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A Consideration of Operation Rate of Learning Organization Model (LO Model) of Senge in education system of Iran Case study: Vocational High Schools in Kashan, Iran

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Abstract

The current study considers the operation rate of dimensions of a learning organization – including Personal Mastery, Mental Models, Shared Vision, Team Learning and Systems Thinking – in Vocational High Schools in Kashan. The study is descriptive due to its hypotheses and study objectives. Statistical Population of study includes teachers and administrators (managers and their assistants) of Vocational High Schools in Kashan and sample size of study includes 80 teachers and administrators employed by Ministry of Education. According to analysis of data and other results, no significant relationship was found between demographic characteristics of teachers and administrators, level of education and work experience and the rate of componential operation of learning organization. Among all dimensions of field of study and age groups, only Personal Mastery had a significant relationship, and other dimensions were insignificant. From viewpoint of job position (teacher and administrator), Personal Mastery, Systems Thinking and Team Learning had significant relationship and two other dimensions were not significant.

Keywords: Learning organization, organizational learning, vocational high schools.

Introduction

Occurrence of Industrial Revolution was the initiation of an era in which, mass and cheap production was practiced. The era peaked its prosperity when Taylor – the first one who introduced "scientific management" – developed his mechanistic ideas through the area of organization. In this situation, human forces were required who were able to do repetitive and mass tasks like a machine and to live in an accumulated society. A training system should be formed outside the environment of home and work place to train such humans, and a training system was required in which, everybody was looked alike to produce standard stereotypes for a large number of learners and to produce similar products during factory working trend. In such a training system, an open program includes study syllabus and a hidden program includes three syllabuses of punctuality (stereotype "time"), obedience and repetitious works[1].

But today, is the age of hasty changes, unreliability to future and lack of information for managers to make decision. The changes to which, if the organization does not adopt, it may be drawn into the abyss of destruction. So organizations are implementing innovative strategies to deal with the turbulent environment and ensure success or even survival[2]. The main danger arises when competitors decide to change rules of the game in industries. In this case, if an organization acts according to its accustomed rules, competitors will probably destroy its competitive advantages. Facing such a danger, the most important reaction for an organization is continuous changes and adaption. Making a learner environment and increasing merit and capability of human resources are required to create a learning organization in which, all members seek to find information about changes and to take necessary information and knowledge, to meet these requirements and to use this knowledge practically to adopt them and their organization with changes of external environment[3].

In such an environment, traditional organizations lose their benefits due to failure to respond quickly to rapid changes. So, organizations should try to develop toward being a learning organization.

Problem Explanation and subject importance: Regarding the importance and effective role of Vocational High Schools in structure of social and economical work of country, an ever-increasing requirement is perceived to take a long-term strategy and to explain it to the organization, to create a systematic thinking and common insight in the entire organization and also to establish organizational learning and to change individual learning to organizational learning.

In this regard, one of the most important problems of technical-professional centers is the method to encounter learning problem, provision of an appropriate environment for learning, recognition of learning requirements for teachers and authorities and meeting these requirements as a necessity for organizational learning[4].

Being accounted as development of general management concepts based on training management, this model tries to reconsider management methods in Vocational High Schools, in order to assist them to establish an orientated and changeable system. Obtaining such these centers requires more changes in the insight of teachers, administrators and students and also all people in the society.

Organizational Learning: Various descriptions and qualifications are explained for organizational learning, although with different appearances but with the same resource.

Diggins describes organizational learning as following: "As a general rule, capability of an organization to discover errors and to correct them, also to change knowledge and organizational merits in order to create new capacities for work and new skills to solve problems". According to this description, followings are qualifications of an organizational learning process: Changing in organizational knowledge and changing mind of staff[5].

Bob Gans describes organizational learning as following: Acquisition and application of knowledge, skills, merits, ides and improving concepts to save, raise and develop an organization[6].

