International Scholars Journals

International Journal of Educational Research and Reviews ISSN 2329-9843 Vol. 3 (4), pp. 191-200, June, 2015. Available online at www.internationalscholarsjournals.org © International Scholars Journals

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Full Length Research Paper

A study of the opinions of faculty members towards Acquiring agricultural education in Iran

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Accepted 12 May, 2015

This study was conducted to explore the subjective opinions of faculty members about the elements of organizational learning at the agricultural and natural resources campus (ANRC) of University of Tehran. The number of faculty members was 120, randomly drawn from the selected population at ANRC. The findings showed that about 70.1% of the total community variance of organisational learning items was determined by extracted factors. Finding also revealed sharing experiences and interest in innovation, information exchange and external responsiveness, internal dynamism, participatory learning and action are shown to be the most important dimensions (factors) and the most predictive of whether the changes (38%) sought will actually be made to the research model of a learning organization. The results that according with the dimensions of a learning organization clearly indicated that the highest percentage of variance attributable to the system levels of ANRC as a higher education institution is placed on the various levels of organization, individual, global and team, respectively.

Keywords: Learning organization, higher education, agriculture.

INTRODUCTION

Higher education is organized around a matrix of relationships that are political, bureaucratic, collegial and, increasingly, economic (Stevenson, 2001). However, higher education currently faces a number of obstacles that were familiar to the automobile industry in the 70's and 80's (Jasinski, 1999). "Educational costs continue to escalate, with no demonstrable improvement of results," (Karathanos,1999). These challenges in higher education include new competition in the form of high demand for online course work, and demands for quality products, increased accountability, and new marketplace requirements (Veisi et al., 2008). In line with these challenges, Higher education institutions need to be highly adaptable and must continue to improve if they want to succeed and take the lead in a fast- paced, competitive and unpredictable environment (Sun, 2003). Since achieving the highest levels of performance requires a well-executed approach to organizational and personal learning, promoting organizational learning in higher education to achieve quality of educational outcomes is a goal of visionary leaders. The key questions to ask is therefore: What would be different if we structured our colleges and departments in higher education to be learning organizations? Using the dimensions of a learning organization, principles, policies, and practices can be created to promote ongoing change and development in higher education (Bauman, 2005). Accordingly, it is important to understand how Higher Education Institutes (HEIs) are building learning organizations. For this purpose they need an organizational learning plan that determines what higher education institutions need to learn in order to do what they do better. To develop an organizational learning

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plan, this study will first determine the components of organization learning in the Agriculture and Natural Resources Campus (ANRC) of University of Tehran; after that, we will propose a model for transforming an HEI into a learning organization.

Theoretical Background

Learning is the central work of colleges and universities (Veisi et al., 2008). Therefore, for a higher education institution in this information age to grow and succeed, it must become a learning organization that understands both its roots and can branch out to new endeavors (Daniel, 2004). According to Walton (1999) and Juceviciene (2009), organizations may develop into learning organizations by choosing one out of two strategic directions:

1. Systemic development of a learning organization: the vision of a learning organization is conceptualized and the systemic solutions of its implementation are implemented in practice. In this regard, the most popular definition of the learning organization is the one proposed by Senge (1990) as: 'where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, and where collective aspiration is set free'. The characteristics of such organization, or the so-called five disciplines are: a) personal mastery (expressed through personal self-development and growth), b) mental models (deeply ingrained assumptions, picture, images that influence employees' understanding of the world and the actions they take), c) shared vision (a shared picture of the future), d) team learning (which increases collective intelligence, knowledge and insights of the collectivity), e) systemic thinking (a framework for identifying patterns and inter-relationships, dealing with issues holistically). In such an organization, the conditions to learn, adapt and change are created (Jamali et al., 2006). With all due respect to the importance of learning organization for organizational knowledge and knowing, the development of learning organization calls for concentration on the processes of learning on all levels and their enabling.

