysis a rule of Eigen value greater than or equal to 1 is used for factor extraction (Gorsuch 1983). Seven factors are extracted and these

factors show a cumulative variance of 73 % as explained in Table 3. The factor loading of each variable is found to be greater than 0.5 which explains that the factor variable significantly contributes to the factor. Each factor is labeled based on the variables extracted under them. Factor 1, Knowledge Dissemination which account for 12.65% variance, is explained by variables such as teachers communication skills to make students understand, access to alumni of the school and support of fellow teachers in knowledge management practices. Factor 2, Shared Culture which account for 11% variance encompasses two variables namely, collaborative environment for open discussion and support given to new teachers. Use of Information and Communication Technology (ICT) in

Teaching; regular update of Knowledge by teachers; participation in seminars, workshop and trainings contribute to Factor 3, Knowledge Creation with a contribution of 10.8% variance. Factor 4, Knowledge Application is derived from the variables; use of innovative methods in teaching and freedom given to teachers to develop lesson plans. This factor contributes to 10.6% of variance. It is found that the teaching methodology is evaluated regularly and the suggestions from students are considered by teachers. These two variables contribute to Factor 5, Knowledge Upgradation which contributes to 10% variance. Factor 6, Leadership support(9.9% variance) is explained by variables like support of Management and Principal, Principals ability to coordinate the activities. Technology infrastructure is Factor 7, which is explained by the use of technology for evaluation and reporting.

Table 3: Factor Analysis

Item	Factor	Variables included in the factor	Factor Loading	Eigen Value	Variance explained %	Cumulative variance explained %
1		Access to alumni	0.768			
2	Knowledge Dissemination	Self satisfaction of skills to make students understand	0.7	1.898	12.651	12.651
3		Support of fellow teachers	0.692			
4	Shared Culture	Collaborative environment for open discussion	0.823	1.646	10.975	23.626
5		New teachers are supported	0.801			
6		Use of ICT	0.781			
7	Knowledge Creation	Regular update of subject knowledge	0.699	1.634	10.896	34.522
8		Seminars, Workshops and Trainings	0.56			
9	Knowledge Application	Innovative methods in teaching	0.865	1.594	10.628	45.151
10		Freedom to develop lesson plans	0.779			
11	Knowledge Upgradation	Evaluation of Teaching Methodology	0.85	1.513	10.087	55.238
12		Considering the feedback and suggestions from students	0.776			
13	Leadership Support	Management and leadership support	0.857	1.497	9.977	65.215
14		Principal's Coordination of activities	0.779			
15	Technology	Technology oriented evaluation and reporting	0.903	1.173	7.823	73.038

Table 4: Descriptive statistics(Experience)

		1-5 yrs	6-10 yrs	11-15 yrs	16-20 yrs	more than 20 yrs	Total
Shared Culture	Mean	11.2	10.35	11.44	11.75	11.93	11.378
	SD	1.36	1.75	1.67	1.15	1.58	1.61
Knowledge Dissemination	Mean	7.4	6.98	7.26	7.3	7.84	7.37
	SD	1	1.57	1.19	1.24	1.27	1.31
Knowledge Creation	Mean	12.3	11.68	11.7	12.35	12.61	12.14
	SD	1.56	1.45	1.78	1.25	1.24	1.48
Knowledge Application	Mean	7.8	7.65	7.59	8	8.57	7.97
	SD	1.43	1.11	1.21	1.65	1.43	1.42
Knowledge upgradation	Mean	7.5	7.6	8	8	8	7.85
	SD	1.05	1.34	0.81	1.31	1.09	1.15
Leadership Support	Mean	8.05	7.86	7.38	7.65	8.13	7.81
	SD	0.4	0.78	1.2	1.07	1.02	1
Technology use	Mean	5.9	3.8	3.67	3.75	3.8	4
	SD	0.9	0.61	0.53	0.7	0.7	3.1

Considering the demographic profile of the respondents there were young teachers with minimum 1 year of experience and also very senior teachers with more than 20 years of experience. Hence it was important to identify if there is any variance in their opinion on Knowledge Management Practices in secondary education. Therefore a Multivariate Analysis of Variance(MANOVA) method is used to analyze the perceptional variance on KM factors identified in table 3.