Learning Organization: The concept of the Learning Organization is not new. It has been around since the early twentieth century, but has lately attracted significant interest because of the complex and dynamic milieu that organizations operate in[2]. Researchers also offer numerous descriptions for the concept of learning organization. Jafari and Kalanaki claims that a learning organization is an organization in which all objectives, strategies, aims, and activities are in line with learning of the staff and the organization as a whole[7]. According to Dajson, a learning organization is the one which creates structures and strategies to elevate organizational learning and also is capable to create, obtain and transfer knowledge, and modifies its behavior in a way which reflects new knowledge and concepts[8]. Michael G. Marquardt in his valuable book entitled "Making a Learning Organization" represents a relatively comprehensive description: "systematically, a learning organization is an organization which learns things collectively and powerfully, and changes itself constantly to gather, manage and use information somehow better, aiming prosperity of its organizational collection"[9].

When third millennium began, along with researches done in valid universities around the world to review structure and the role of organizations in technology-based era, many changes occurred in thought of managers of great organizations. For the first time, a paper was published in the Journal of Massachusetts Technical University entitles: "Transformation of Organizations" and such this scientific restructuring was named Learning Organizations.

Difference between Learning Organization and Organizational Learning: Basically, there are three great differences between learning organization and organizational learning in literature of management. Current methods in literature of management to distinct learning organization and organizational learning are as following: i. A learning organization is a kind of organizations, but organizational learning is an activity and a learning process throughout the organization[10]. ii. Making effort is required to establish a learning organization, but organizational learning is being created by itself with no effort[11]. iii. As the third difference it should be mentioned that any organization needs organizational learning to exist, but any organization even not being a learning organization can exist. For example, Kim suggests that organizations cannot exist without organizational learning and Hawkins also expresses that all organizations have learning process, otherwise may not exist externally[12,13].

Learning Organizations and Model of Senge: Researchers intend to explain the concept of learning organization from viewpoint of individual experiences. Senge describes the learning organization as following: "Where people increase their capabilities continually to obtain desirable consequences, where new patterns of thinking grow up, where group delight is formed and is distributed, where people are continually learning how to learn"[14].

Watkins and Marsick remember their learning organization as "an organization which learns and changes itself continually"[15]. Gephart explains learning organization as following: "An organization which increases its capabilities in order to learning, conformity and changes, and an organization in which learning process is being analyzed, controlled, developed, managed and directed in order to improve targets"[16].

Many researchers have accepted that learning organization is an ideal structure to obtain continuous changes and improves[12].

The fifth discipline of Senge is derived from his work experience about organizational learning in MIT Management School. Senge suggests that learning organizations requires five key principles: Personal Mastery, Mental Model, Shared Vision, Team Learning and Systems Thinking. Systems Thinking is a basic discipline having responsibility to create integration and unity in learning organizations. This discipline not only integrates four other principles, but also requires all of them to make its own identity. So, Systems Thinking exists inside all of these principles and is also independent of them[17].

The fifth-principle model of Senge is the most famous learning organization model at present. Learning organization was derived from Systems Thinking in the USA as a model, and then Senge patterned this systematic approach[18]. Garvin claims: "Peter Senge is the most influential interpreter in the body of United States[19].

These five disciplines are categorized into two groups according to their concentration on individuals or groups. The first group includes: Personal Mastery, Mental Model and Systems Thinking which concentrates on individual practices and behaviors. Personal mastery includes "bright expression of perspectives and deepening them, concentration of energies, raising patience and looking at realities precisely". This process is an individual commitment toward life-long learning, vision and excellence. Mental model is the deep establishment of suppositions, powers, creations or even images and imaginations which effects our perception about the world and our functionality, where people demonstrate their think style efficiently to influence others. Systematic thinking concentrates on multi-lateral relations. Systematic pattern and simulation are two components to create systematic thinking[14].

The second group includes Shared Vision and Team Learning. The disciplines to create common perspectives and team learning are distinct from the other three principles because those three exist naturally in the human nature. The method of these two disciplines is activities performed by groups. Shared Vision refers to individual goals and viewpoints integrated with organizational perspective. According to Senge, "No organization will learn, unless teams can learn"[14].