2. The development of learning organization by the principle of 'side effect'. In this case, organization first of all takes care of improving its various activities, whereas the characteristics of the learning organization form as a 'side effect'. In this context, the traits of learning organization are usually acquired when the activities are improved on the following aspects (Walton, 1999):

- Cultural (e.g. learning to overcome the cultural differences by working in the team and seeking to become a multicultural organization);
- Learning initiatives (the employees are motivated to plan their self-development and actively learn from each other);
- Information systems (systems are adjusted so that people can express their ideas, are capable of 'capturing' learning and accumulate its results);
- Structures (the structures are created that promote dialogue, creativity and information exchange, are easily adjusted to the solution of new tasks).

To achieve the development of a learning organization by the principle of 'side effect' in higher education, the Higher Education Funding Council for England (HEFCE) (2005) addressed 12 activities to transform toward a learning organization. These were: 1) change in understanding of individual and organizational learning; 2) provide knowledge based collaboration; 3) develop team learning; 4) change the managers role to facilitator; 5) embrace experiment and risk; 6) provide structures, systems and time for learning; 7)establish mechanisms for sharing learning and teaching; 8) fallow information in organization; 9) develop system thinking; 10) promote a learning culture; 11) develop a landscape for organizational excellence; and 12) institutionalization of organizational learning.

With specific reference to agricultural higher education institutions, Lieblein et al. (2000) described a future active learning university in which 'the campus environment is represented by an open building for learning the building block sciences and humanities in an even more integrated format than in the previous example. Numerous options for organization are possible within this building, and different universities may choose to use different models according to their goals and students. Walls, ceilings, roof, and floor are all porous boundaries, indicating a continuing interchange of information and experience with outside sources and clients. Applied research and learning has been moved to the field. Strong linkages of university instructors and students with people and questions outside the conventional campus can be achieved by moving off campus, or by redefining what is a 'campus.' Action research with students learning in the field and with full participation of many stakeholders is one vehicle to achieve this link. Another approach is broadening the concept of 'faculty' to include new instructors for specific topics in the university classroom and as learning catalysts in other settings: farmers and ranchers, people from commercial enterprises and non-profit groups, natural resource managers, government agency specialists and beyond. This step also expands what is now called 'the agricultural sector', since it includes a multiplicity of players in the food system and connected activities in society. In research, teams of university faculty and students will interact on a collegial basis with partners in farming and the food industry through case studies that bring real-world problems into the classroom and students into the field (applied technical research / education). Much education will

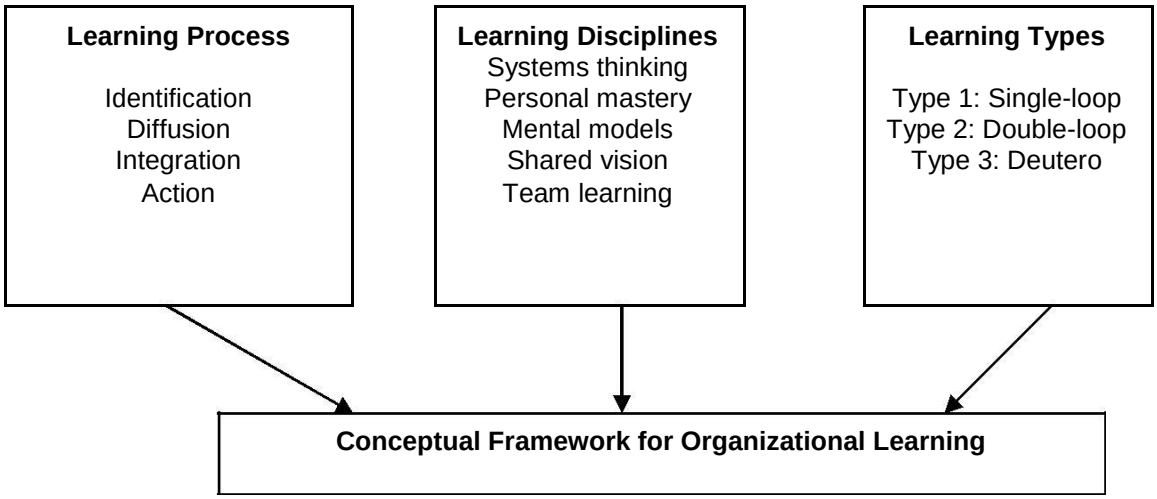

Figure 1. Conceptual framework for organizational learning. Note: Adapted from Pawlowsky (2001) and Hübner (2002)

l occur outside the classroom and off campus. This obviously happens today, but we often fail to recognize and validate the importance of learning in a wide range of contexts. Action-based research and education have potential to revitalize the future university learning environment, especially when coupled with reflection on the experience. Students will be able to see and develop applications of their academic studies through interactions with people in the farming and food systems who face daily tests in their business decisions. There is also the enablement of continuous feedback from clients into university research and education programs, because clients can interact frequently with faculty and students. Student faculty teams will learn in cooperation with farmers and others in specific agroecozones and businesses.'

