

Organization for Economic Co-operation and Development guidelines for learning organization in higher education and its impact on lifelong learning – evidence from Indian business schools

Guidelines for learning organization

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Abstract

Purpose – Lifelong learning has gained significant research attention world over because of its potential to enhance and ensure continuous employability. However, role of higher education institute as a learning organization to develop lifelong learning attitudes among young adults has not been discussed much. Parameters that determine lifelong learning among working professionals or school-going children may differ from that of prospective managers studying in business schools. Organization for Economic Co-operation and Development (OECD) have given guidelines on learning organization in higher education context which has not been empirically tested. The present study aims to develop a scale on learning organization based on the OECD guideline. It also aims to explore the impact of learning organization and learning processes on lifelong learning attitude in Indian business schools.

Design/methodology/approach – The present study develops a multidimensional scale to measure business schools' perceived level of performance as a learning organization from the perspective of faculty. The scale considers a learning organization as a multidimensional second-order construct comprising organizational climate for learning, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication. Exploratory factor analysis (EFA) has been used to refine and validate the scale. The study also assesses the impact of business schools' performance as learning organization on perceived learning processes and lifelong learning attitude from the perspective of business school students by using structural equation modeling.

Findings – The study reveals that a learning organization is characterized by organizational climate for learning, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication. Learning organization determines both perceived learning processes ($\beta = 0.397$) and lifelong learning attitude ($\beta = 0.259$). The relationship between learning organization and lifelong learning partially mediates through learning processes (Sobel's statistics = 1.82, p -value = 0.068, indirect effect = 29%). Lifelong learning is characterized by self-regulated reflective learning with knowledge gained through various sources including virtual sources.

Originality/value – Literature adequately speaks about various scales on learning organization, but there is no specific scale developed, so far, for higher education institutes. Thus, the unique contribution of the present study is the development of a new scale on learning organization based on OECD guidelines on higher education. The scale has been developed based on survey of faculty members and students of Indian business schools. The scale can be used to assess academicians' perception toward effectiveness of a learning organization. Such information would help in formulating strategies on what should be the characteristics of



teaching–learning process, knowledge acquisition and knowledge dissemination to ensure lifelong learning and continuous employability.

Keywords India, Business schools, Learning organization, OECD, Lifelong learning, Perceived learning processes

Paper type Research paper

Introduction

In 1996, the Organization for Economic Co-operation and Development (OECD) launched a research and development programme on lifelong learning as “a reality for all” (Organisation for Economic Co-operation and Development, 1996). It was also supported by UNESCO’s medium-term plan (Delors, 1996) for 1995–1998 that focused on “sustainable human development, lifelong learning and peace.” More recently, in January 2018, in a survey of 424 human resources and talent professionals from the USA (AACSB, 2018), it was found that a majority (73 per cent) of professionals believed that lifelong learning is an important or critical part of organizations’ talent strategy. Most significant life-long learning initiative mentioned was developing a process of self-directed learning through which both employees and organizations can get benefitted. The study indicated learning process is gradually shifting toward high focus on technology (81 per cent), personalization (82 per cent) and social learning (77 per cent). Jackson and Chapman (2012), in their survey of over 200 managers/supervisors of business graduates and 156 business academics on assessments of performance levels of Australian business graduates against a comprehensive framework of 20 skills and 45 associated workplace behaviors, found that graduates are confident and proficient in certain non-technical skills, but are deficient in vital elements of the managerial skill set. In another survey by Association of American Colleges and Universities, it was found while a majority of employers (57 per cent of executives, 60 per cent of managers) believe that students have the knowledge to succeed in entry-level positions, only 34 per cent of executives and 25 per cent of managers believe that students have the skills to be promoted further. The study emphasized on the need of liberal arts for developing lifelong learning skills (Bauer-Wolf, 2018). According to Brooks and Everett (2008), graduates are more likely than other groups of people to engage in further learning. Impact of higher education on further learning depends on the process of learning; the construction of learner identities; and understandings of the relationship between learning and the wider world. In this turbulent time of changing demands from students, society and technology, higher education institutes (HEIs) require to continuously adapt, learn and innovate (Watkins and Marsick, 1993). A competitive HEI feels the need to transform itself into a learning organization where individuals, teams and organization learn and grow simultaneously. There are several studies done in the past 50 years on how adapting, learning and innovation have enhanced organizational effectiveness (Argyris and Schoen, 1978; French and Bell, 1978; Schein, 1992; Senge, 1990; Watkins and Marsick, 1993, 1996; Wheatley *et al.*, 2003), though studies in context of educational institutes are limited. Kezar (2005) noted, in the context of higher education, that learning organizations and organizational learning are often confused and are usually defined only in the context of management initiatives introduced by administrators. According to Senge *et al.* (2012), “a learning organization is an organization in which people at all levels are, collectively, continually enhancing their capacity to create things they really want to create.” They emphasize that innovation in academic institutions should not be only self-directed and confined to the individual initiatives taken by faculty. But it has to be organization-driven. In a learning organization, there is shared collective organizational vision and employees are