Even if extensively approaching the transformation of schools into learning organizations at the level of theory and practice is restricted, quite a few school models and educational research concentrating on building a learning organization are rooted in and explained by Senge's five disciplines. Senge has shown great interest in transforming educational centers into learning organizations. He supports that at first, the learning organization model developed for business is relevant for teachers and schools[17]. The five disciplines provide "important insight into how educators can achieve meaningful change and transform schools into learning organization that renew themselves"[20].

Leaders of Training Centers and Learning Organization: Educational organizations, as one of the most influential social organizations, are in dire need of being in harmony with social and cultural changes as well as the global ones and therefor they have to improve the learning capabilities of their staff in order to respond to changes[7].

Bulman and Deal explain that "leaders, as influential powers around the world, pressure public and private organizations to improve their functionality and to decrease environmental pressures in order to change existing policies, activity patterns, tendencies and trends to achieve appropriate goals". Changing an organization as a learning organization is beyond the changes of structure and requires many tasks such as to change organizational culture[21]. Fullan describes that "changing formal structures is not equal with changing customs, habits, skills and believes. The new job of leader is to create a learning organization in future. Moreover, they are responsible toward others and their own learning". Following his studies about leadership in learning organizations, Fullan explains his four conclusions[22]: i. The new role of training managers in a learning organization is to be powerful unilateral leaders, not leaders followed by weak followers. ii. The proficiency of leadership in these centers requires high level of expertise and skill. iii. Training leaders should learn to impress and coordinate changes dynamically complex and in a non-linear manner. iv. Management style in training centers, as we witness it at present, may be disappeared completely provided that moving toward a learning organization, and may be replaced by group leadership.

Dufour describes ideal educational centers as a learning organization and offers five prerequisites for them, briefly explained below[23]: i. Provision of classes and justification programs for new members of training board; for example, teacher-student relationship. ii. Curricular/interdisciplinary groups: All teachers should meet these groups as a group foundation for cooperation with very important goals, such as assessment of training activities of teachers in order to improve the function of students. iii. Peer Observation: Taking and offering feedback about training and teaching activities to be used as a criterion for all teachers. Teachers and peers should take instructions about these observations, manual analysis, gathering skills and methods to participate in group activities. iv. Study Groups: All teachers should participate in these groups and learn more about essential subjects. v. Operational Study: As a commitment toward learning, a school should encourage teachers to study about different fields to be able to develop notions, to take information and to analyze them and to extract results based on which, they be able to offer an operational plan.

Hypotheses: i. There is a relationship between the concepts of teachers and administrators about application of dimensions of a learning organization according to their education. ii. There is a relationship between the concepts of teachers and administrators about application of dimensions of a learning organization according to their field of study. iii. There is a relationship between the concepts of teachers and administrators about application of dimensions of a learning organization according to their teaching background. iv. There is a relationship between the concepts of teachers and administrators about application of dimensions of a learning organization according to their age groups. v. There is a relationship between the concepts of teachers and administrators about application of dimensions of a learning organization according to their position.

Methodology

The Methodology of this study is descriptive. The study is descriptive because its target is identical, real and regular description of specifications of a situation or a subject. Khaki believes that "a descriptive study is performed in order to explain events and specifications about an idea or desirable subject systematically, identically and accurately"[24].

Statistical population: The statistical population in this research includes all teachers and administrators (managers and their assistants) in five technical-professional centers for males in Kashan during 2011-2012 academic year.

Sampling Method: No sampling method is used in this research and instead, a questionnaire is sent for all teachers and administrators in these five technical-professional centers in Kashan. Among 96 teachers and administrators, 80 of whom returned their questionnaires; so, return index is calculated 83% which is acceptable[24].

Data Gathering Method: In order to gather data following procedure has been done: i. Necessary contacts were made with authorities of these centers in order to gather data. ii. To reach a higher level of responsibility, one of the authorities was defined in any center to gather questionnaires. iii. Questionnaires were delivered to authorities by a direct contact and they distributed them among all teachers and administrators in each center. iv. Questionnaires were returned to authorities after completion. v. Finally, researcher took questionnaires from authorities.

Measurement Tool: The questionnaire distributed among teachers and administrators (managers and their assistants) to test dimensions of a learning organization, includes 27 questions with five multiple choices according to Likert Spectrum (from 1 to 5).