Table 5:Box's Test of Equality of Covariance Matrices

Box's M	811.199
F	6.532
df1	112
df2	30586.493
Sig.	.000

The Box's Test of Equality of Covariance checks the assumption of homogeneity of Covariance across the groups using p<.001as a criterion (Table5). This tests the null hypothesis that the observed covariance matrices of dependent variables are equal across the groups. Here since p value is .000<.001, the null hypothesis is rejected. Therefore the observed covariance matrices of dependent variables are not equal across the groups. Hence the assumption of homogeniety of covariance is violated and Pillai's Trace(a teststatistic that is very robust and not highly linked to assumptions about the normality of thedistribution of the data) is considered appropriate than WilksLamba Test.

Table 6: Manova(Multivarate Tests)

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Experience	Pillai's Trace	.373	2.452	28.000	668.000	.000	.093
	Wilks' Lambda	.669	2.496	28.000	592.733	.000	.096
	Hotelling's Trace	.434	2.520	28.000	650.000	.000	.098
	Roy's Large st Root	.204	4.868	7.000	167.000	.000	.169

The Table 6 shows MANOVA using the Pillai's Trace test. Using an alpha level of .05, we see that this test is significant, as The Pillai Trace value = .373, $F(28, 668) =$ 2.452, $p < .001$, multivariate $?2 = .093$. This significant F indicates that there are significant differences among the opinion of school teachers(based on years of experience) on KM Practices in secondary education.The multivariate $?2$ value (partial eta squared value) indicates that the variance contribute to 9.3%.Table 7 shows the results of Levene's Test of Equality of error variances.This tests the null hypothesis that the error variances of the dependent variables are equal across the groups. The test is not significant for variables; shared culture, knowledge dissemination, knowledge creation, knowledge application and knowledge upgradation.(sig value>.05). Hence the null hypothesis is accepted. But in the case of variables ; Leadership support and Technology use, the null hypothesis is rejected(sig value<.05) and therefore the homogeneity of variances assumption has been violated.

Table 7: Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
SharedCulture	1.460	4	170	.217
KnowledgeDissemination	1.136	4	170	.341
Knowledge Creation	.523	4	170	.719
KnowledgeApplication	.856	4	170	.492
Knowledge Upgradation	.999	4	170	.410
Leadershipsupport	6.071	4	170	.000
Technologyuse	6.556	4	170	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Table 8: Tests of Between-Subject Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
	SharedCulture	58.798	4	14.700	6.305	.000	.129
	KnowledgeDissemination	16.180	4	4.045	2.416	.051	.054
	Knowledge Creation	26.530	4	6.632	3.177	.015	.070
	KnowledgeApplication	25.131	4	6.283	3.270	.013	.071
	Knowledge Upgradation	7.081	4	1.770	1.333	.260	.030
	Leadershipsupport	13.192	4	3.298	3.427	.010	.075
	Technologyuse	81.418	4	20.355	2.171	.074	.049

Since the Multivariate test results in Table 6 are significant, it is important to analyze the univariate effect of the independent variable on each of the dependent variables separately. The Table 8 shows that with regard to Shared Culture, Knowledge Creation, Knowledge Application and Leadership Support, the p value is less than .05. Therefore there exists a significant difference in perception of teachers of different experience groups with regard to these KM factors. But in the case of Knowledge Dissemination, Knowledge Upgradation and Technology use, the perception of teachers does not vary with experience. From the Table 5, its clear that the mean values are high for lower experience group(1-5 years) and gradually decreases as experience increase, but the again increase after an experience of 15 years. The beginners and highly experienced teachers are positive on KM Factors such as Shared Culture, Knowledge Creation, Knowledge Application and Leadership Support. But teachers belonging to the experience group of 5-15 years are not so positive on these factors. But with regard to factors Knowledge Dissemination, Knowledge Upgradation and Technology use the perception remain the same across the groups, where the mean value remains comparatively low, indicating a lower rating.