Based on research literature above, in the framework of the development of learning organization by the principle of 'side effect', we explored all activities for promoting the organizational learning as a strategy to transform into learning organization Liao et al., (2010) in agricultural higher education insitutions. For this, an integrative learning model was employed that embraced three dimensions of organizational learning: (a) different learning modes, such as cognitive, cultural, and action learning, (b) different learning types, and (c) different phases of the collective learning process. These dimensions (Figure 1) can be regarded as basic cornerstones of an integrative conceptual framework and promotion of organizational learning (Pawlowsky, 2001).

One of the cornerstones is the learning disciplines that have been mentioned earlier. Different learning types are a second central issue in managing organizational learning. The responsibility for making simple corrections to the outcomes of actions should be delegated as far down in the organizational hierarchy as possible. The learning types include i) the single- loop learning effect which involves making adjustments to given standards and actions; and ii) the double-loop learning which implies that mismatches in the outcomes are corrected by first examining and altering the governing variables, and then the actions. Management should select the appropriate learning type that is useful under different learning circumstances. The management of learning processes within the framework of different phases is the third important cornerstone. In order to identify the phase of the learning process, a number of questions can be posted that will help to find the right answer. The identification of the information phase which is relevant for learning or for the creation of new knowledge needs special attention. One has to ask, for example, what is the best way to combine existing knowledge and past experience in order to generate new knowledge. With respect to the second phase - the diffusion and exchange of knowledge either from the individual to the collective level, or at the collective level itself - it is necessary to analyze the flow of information within the organization, and the type of communication that seems to be the most effective. The modification and integration phases of organizational learning refer to the process by which new knowledge is integrated into the daily operations of the institution. It is necessary to question existing theories -in-use and eventually modify existing assumptions on the basis of new insights (Hübner, 2002).

METHODOLOGY

The study adopted a descriptive survey design. The population identified to participate in this study was faculty members in agricultural campus of university of Tehran during autumn 2008 (N = 185). Accepting 5% error from the mean (e) and 95% confidence interval (t = 1.64), the minimum sample size was calculated as 120. Data were collected by administering a structured questionnaire consisting of items mostly selected from the generalizations defined by Lieblein et al., (2000), Goh (2001) and Neefe (2001), to assess the faculty members' statements with regard to organizational learning components. A five-point, Likert-type scale (1=Low, 5=High) was used to indicate the degree of agreement with the items of organizational learning. The panel of experts (Agricultural faculties) was used for assuring content validity. The questionnaire was pilot tested for clarity and reliability, using agriculture faculties from University of Tehran. The Cronbach's Alpha coefficient of internal consistency for the items measuring organizational learning was 0.85. According to Hair et al., (1995), the commonly used coefficients limiting value of acceptable reliability is 0.7. Minor revisions were made to the questionnaire to improve clarity and the internal consistency of the instrument.. A total of 120 faculty members were randomly selected from NARC of Tehran university to represent the population. Analyses of data were accomplished by exploratory factor analysis, using principal component analysis of responses on 45 organisational learning items and varimax rotation, in which indicated the most likely structure of the organisational learning construct.In interpreting the retained factors we only used variables with loadings above 0.4 (i.e. variables with high influence). Further, we looked for a logical connection (also called a Álatent factor') between the magnitude and direction of the loadings of these variables.