Reliability of Questionnaire: Cronbach's Alpha Index was used in this study to define reliability of questionnaire. In such this tool, the answer of each question may bear various numerical amounts. To calculate this index, the variance of scores for each sub-group of questions and also the total variance should be calculated at first. Then, Alpha Index should be calculated by means of related formula.

Reliability index may be calculated by following formula:

$$r_b = \frac{j}{j-1}\left(1 - \frac{\sum s_i^2}{s^2}\right)$$

r_b= Total validity index of test, j= The number of questions, s_i^2= The variance of component i for the current sample, s^2= The variance of the observed total test scores.

Substituting related figures in above formula, reliability index for learning organization is calculated as:

$$\frac{37}{36}\left(1 - \frac{0/52}{546/6}\right) = 0/93$$

This index is 0.93 for our questionnaire which refers to a high level of reliability for our measurement tool.

Validity of Questionnaire: Professionals of organizational behavior confirmed the validity of our questionnaire in five dimensions of a learning organization after being prepared and arranged by researcher.

Analysis of Data: In this part, individual qualifications of statistical samples are defined by number and percent.

Table-1
Distribution of statistical sample of teachers and administrators according to their education

Certificate	Number	%
Associate of Arts	18	22.5
Bachelor of Arts	57	71.25
Master of Arts	5	6.25
Sum	80	100

Findings of table 1 show that 22.5% of teachers and administrators hold an AA certificate, 71.25% of them hold a BA certificate and 6.25% of them hold an MA certificate.

Table-2
Distribution of statistical sample of teachers and administrators according to their field of study

Field	Number	%
Humanitarian	64	80
Other	16	20
Sum	80	100

According to the findings of table 2, 80% of teachers and administrators have studied in humanitarian fields, and 20% of them have studied other sciences.

Table-3
Distribution of statistical sample of teachers and administrators according to their position

Position	Number	%
Managers and their assistants	64	80
Teachers	16	20
Sum	80	100

According to findings of table 3, managers and their assistants include 20% of sample and teachers include 80% of sample.

Table-4
Distribution of statistical sample of teachers and administrators according to their working background

Working background	Number	%
less than 10	22	27.5
10-20	31	38.75
20-25	20	25.0
more than 26	7	8.75
sum	80	100

Findings of table 4 shows that 27.5% of teachers and administrators have less than 10 years working background, 38.75% have between 10 and 20 years background, 0.25% have between 20 and 25 years background and 8.75% more than 26 years background.

Table-5
Distribution of statistical sample of teachers and administrators according to their age

Age	Number	%
less than 40	40	50.0
41-50	34	42.5
more than 51	6	7.5
sum	80	100

Table 5 shows that 50% of teachers and administrators were less than 40, 42.5% were between 41 and 50, 4.5% were between 40 and 50 and 7.5% were more than 51.

Table-6
A comparison between average score of learning organization dimensions according to working position

Dimensions	Mean	t-score	Probability
Personal Mastery	3.628	8.08	0.000
Mental Model	3.56	5.97	0.000
Shared Vision	3.52	5.87	0.000
Team Learning	2.33	3.87	0.000
Systems Thinking	3.55	7.4	0.000

According to table 6 the level of application of learning organization dimensions among teachers and administrators is more than average except for Team Learning. In the other words, teachers and administers at Technical-Professional Centers of Kashan, had a belief that their schools should be considered as learning organizations.

Question 1: Is there any relationship between the concept of teachers and administrators about level of application of learning organization dimensions according to education?

Following table represents answers to this question.

Table 7 represents average score of learning organization dimensions in viewpoint of teachers and administrators according to their education. In this table average scores of dimensions have a little difference according to the level of education. So, MANOVA Test (analysis of multiple variances) was used for a more accurate comparison between these averages. According to calculated f and sig (significance level), it is obvious that there is no significant difference between averages. Table 8 represents output of this analysis.

As, observed F is not significant in $P \leq 0.05$ level, it is said that there is no significant difference between dimensions of learning organization in relation to education of teachers and administrators. As the rate of relationship and correlation of dependent variable and explanation of variable's variance, Eta and Power statistics show that this relationship is rejected.
Question 2: Is there any relationship between the concepts of teachers and administrators about the rate of application of dimensions of learning organizations according to their education?