motivated to continuously learn and innovate (Watkins and Marsick, 1993). Longworth (2019) defines lifelong learning as:

Lifelong learning is the development of human potential through a continuously supportive process which stimulates and empowers individuals to acquire all the knowledge, skills, values and understanding they will need throughout their lifetimes, and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environments.

Lifelong learning is not teaching or training, but self-directed learning which may include open and distance learning, industry–academia collaboration for employment and continuous employability (Longworth, 2019). Sullivan, Fulcher-Rood, Kruger, Siple, and G van Putten (2019) explored how 4 Cs of twenty-first-century skills, i.e. communication, collaboration, creativity and critical thinking, can be strengthened through their massive open and online course (MOOC) called “Emerging Technologies for Lifelong Learning and Success.” Yang *et al.* (2015), on their book on lifelong learning, highlight how European Universities are emphasizing on creating Lifelong Learning Universities (ULLL) and how tertiary lifelong learning (TLLL) is contributing to the well-being of older learners by enhancing their capital stock and quality of work and life.

Faculty members generally perceive the issue of the learning organization with skepticism (Jeris, 1998; Kezar, 2005), often confusing between the concepts of learning in higher education and learning by higher education. Brown (1997) suggested higher education lags behind the corporate world in applying the five disciplines of the learning organization as defined by Senge (1990): personal mastery, shared vision, team learning, systems thinking and mental models. The OECD–UNICEF guidelines (Kools and Stoll, 2016) for academic institutes further elaborated on the five disciplines and suggested seven steps of developing a learning organization in the context of educational institutes. They are as follows:

- (1) developing and sharing a vision centered on the learning of all students;
- (2) creating and supporting continuous learning opportunities for all staff;
- (3) promoting team learning and collaboration among all staff;
- (4) establishing a culture of inquiry, innovation and exploration;
- (5) embedding systems for collecting and exchanging knowledge and learning;
- (6) learning with and from the external environment and larger learning system; and
- (7) modeling and growing learning leadership.

The business schools form the interface of corporate world and academics and faces challenges in the teaching and learning processes (Hawawini, 2005) because of globalization of education; shortages of faculty; and growing emphasis on softer skills and analytical skills. With the advent of information and communication technology and changing governance structures, business schools are struggling to maintain a balance between traditional financial models and adoption of alternative models to remain competitive. According to Senge *et al.* (2012), knowledge sharing is of critical importance in business schools. While adopting any new practice, participants should have opportunities to observe the process, understand the qualities and attributes of the practice and appreciate it. In a study of 40 academic institutes in Malaysia on the interrelationship between learning organization, organizational performance and innovativeness, it was found that continuous learning has high positive correlation with organizational performance, whereas collaboration and team learning have strong direct association with organizational innovativeness (Hussein *et al.*, 2016). The dynamic environment in which most business