RESULTS

The results of this study demonstrates, in relation to the respondents' demographic characteristics as well as their organizational characteristics, revealed that that the average age of the respondents was 44.32 years and average number of years of employment in the current job was 12.2 years. Participants in this study were drawn from several agricultural disciplines within the campus. The largest number of faculty members had concentrated their undergraduate studies in the area of animal science (40.3%), followed by 20.8% in the area of horticultural science. Fewer faculty members reported their agricultural specializations as crop science (10.4%) and soil science (3.9%). Several faculty members reported a dual focus for their agricultural studies, combining disciplines such as agricultural engineering, agricultural economics, and biological sciences with animal science, horticultural science, or crop science disciplines.

Factor analysis to determine of the dimensions of an learning organization

The appropriateness of the data for factor analysis was evaluated using Bartlett's Test of Sphericity (BTS). BTS (BTS=1104.721, p<.000) suggests that the bivariate correlations among the items of organizational learning are significantly different from zero and therefore appropriate for factor analysis. Further, the sampling adequacy, as evaluated by Kaiser's Measure of Sampling Adequacy, appears to be acceptable at a value of 0.79. Table 1 shows all the factors extractable from the analysis along with their eigenvalues, the percentage of variance attributable to each factor, and the cumulative variance of the factor and the previous factors. As the results indicate, that there are 11 factors to measure the construct of organizational learning at about 70.10 percent; the variance that the first factor accounts is for 14.73 % of the variance, the second 9.45 %, the third 8.16.95 % and so on.

Table 1 also shows the loadings of the variables on the factors extracted. The higher the absolute value of the loading, the more the factor contributes to the variable. The gap in the table represents loadings that are less than 0.4, which makes reading the table easier, we suppressed all loadings of less than 0.4. Regarding the Varimax Rotation matrix (Table 1), the idea of rotation is to reduce the number of factors on which the variables under investigation have high loadings. Rotation does not actually change anything but makes the interpretation of the analysis easier. Verbal description of the factors:

Factor 1 items include: shared new useful work with all employees; rewarded innovative ideas by leadership; overlap in work between different units; forming informal groups to solve organizational problems; the opportunity to talk to other faculties about successful programs or work activities in order to understand why they succeed; provision of action-based learning environments; opening mangers to change and new ideas; and no resistance and towards change and new ideas. All of these are substantially loaded on factor (Component) 1. According the nature of items covered by this factor, factors are sub-divided into management skills and organizational environment.

Factor 2 expresses cooperation and interaction with bodies' off -campus as the system allows learning of successful practices from other departments, integrating education across disciplines with team teaching of courses, a faculty that includes instructors from outside the formal structure, and close linkages of the classroom with the field; finally, farmers, ranchers, consumers, industry and agency people are used as co-teachers and co-learners in a multi-tiered, student-focused learning model within the campus.

Factor 3: Behind this factor is the idea that there is movement towards organizational improvement and better performance (internal dynamism) among mangers and faculty members for getting achieving the goals of the ANRC. In this term, such items as the opportunity to

Table 1. Total Variance Explained

Factor (components of organizational learning)	Extraction Sums of Squared Loadings			Rotated Component (Factor) Matrix		
	Total	% variance	Cumulative %	Total	% variance	Cumulative %
Factor 1	14.41	32.76	32.76	6.48	14.73	14.73
Factor 2	2.65	6.04	38.80	4.15	9.45	24.18
Factor 3	2.26	5.13	43.94	3.59	8.16	32.35
Factor 4	1.95	4.43	48.37	2.72	6.18	38.53
Factor 5	1.81	4.11	52.49	2.38	5.41	43.94
Factor 6	1.62	3.69	56.18	2.27	5.15	49.10
Factor 7	1.34	3.04	59.23	2.09	4.76	53.87
Factor 8	1.29	2.94	62.17	1.94	4.42	58.29
Factor 9	1.26	2.87	65.05	1.82	4.15	62.44
Factor 10	1.26	2.63	67.69	1.79	4.07	66.52
Factor 11	1.061	2.41	70.10	1.57	3.57	70.10

work on challenging assignments and self-assessment with respect to goal attainment managers, sharing a common vision of what their work should accomplish, a shared set of visions for the new curriculum to be developed and implemented among stockholders and encouraging questioning of the way things are done, have the greatest weighing loaded on this factor.

Factor4: This factor relates to participatory learning and action. Regarding this, involvement of employees and faculties in important decisions and providing participatory and team opportunities for skills and employee training are items substantially loaded on it.