Discussions

Researches on KM in schools has been conducted in Malaysia (Awang et al.,2011) , Japan (Chu, Wang and Yen, 2011) and Taiwan (Lee et al.,2010), but not in the Indian context and this study explored the factors of KM in secondary education. Out of the seven factors identified, Knowledge Dissemination, Knowledge Creation, Knowledge Application, Knowledge Upgradation are the Knowledge Processes and factors such as Shared Culture, Leadership support and Technology are Knowledge Enablers. When the teachers are satisfied with their skills to make students understand the subject, it's a clear sign of effective knowledge dissemination. The support of fellow teachers, students and alumni of the schools also contribute to this process. Lokman et., al (2003) explains the importance of improving the teachers performance through better acquisition of knowledge through update of subject knowledge and provision of seminars , training and workshops. These practices are implemented in the schools and Knowledge Creation is identified as another major KM factor. Knowledge Application is another important factor , as teachers apply their knowledge for developing innovative teaching methods and sufficient freedom is given to develop the lesson plans. This is in accordance to the fact mentioned by Harkins and Moravec (2011) on development through Knowledge Application. The study found that there is a regular evaluation of effectiveness of teaching methodology and the feedback of students are taken into consideration by teachers for improvement, resulting in Knowledge Upgradation. Khedaria and Jamal (2011) has clearly mentioned about the role of team members in KM. Shared Culture is identified as another major KM factor in schools. This results from a collaborative environment for open discussion and mutual support of members. Above all, the implementation of all above factors materialize with Leadership Support. The Management support and role of principal is significant in this regard. The last major KM factor identified is Technology oriented evaluation and reporting in teaching. This would effectively enhance development of knowledge repositories apart from improving the efficiency and effectiveness of managing processes.

After identifying the major KM factors in secondary education, the study analysed the perceptional differences of teachers about these factors based on their experience. The Multivariate Analysis of Variance (Manova) tests results(Table 6) shows that is a significant difference in perception. The Univariate Tests (Table 8)separately shows the variance for each KM factor. A significant difference in perception of teachers of different experience groups with regard to Shared Cuture, Knowledge Creation , Knowledge Application and Knowledge upgradation. The describtive

statistics (Table 5) shows that the young teachers and teachers with more than 20 years experience share similar perceptions and are positive about KM practices. But the other groups are not so positive on KM practices and are rather found to be more confused on the system. The reasons could be further explored in future studies.

Conclusion

This study contributes to the literature by exploring the KM factors in Indian secondary education based on the perception of government school teachers. The seven factors include Knowledge Disseminaton, Shared Culture, Knowledge creation, Knowledge application, Knowledge Upgradation , Leadership support and Technology. It was found that many factors of KM that are found in the international studies on education were also relevant in indian context in terms of applicability. The perceptional variance analyzed on these factor gave certain interesting results. It was observed that very young teachers and highly experienced teachers were more positive and enthusiastic about the KM practices in schools.The fresh teachers could be more positive as they are in the initial phase of their career. The highly experienced teachers would have actually studied the positives and negatives of the system and could be matured enough to take the positive aspects of KM. Further psychological analysis can also be done on the teacher attitudes in future studies. The study is limited to government schools of a particular district , but as the curriculum and system followed across the country fundmentally remains the same, the results can be generalized to a greater extend. Although the KM factors were explored and perception of teachers on KM practices in secondary education were analyzed, its impact on the academic performance is not identified in the study. This gap can be filled by future researches in the area. This study hopes to contribute the KM implementation practices in Indian schools.

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