schools operate as well as recent criticisms of business schools drew us to the question of whether the less discussed construct of a learning organization would be a significant construct in context of business schools. However, we also took it as an opportunity to contribute to the literature on learning organization through this study. Since [Senge et al. \(2012\)](#) introduced the notion of a learning organization, scholars have given considerable theoretical consideration to it ([Watkins and Marsick, 1993, 1996](#); [Wheatley et al., 2003, Kezar, 2005](#)). However, empirical work related to the learning organizations lags behind in business school context, in particular, and higher educational institutes, in general, because there is no accepted measure of a learning organization for higher education. According to [Gupta and Gollakota \(2004\)](#), India ranks second after the USA in number of business graduates trained annually. About 75,000 business degrees are conferred annually. With the lack of enough faculty members in most business schools in India, existing faculty member are overburdened with instructional loads and research is not given its due importance, which is of high significance for a learning organization. It, further, raises the additional challenge of developing instructional materials or cases that reflect the Indian context ([Chanda, 2006](#)). Business schools in India are facing 30 per cent shortage of faculty and it might rise up to 50 per cent by 2020 ([Dave, 2011](#)). [Kaur \(2015\)](#) found that career planning and development, faculty development programs, job enrichment, cooperation from the work teams and job security can be drivers of faculty retention in business school context. Faculty themselves were trained in traditional teacher-based mode of learning and are reluctant to adopt to pedagogical changes that will meet the present-day business needs ([Kannan, 2008](#)). Other challenges are poor regulatory mechanism, governance and accountability ([Jha and Kumar, 2012](#)). [Joshi and Chadha \(2016\)](#) defines internal service quality in business schools based on seven dimensions of work resources, rewards, academic freedom, professional development support, vision of top management, communication and teamwork, and reflects its importance in the context of Indian business schools. Thus, India, an emerging economy with the largest number of graduate trainees pursuing business management degree after the USA, and facing multiple issues on business education, is our target region. Most of the 39 business schools which form our sample are at various stages of international accreditation process by organizations such as AACSB and EQUIS and results obtained from these business schools thus can be generalized globally. A study by [Elliott and Goh \(2013\)](#) has shown that AACSB accreditation facilitated organizational learning and re-assessment of the schools' missions; promoted strategic alignment; increased focus on research; and enhanced performance. Accreditation also served as a catalyst for change, one which motivated program improvement. In terms of contextual factors, leadership was found to be the most pervasive influence on organizational learning effects.

The purpose of this research is to explore, first, what is perceived as a learning organization by business school faculty in India. Second, it aims to explore the relative importance of the learning organization sub-constructs among business schools. Third, it explores whether business school's performance as a learning organization has any impact on students' lifelong learning attitudes. As put forth by [Brooks and Everett \(2008\)](#), learning process or environment also contributes lifelong learning; this study also intends to reexamine the impact of perceived learning process. To date, no study has empirically demonstrated the presence of dimensions of the learning organization as prescribed by OECD. Our purpose here is twofold. First, we intend to provide an empirical validation of the learning organization construct as discussed in OECD report ([Kools and Stoll, 2016](#)). Second, we explore the usefulness of the constructs of lifelong learning and learning organization in business schools' context and also examine the degree to which role of the

learning organization and learning processes affects the students' perceived lifelong learning attitude. We begin with a brief review of the relevant literature and the conceptual background that led to our hypotheses. We report the methodology, setting, analysis and results of our study of 39 business schools. Finally, we discuss the conclusion and implications of the research for leading business schools.

Literature review

Lifelong learning

Lifelong learning is education beyond the formal education in schools and colleges. Lifelong learning was conceptualized by the United Nations Educational, Scientific and Cultural Organization (UNESCO)–United Nations Conference on Trade and Development (UNCTAD) as continuous learning process from childhood till death essential for fulfilment of democratic and human rights. Education, democratization and self-actualization are interlinked (Dewey, 1966). Education cannot be confined to formal setting but extends to informal setting such as at workplace and voluntary services (Dobson, 1982), and social and recreational environment (Merriam *et al.*, 2007). American Institute of Certified Public Accountants (AICPA), (1999) recommended developing skills associated with the role of a lifelong learner rather than traditional curriculum-based learning for present-day accountants. Candy *et al.* (1994) and Knapper and Cropley (2000) have argued that higher educational institutes should not only provide formal knowledge and skills, but develop in students the capability to continue with self-directed learning throughout their life under varied contexts. They considered lifelong learning as a process of learning how to learn. The steps of the process include:

- setting up goals;
- applying appropriate knowledge and skills;
- engaging in self-directed learning and evaluation;
- locate required information; and
- adapt their learning strategies to different conditions.

Regmi (2015) emphasized on two foundational models for explaining lifelong learning, the “human capital model” and the “humanistic model.” Human capital model aims to increase productive capacity by encouraging competition, privatization and human capital formation so as to enhance economic growth. The humanistic model aims to achieve social welfare through citizenship education, building social capital and expanding capability.