Factor 5: This factor places the emphases on systems thinking, in which items include: encouraging employees (mangers, faculties and staff member) to understand the perspectives of people in other positions, informing faculty members of how their role contributes to the overall organizational process and creating multidisciplinary research and learning teams across departments that focus on broad systems. These are the key components substantially weighted on it (Table 2).

Factor 6: This factor represents a statement that encourages dialogue and research among stockholders through respecting students' and other stockholders' comments and complaints, coordinating the activities of the different departments on campus and giving widespread support and acceptance to the campus vision statement.

Factor 7: Behind this factor lies the idea that organizational excellence and development is an Important important part of organizational learning in higher education. Having a system that allows for the learning successful practices from other organizations and departments, continuous feedback from on-campus research and education and the existence of a feedback mechanism that helps to identify potential problems and opportunities are fundamental elements of this factor.

Factor 8: This factor expresses knowledge-based cooperation through encouraging employees to solve problems together and form problem solving groups that feature employees from a variety of functional areas or departments.

Factor 9: This factor relates to the proper organizational context for raising learning. Based on loaded weights, providing opportunities to share knowledge and skills learned from training and the full use of faculty members' skills and abilities are the main steps towards providing a proper organizational context for raising learning.

Factor 10: This factor expresses the creation of continuous learning opportunities in higher education systems through bringing new ideas into the department, providing opportunities to improve knowledge, skills and abilities in order to undertake new work assignments and receiving new skills training that can be applied to improving work immediately.

Factors 11: This factor emphasizes an open atmosphere of organization. In other words, it encourages individuals and teams to reflect on actions which led to successes or failures and accept criticisms by managers

Table 2. Factor Analysis with Varimax Rotation

Variables	1	2	3	4	Rotated Component (Factor) Matrix
New work processes that may be useful to the organization as a whole are usually shared with all employees.	0.63				Sharing experiences and interest in innovation
Innovative ideas that work are often rewarded by leadership	0.63				
We don't r require approval in writing for the introduction of new work activities	0.54				
There is much overlap in work between different units in the organization	0.64				
I often have an opportunity to talk to other staff about successful programs or work activities in order to understand why they succeed	0.49				
on campus, for students and faculties there are action-based learning environments where people can see the applications of their work, and understand their implications for the larger society	0.73				
We problem solve by not only identifying the solution, but by identifying what led to the problem and how it can be prevented	0.67				
Mangers in this organization are open to change and new ideas	0.52				
Senior managers in this organization resist change and are afraid of new ideas	0.60				
Management skills such as leadership, coaching and teambuilding are emphasized as much as purely technical work skills in this organization	0.58				
I understand how the vision of this organization is to be achieved		0.67			Informing and External responsive
In my experience, new ideas from staff are welcomed by management		0.48			
We have a system that allows us to learn successful practices from other departments.		0.68			
In this campus, integrated education across disciplines with team teaching of courses, a faculty that includes instructors from outside the formal structure, and close linkages of classroom with field are encouraged.		0.56			
In this department, farmers, ranchers, consumers, industry and agency people are co-teachers and co-learners in a multi-tiered, student-focused learning model within the campus.		0.52			

Table 2. cont.

I have opportunities to work on challenging assignments				0.51				
Managers and employees in this campus share a common vision of what our work should accomplish.					0.68			Internal Dynamism
We have opportunities for self-assessment with respect to goal attainment					0.69			
There are a shared set of visions for the new curriculum to be developed and implemented among stockholders.					0.70			
From my experience, people who are new to this department are encouraged to question the way things are done					0.53			
In our department, action research and education put students in the problem-solving mode and in frequent communication with clients outside the university						0.44		Participatory Learning and Action
Training in this organization is done in work teams						0.81		
Managers in this campus frequently involve employees and faculties in important decisions						0.57		
Employee training is emphasized equally at all levels in this organization.						0.46		
	5	6	7	8	9	10	11	
Employees (mangers, faculties and staffs) are encouraged to understand the perspectives of people in other positions..	0.41							Systems Thinking
Employees (mangers, faculties and staffs) are informed of how their role contributes to the overall organizational process.	0.63							
Multidiscipline research and learning teams across departments that focuses on broad systems are key components	0.76							
We encourage students and other stockholder's comments and complaints because they help us to do a better job		0.52						Encouraging dialogue and research
The activities of the different departments in this campus are well coordinated		0.72						
There is widespread support and acceptance for the campus vision statement		0.82						
We have a system that allows us to learn successful practices from other organizations and departments.			0.80					Motivating toward organizational excellence

Table 2. cont.