Table 9 represents the answers to this question.

Table-7
A comparison between average scores of learning organization dimensions in viewpoint of teachers and administrators educational level

Certificate / Component	Associate of Arts		Bachelor of Arts		Master of Arts	
	Mean	Variance	Mean	Variance	Mean	Variance
Personal Mastery	3.631	2.5	3.627	1.79	3.636	2.02
Mental Model	3.419	2.67	3.421	1.62	3.414	1.92
Shared Vision	3.518	2.44	3.526	2.82	3.519	2.96
Team Learning	2.333	2.82	2.341	2.82	2.238	2.92
Systems Thinking	3.560	2.24	3.594	3.59	3.551	2.53

Table-8
A brief variance multiple analysis (MANOVA) according to level of education

	Component	F	Sig.	Eta	Power
level of education	Personal Mastery	1.106	0.497	0.017	0.159
	Mental Model	1.417	0.238	0.022	0.416
	Shared Vision	1.88	0.175	0.049	0.272
	Team Learning	0.088	0.768	0.001	0.060
	Systems Thinking	1.55	0.217	0.024	0.234

Table 9 reflects a comparison between average scores of dimensions of a learning organization in viewpoint of teachers and administrators according to their Field of Study. T-test is used for this consideration. According to field of Study, output of test shows that there is a significant difference between Personal Mastery with average scores of dimensions of a learning organization. As regards the significance level for this component is less than 0.05, so the difference between average scores of this component is significant for teachers and administrators.

Question 3: Is there any relationship between the concepts of teachers and administrators about the rate of application of dimensions of learning organizations according to their working background?

Following table represents the answers to this question.

Table 10 represents a comparison between the mean of dimensions of a learning organization in viewpoint of teachers and administrators according to work experience. In this table, two descriptive statistics of "mean" and "standard deviation" are used. According to the mean statistics, it can be said that there is no significant difference between dimensions from viewpoint of mean average based on working experience.

Table 11 is the output of multivariate variance analysis, in fact, to assess significant difference between dimensions of a learning organization according to work experience. In above table, it can be said according to *f* statistics and significance levels that significance level for none of the dimensions is calculated less than 0.05, which refers to indifferent dimensions according to work experience. *Eta* and *Power* statistics also reject this difference strongly.

Question 4: Is there any relationship between the concepts of teachers and administrators about the rate of application of dimensions of learning organizations according to their age?

Table-9
Average degree of dimensions of a learning organization from viewpoint of teachers and administrators according to field of study

Field / Component	Humanitarian		Other			
	Mean	**Variance**	**Mean**	**Variance**	**t**	**P-Value**
Personal Mastery	3.711	1.46	3.439	2.21	2.710	0.030
Mental Model	3.419	1.71	3.425	1.65	1.110	0.290
Shared Vision	3.522	1.70	3.527	1.19	1.324	0.167
Team Learning	2.337	1.70	2.345	2.16	1.243	0.186
Systems Thinking	3.551	2.38	3.552	2.04	1.003	0.310

Table-10
A comparison between dimensions of learning organization in viewpoint of teachers and administrators according to work experience

Experience / Dimensions	Less than 10		10-20		20-25		More than 26	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Personal Mastery	3.656	1.70	3.659	1.74	3.655	1.84	3.654	1.45
Mental Model	3.422	1.51	3.420	1.48	3.418	1.46	3.423	1.58
Shared Vision	3.522	1.56	3.519	2.88	3.525	1.87	3.539	1.97
Team Learning	2.230	2.12	2.328	2.07	2.401	2.05	2.238	2.07
Systems Thinking	3.550	1.89	3.559	1.92	3.548	1.17	3.544	2.14

Table-11
A brief variance multiple analysis (MANOVA) according to Work Experience

	Component	**F**	**Sig.**	**Eta**	**Power**
Work Experience	Personal Mastery	1.902	0.158	0.056	0.381
	Mental Model	0.804	0.452	0.025	0.182
	Shared Vision	0.114	0.892	0.004	0.067
	Team Learning	2.352	0.690	0.012	0.108
	Systems Thinking	0.052	0.950	0.002	0.057

The results are reflected in following table.