Most studies on life-long learning are based on case studies of lifelong learning (Stehlik, 2003, Nicol, 2007). Some of the sub-constructs of lifelong learning considered by researchers are self-directed learning (Zimmerman, 2008), deep learning (Kirby *et al.*, 2003), changing and learning, critical curiosity, meaning making, dependence and fragility, creativity, learning relationships and strategy decision (Crick *et al.*, 2004; Crick and Yu, 2008).

In a panel data study of a cohort born in 1958 in the UK by Jenkins *et al.* (2003), it was found that women who pursue lifelong learning, such as obtaining higher degrees, earn better wages, and men who pursue higher degrees at a mature age get benefited economically. In Denmark and France, workplace learning was found to be adopted as national policy for promoting lifelong learning (Ogunleye, 2013). Osborne and Edward (2003) opine that different types of learning activities usher varied socio-economic outcomes. A learning organization is often considered as both antecedent and as a consequent of lifelong learning.

Learning organization in higher education

The concept of organizational learning (Argyris and Schoen, 1978) was developed in terms of the “thinking organization” (Sims and Gioia, 1986), “learning business” and “corporate classroom” (Eurich, 1985), “learning community” (Marsick, 1987) “learning company” (Pedler *et al.*, 1991) “learning organization” (Senge, 1990) and “corporate curriculum” (Kessels, 1996). The rise of the knowledge sector, knowledge organizations and knowledge workers assumes that organizations instil conducive learning environments where learning becomes the central unifying focus of all organizational activities (Gibbons, 1994). Learning organization stimulates learning in various settings such as formal education, group learning and self-driven lifelong learning. In the context of academic institutes, it has been emphasized that, if leadership encourages learning of members, then faculty engage in continuous lifelong learning. MOOC, for example, has been found to be a disruptive tool for revitalizing higher education for sustainable development (Duangchinda, and Lertpaitoonpan, 2019). American Association of State Colleges and Universities (AASCU, 2013) has declared development of competency-based online education as one top of the agenda points in their higher education policy. Garvin (1998) defined “learning organization” as “an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights.”

Learning organization with respect to higher education specifies faculty and staff to work together for solving problems through networking and team learning (Senge *et al.*, 2000). It promotes a collaborative learning environment in contrast to bureaucratic structure that hampers creative problem-solving (Coleman, 1997). According to Wall *et al.* (2017), pan-faculty work-based learning resources can act as a catalyst for change at a higher education institution. With adequate teaching resources and competent teachers, required graduate employability skills (technical and soft), as demanded by labor market, can be imparted by higher education institutes (Okolie *et al.*, 2019). Adult learners are perceived to be different from traditional-aged learners both inside and outside the classroom (Choy, 2002). They appreciate active, participatory approaches to learning and value opportunities to integrate academic learning with their life and work experiences (Benshoff, 1993). Adult learners are critically concerned about the outcomes or deliverables of the academic degree program, and give impetus to practical application of knowledge in their workplace.

Faculty members of higher education institutes and universities are under continuous pressure to perform, loaded with teaching assessments and academic audit responsibilities. The learning process includes measurement for quality of academic delivery; processes that can be implemented to encourage exchange and transfer of knowledge pertinent to academic quality; and application of knowledge for the improvement of teaching and learning. Academic accountability to ensure improvement and maintenance of all academic processes lead to learning organizations (Dill, 1999). The higher education institutes or universities are perceived to be a decentralized, “loosely-coupled” organization, where faculty have freedom to improve quality of teaching and learning based on shared norms and disciplines (Clark, 1983). With changing norms, technological environment and demands of accreditation process, structural and governance adaptations are necessary to assure the quality of teaching and learning in the new competitive environment. Transformational leadership, rather than transactional leadership, stimulates a learning organization (Bass, 2000). Higher education leaders in a learning organization is expected at times to display boldness to take initiative and responsibility for providing direction to members to meet organizational goals. In other times, a shared leadership, consultation and consensus about its means and ends with members are likely to reap better benefits. Participatory leadership holds commitment and creativity as high priority. Leaders are guides, mentors and cheerleaders

for faculty, staff and students (Bass, 2000). In Mauritius, it has been found that barriers to learning organization and knowledge sharing are lack of policies and reward mechanisms, resources for research, frequent leadership changes, lack of knowledge-sharing culture and research repositories and weak industry–academia linkages (Veer Ramjeawon and Rowley, 2017). Hanaysha (2016) found, in context of higher education institutes in Malaysia, that the learning organizations stimulate higher organizational commitment. Dee and Leišytė (2016), however, found that high levels of specialization, structural differentiation and extensive decentralization are barriers to learning organization. Ryan (2015) emphasized on the role of faculty members in enhancing reflective and reflexive thinking to inculcate lifelong learning attitude. Ponnuswamy and Manohar (2016) based on a survey of 700 faculty members of higher education institutes in India found that the learning organization culture, knowledge performance and research performance are correlated.