Continuous feedback from on-campus research and education through 'knowledge-based action' that is applied in the field, and through 'action-based knowledge' that enriches the classroom learning environment are emphasizes.	0.45					
Managers in this organization often provide feedback that helps to identify potential problems and opportunities	0.46					
We can usually form informal groups to solve organizational problems		0.64				Knowledge Based Cooperation
Current organizational practice encourages employees to solve problems together before discussing it with a supervisor.		0.36				
Most problem solving groups in this organization feature employees from a variety of functional areas or departments		0.76				
I have opportunities to share my knowledge and skills learned from training with other employees			0.82			Providing proper organizational context for raising learning
My work makes full use of my skills and abilities			0.51			
Managers in this organization encourage employees to experiment in order to improve work processes			0.35			
I have opportunities to improve my knowledge, skills and abilities in order to undertake new work assignments.				0.67		Create continuous learning opportunities
I can often bring new ideas into the department				0.33		
The new skill training I receive can be applied to improve my work immediately				0.58		
Individuals and teams are encouraged to reflect on actions which led to successes or failures					0.50	Open atmosphere of organization
Managers in this organization can accept criticism without becoming overly defensive					0.66	

without becoming overly defensive; these are the items that are substantially loaded on it.

DISCUSSION

The findings of the study supported and confirmed the applicability of the proposed conceptual framework for organizational learning, since about 70.1 percent of the variance is determined. The results of study have shown that sharing experiences and interest in innovation and external responsiveness, internal dynamism, participatory learning and action are the most important dimensions of this conceptual framework and the most predictive of whether the changes (38%) sought will actually be incorporated into the model. This supports the argument