Table 12 shows a comparison between average score of dimensions of a learning organization in viewpoint of teachers and administrators according to age groups. In this table, two descriptive statistics of "mean" and "standard deviation" are used. According to the mean statistics, it can be said that there is only a significant difference in component of Personal Mastery in which average scores are various according to age groups. No difference is observed in other dimensions.

Table 13 is arranged to test the difference of average scores of dimensions of a learning organization according to age groups. In this table, multivariate variance analysis test is used. Observed *f* and its significance level represent a significant difference only in component of individual capabilities, namely the significance level is equal with 0.002 referring that the component is significant in the level less than 0.01. *Eta* and *Power* statistics confirm this difference.

Question 5: Is there any relationship between the concepts of teachers and administrators about the rate of application of dimensions of learning organizations according to their position?

The results are reflected in table 14.

Table 14 reflects a comparison between average scores of dimensions of a learning organization in viewpoint of teachers and administrators according to their positions. T-test is used for this consideration. According to working position, output of test shows that there is a significant difference between Personal Mastery, Team Learning and Systems Thinking with average scores of dimensions of a learning organization. As regards the significance level for these dimensions is less than 0.05, so the difference between average scores of these dimensions is significant for teachers and administrators.

Table-12
A comparison between dimensions of learning organization in viewpoint of teachers and administrators according to age

Age / Component	Less than 40		41-50		More than 51	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Personal Mastery	4.066	1.74	3.247	1.26	3.251	2.01
Mental Model	3.417	1.81	3.422	1.20	3.431	1.88
Shared Vision	3.523	2.07	3.521	2.09	3.525	1.77
Team Learning	2.337	2.30	2.339	1.08	2.349	1.32
Systems Thinking	3.558	1.98	3.549	1.06	3.547	1.37

Table-13
A brief variance multiple analysis (MANOVA) according to Age

	Component	F	Sig.	Eta	Power
Age	Personal Mastery	6.770	0.002	0.175	0.906
	Mental Model	0.434	0.650	0.013	0.118
	Shared Vision	1.330	0.270	0.040	0.278
	Team Learning	0.238	0.789	0.007	0.086
	Systems Thinking	2.630	0.079	0.076	0.507

Table-14
A comparison between dimensions of learning organization in viewpoint of teachers and administrators according to position

Position / Component	Administrators		Teachers			
	Mean	**SD**	**Mean**	**SD**	**t**	**P-Value**
Personal Mastery	4.066	1.74	3.247	1.26	2.234	0.029
Mental Model	3.417	1.81	3.422	1.20	1.090	0.0280
Shared Vision	3.523	2.07	3.521	2.09	1.491	0.148
Team Learning	2.337	2.30	2.339	1.08	2.121	0.040
Systems Thinking	3.558	1.98	3.549	1.06	2.715	0.030

Results and Discussion

The results indicate that teachers and administers at Technical-Professional Centers of Kashan, had a belief that their schools should be considered as learning organizations. In addition, the results show that there is no significant difference between dimensions of learning organization in relation to level of education and work experience of teachers and administrators.

Morever, according to field of Study and age groups, output of test shows that there is a significant difference in Personal Mastery with average scores of dimensions of a learning organization, and, According to working position, output of test shows that there is a significant difference between Personal Mastery, Team Learning and Systems Thinking in dimensions of a learning organization.

Conclusion

According to result, it can be said that work experience is not the only factor that affect operation rate of learning organization. It seems that if work experience comes with necessary training and personal attempt, this dimension can work as an influential factor.

On the other hand, the concepts of Personal Mastery, Team Learning and Systems Thinking out of five dimensions are more tangible and subjective toward other Mental Models and Shared Vision which are considered in organizations and managing theories somehow. The discussion of Shared Vision and Mental Models is the discussion of mental and intangible subjects not being suitable in previous managing theories. The difference may arise due to new application of this concept in theories of management.

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