The first hypothesis to be tested is:

H1. A learning organization positively determines attitudes and skills for lifelong learning of students of higher education.

Perceived learning processes in management education

Management education can be visualized as form of an art, creativity and extension of human possibilities, both functionally and aesthetically (Alder *et al.*, 2006). Bartunek and Carboni (2006) have perceived contemporary management education as a blend of reflexive learning and artistic processes. Self-reflection on what and how of learning helps develop critical thinking ability (Thompson *et al.*, 2006). According to Tung (2006), East Asian nations prefer artistic processes in which learning is through experiences and practices, whereas North American business schools practice traditional scientific mode of education in classroom setting. According to Tung, a blended mode of learning, which is a combination of an inductive intuitive process that calls for imaginative thinking with a mix of deductive approach, is most fruitful. Starkey and Tempest (2009) suggested management education practices in terms of “narrative imagination” (focusing upon the language used) and “dramatic rehearsal” (focusing upon drama and music) to meet present-day business needs. The ideal learning process as conceived by Knowles (1990) is when:

- learning is self-directed;
- physical and aesthetic environment of learning ensures comfort;
- there is mutual trust and respect between learners and the trainers;
- learning goals of learners is aligned with the overall goal of learning process;
- learners participate in planning and execution of learning experience;
- there is active participation of learners in learning process;
- learning process takes into account previous experiences of learners; and
- learners are given opportunities to reflect during the learning process.

Students’ sense of belongingness to educational institute enhances their engagement and instill lifelong learning skills (Yorke, 2016). In a Palestinian study, it was found that most higher education institutes lack in student support system and student activities (Al Shobaki and Naser, 2016). Another important factor is continuous and timely feedback, which help learners to self-reflect and progress (Race, 2001). Enos *et al.* (2003) opine that managers of

high proficiency learn through informal sources and are more willing to share learnt knowledge and experience.

H2a. A learning organization determines significantly perceived quality of learning process.

H2b. Perceived quality of learning process explains positively lifelong learning attitude.

H2c. Perceived quality of learning process mediates the relationship between learning organization and lifelong learning attitude.

The theoretical model for the study is shown in [Figure 1](#).

Methodology

Setting

For measuring the construct of learning organizations, we adapted OECD guidelines for the learning organization for educational institute ([Kools and Stoll, 2016](#)). The questionnaire has 44 items measuring parameters related to shared vision, support for professional development of faculty and staff, collaborative learning, support for innovation, knowledge sharing, learning orientation and leadership. The items were modified to capture appropriately the perceptions of faculty and leadership of Indian business schools on the learning organization.

For measuring lifelong learning attitudes, we used the 14 items questionnaire developed by [Kirby et al. \(2010\)](#) reflecting goal setting, application of knowledge and skills, self-direction and evaluation, locating information and adaptable learning strategies of students. For measuring perceived educational practices, a nine-item scale was used based on studies by [Knowles \(1984\)](#) and [Chickering and Gamson \(1987\)](#). Structural equation modeling with maximum likelihood estimation were used for testing of the four hypothesis statements. SPSS with AMOS version 21 was used for the analysis

Faculty participants

The 44-item learning organization questionnaire was administered to 122 faculty members from 39 business schools in India. A total of 38 faculty members were associated with undergraduate programs and 84 faculty members were representatives of postgraduate management programs; 81 faculty members were from private business schools and rest were from government business schools. Government business schools included top-tier schools such as Indian Institute of Management (Ahmedabad, Kolkata, Kozhikode, Lucknow). Private business schools included business schools under Symbiosis (Deemed) International University, Narsee Monji Institute of Management Science (NMIMS) and Management Development Institute (MDI). The survey was carried out in the month of September, 2018 over a period of 15

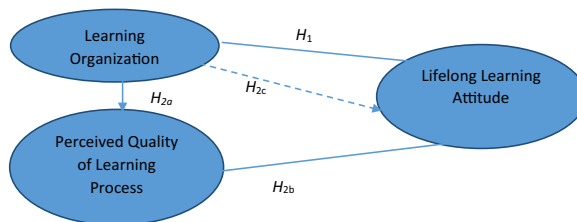


Figure 1.
Theoretical model

days. Details of the sample of faculty is described in Table I. Participants were given a brief introduction and a definition of a learning organization, and were asked to think about how their school and its leadership support learning at the individual and team levels. Participants responded on a seven-point Likert scale ranging from 1 (never or rarely) to 7 (always).