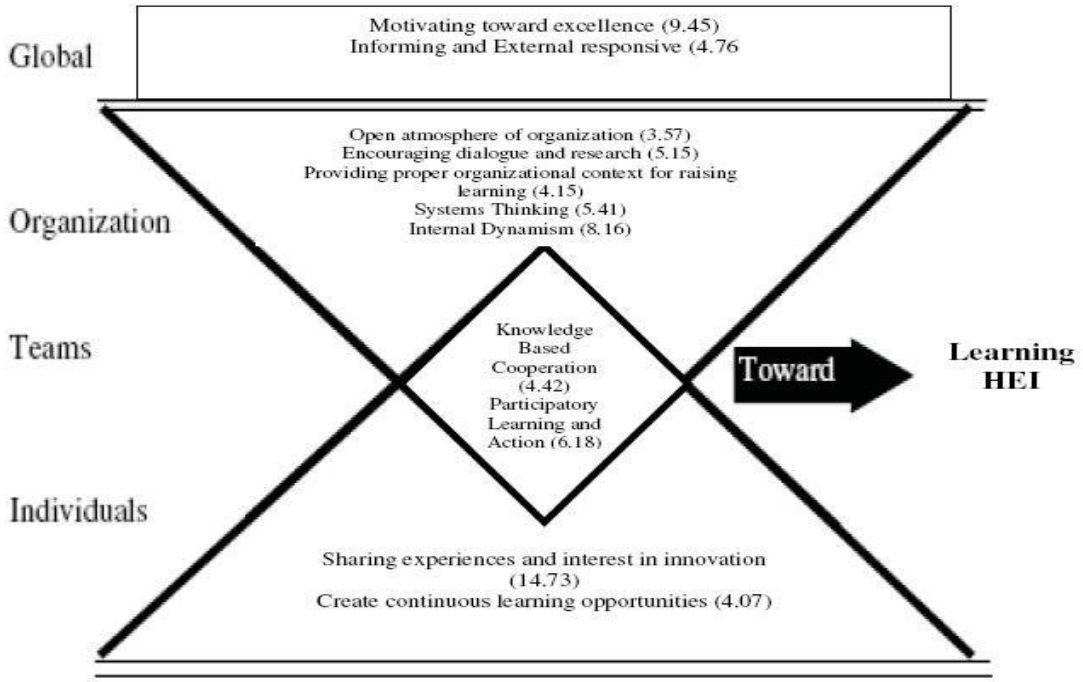

Figure 2. Model of Dimensions of a Learning Organization in ANRC

by Boyce (2003) that "encouraging organizational learning through specific practices such as inquiry and dialogue; continuously utilizing action learning; and institutionalizing and embedding changes in the structures, systems, and cultures of the institution is essential to achieving and sustaining change in higher education." This study has also found that providing a proper organizational context for increasing learning, creating continuous learning opportunities and participatory planning are the least predicative of the changes of the research model. This finding is in contradiction with the necessity of attaching change to structures that emerged from Clark's study of successful change in five universities (1998). Comparison of the results of this study with those reported in the literature confirms many of the findings from the current studies and highlights consistent themes in the faculty members' opinions. The 11 determined factors are in accordance with Hübner.'s conceptual framework for organizational learning. With regards to these at first, external responsiveness and knowledge-based cooperation are associated with components of the learning process in the conceptual framework. Then, the following factors-systems thinking, providing a proper organizational context for raising learning, encouraging dialogue and research and sharing experiences and interest in innovation-are related to the learning disciplines. These, according to Senge's theory are the five disciplines that are necessary for transformational learning. Finally, the factors of participatory learning and action, motivating toward organizational excellence and organizational flexibility and innovation that are related to the learning types are a central issue in managing organizational learning (Hubner 2002).

RECOMMENDATIONS

Model and Organizational Learning Plan in ANRC

Finally, in the development of learning organization by the principle of 'side effect', the determined factors are first classified on the basis of system levels (i.e. individual, team, organization and global). The results clearly indicate that the highest percentage of variance attributable on system levels of higher education institutions is placed upon the levels of organization, individual, global and team respectively (Figure 2).

With regard to the priority of learning at system levels, the actions for implementation are suggested as a four-step organizational learning plan:

The first step is the creation of a culture, structure, and environment which is conducive to learning. Research about the culture, structure, and environment of higher education provides us with indicators for sustainable change. Bergquist (1992) proposed the idea of four competing cultures in the academy: the collegial, managerial, developmental, and negotiating cultures. In examining culture and change, Bergquist observed that all four cultures exist in tension with each other in colleges and universities. Additionally, Bergquist categorized the expression of these cultures into three institutional domains: structure, process, and attitude. Since he focused on change in higher education institutions, Bergquist asserted that organizational change is necessary in each of the three domains. Training in brainstorming, problem solving, evaluating experiments and promoting; one-to-one communications, commonality (a sense of common purpose), parity (equal respect for people whatever their status), multiplicity (encountering people in different roles) and durability (investing in long-term relationships) within Departments among faculty members and managers are just a few learning skills and practices which are essential. In association with the model and type of learning, this step is designed to enhance cultural and double-loop learning.

The second step is to improve faculty members' skills and capabilities. The university needs to embrace new paradigms, such as university–community collaborations that promote greater engagement with community realities and needs and this further necessitates a cross-disciplinary (even a-disciplinary) approach. This helps to break down the traditional scientific association with abstract (and sometimes irrelevant) theory by emphasizing theory that is grounded in practice. This step is also in accord with the cognitive and single-loop approach.

The third step regards change at the team level. For this, the suggestion is to have strong linkages of university instructors and students with people outside the conventional campus which can be achieved by establishing the centers of excellence and moving off-campus or by redefining what the campus is. The result of this step is to enhance action and deutero learning in a conceptual framework.

The fourth step is to open up boundaries and stimulate the exchange of ideas in a global environment. This could be achieved through conferences, meetings, and project teams which either cross organizational levels or link the higher education institutions and its stockholders. For example, symposiums bring together external and internal groups to share ideas and learn from one another. Together, these efforts help to eliminate barriers that hinder learning and begin to move learning higher on the organizational agenda. They also suggest a shift in focus, away from continuous improvement towards a commitment to learning. This step is to promote cultural learning and cognitive learning together.

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