Student participants

Twenty students from each of the 39 business schools from which faculty participated in the first round of survey on the learning organizations were administered the questionnaire on lifelong learning attitudes and perceived instructional practices through a google form. A total of 234 students completed the questionnaire. Hence, the participation rate of students was 30.7 per cent. Description of the student's sample is given in Table II.

Control variable	Frequency	(%)	
<i>Gender</i>			
Unreported	1	0.8	
Female	52	42.3	
Male	69	56.1	
<i>Designation</i>			
Others	4	3.3	
Assistant professor	43	35.0	
Associate professor	20	16.3	
Professor	46	37.4	
Head of the department	8	6.5	
Director	1	0.8	
<i>Type</i>			
Undergraduate	38	30.9	
Postgraduate	84	68.3	
<i>Ownership</i>			
Private	81	65.9	Table I. Description of faculty sample
Government	41	33.3	

Control variable	Frequency	(%)	
<i>Gender</i>			
Female	88	37.8	
Male	145	62.2	
<i>Type</i>			
Undergraduate	68	29.2	
Postgraduate	165	70.8	
<i>Ownership</i>			
Private	156	67.0	Table II. Description of student sample
Government	77	33.0	

Results

Analysis of faculty responses on a learning organization

Descriptive statistics for the learning organization questionnaires are reported in [Appendix 1](#). Item means ranged from 4.96 to 5.87 (on the scale from 1 to 7). Internal consistency (Cronbach's alpha) was 0.899, which is reasonably high for a multi-dimensional construct such as a learning organization. The removal of any item diminished the alpha coefficient, and hence all questions were retained.

To examine the factor structure, the items were subjected to an exploratory factor analysis with principal component extraction. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.899, and Bartlett's test for sphericity was significant, suggesting data was robust enough for factor analysis. Five factors having eigenvalue > 1 were retained. They include organizational learning climate, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication. The first factor (eigenvalue = 6.303) accounted for 14.33 per cent of the variance. Eight items with factor loadings greater than 0.5 represented the factor. Items included "Professional learning is focused on teaching pedagogy and area of specialization" and "There is mutual trust and respect among faculty." The inter-items correlation coefficients (ranged between 0.390 and 0.591) and the item-construct correlation coefficients were significantly high (ranged between 0.673 and 0.792). The Chronbach's alpha was 0.871. This was named "organizational learning climate."

The second factor (eigenvalue = 5.772) accounted for 13.12 per cent of the variance. Nine items with factor loadings greater than 0.5 represented the factor. Items included "Institute leaders promote collaboration with other institutes, the community, higher education institutions and industry partners" and "School leaders promote experiential learning." The inter-item correlation coefficients (ranged between 0.125 and 0.544) and the item-construct correlation coefficients were significantly high (ranged between 0.341 and 0.775). The Chronbach's alpha was 0.865. This was named "leadership support for knowledge exchange."

The third factor (eigenvalue = 4.626) accounted for 10.51 per cent of the variance. Five items with factor loadings greater than 0.5 represented the factor. Items included "Institutional best practices are made available to all faculty" and "Faculty have the capacity and opportunities for engaging in continuous improvement of curriculum and teaching and learning process." The inter-item correlation coefficient (ranged between 0.383 and 0.561) and the item-construct correlation coefficient (ranged between 0.737 and 0.802) were significant. The Cronbach's alpha was 0.826. This construct was named "Support for Innovation"

The fourth factor (eigenvalue = 4.564) accounted for 10.37 per cent of the variance. Six items with factor loadings greater than 0.5 represented the factor. Items included "information and communication technology (ICT) tools such as MOODLE is widely used to facilitate communication, knowledge exchange and collaboration with the external environment" and "The institute collaborates and interacts with local community as partners in the education process and the organization of the school." The inter-item correlation coefficient (ranged between 0.359 and 0.518) and the item-construct correlation coefficient (ranged between 0.697 and 0.754) were high. The Cronbach's alpha was 0.826. This was named "applied research environment."

The fifth factor (eigenvalue = 3.123) accounted for 7.097 per cent of the variance. Four items with factor loadings greater than 0.5 represented the factor. Items included "vision ideation is the outcome of a process involving feedback of parents" and "vision ideation is the outcome of a process involving the external community." The inter-item correlation

coefficient ranged between 0.327 and 0.592. The item-construct correlation coefficient ranged between 0.667 and 0.814. The Cronbach's alpha was 0.735. This was named "vision communication." Twelve items having factor loadings less than 0.5 were dropped (see Appendix 2).

Average of the all item scores corresponding to a sub-construct (factor) of the learning organization against which they are loaded was taken to represent cumulative score of the sub-construct. There are no significant differences found between the average scores of sub-constructs of the learning organization in terms of gender (absolute value of t -statistics ranged between 0.356 and 1.73 at 119 degrees of freedom), type (absolute value of t -statistics ranged between 0.159 and 0.619 at 120 degrees of freedom) and ownership (absolute value of t -statistics ranged between 0.323 and 1.729 at 120 degrees of freedom). This implies that faculty members of business schools in general have a moderately high opinion about their respective schools on dimensions of learning organizations, irrespective of type and structure of the school.

Significant differences were found on sub-constructs of innovation support (F -statistics = 3.83, p -value = 0.003) and applied research (F -statistics = 2.525, p -value = 0.033) among various ranks of faculty (ANOVA; Appendix 3). Average ratings given by Professors (5.44 on innovation support and 5.40 on applied research) and HODs (5.48 on innovation support and 5.15 on applied research) were significantly lower than ratings given by Assistant Professors (5.69 on innovation support and 5.33 on applied research) and Associate Professors (5.79 on innovation support and 5.64 on applied research). Hence, senior faculty members were less satisfied with the resources available to support innovation and research.

Analysis of student responses on learning process

Item means of learning process questionnaire ranged from 5.19 to 5.57 (on the scale from 1 to 7) and standard deviations ranged from 0.08 to 0.09, demonstrating an overall high level of perceived learning processes with reasonable variability. Internal consistency (Cronbach's alpha) was 0.865, which is reasonably high. The removal of any item diminished the alpha coefficient, and hence all questions were retained.

To examine the factor structure, the items were subjected to an exploratory factor analysis with principal component extraction. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.893, and Bartlett's test for sphericity was significant, suggesting data was robust enough for factor analysis. There was only factor with eigenvalue > 1 . With an eigenvalue of 4.335, it explained 48.17 per cent of variance. Top three items with the highest factor loading were as follows: "Encouraged to participate in self-reflection activities," "Engaged in active learning outside of classroom settings" and "Encouraged to consider different perspectives and points of view" (Appendix 4). The inter-item correlation ranged between 0.283 and 0.529. The item construct correlation coefficient ranged between 0.67 and 0.72. Hence, self-directed, experiential and social learning processes are preferred by students.

Analysis of student responses on lifelong learning

Item means of lifelong learning ranged from 4.09 to 5.66 (on the scale from 1 to 7) and standard deviations ranged from 1.14 to 1.819, demonstrating an overall moderate level of perceived lifelong learning attitude and reasonable variability. Internal consistency (Cronbach's alpha) was 0.761, which is reasonably high. The removal of any item diminished the alpha coefficient, and hence all questions were retained.

To examine the factor structure, the items were subjected to an exploratory factor analysis with principal component extraction. The Kaiser–Meyer–Olkin measure of

sampling adequacy was 0.763, and Bartlett's test for sphericity was significant, suggesting data was robust enough for factor analysis. Four factors were generated with eigenvalue greater than 1. Based on scree plot factor loadings, two factors were retained. Factors were named "knowledge update method" and "self-directed learning" based on item loadings. Details are given in [Appendix 5](#), [Figure A1](#) and [Table AV](#).

Average of the item scores corresponding to a sub-construct (factor) of lifelong learning attitude against which they are loaded was taken to represent cumulative score of the sub-constructs (knowledge update method and self-regulated learning).

Structural equation modeling for testing of hypothesis

Step 1: The average scores of all faculty respondents of a business school for each sub-construct of the learning organization (LO) (i.e. organizational climate for learning, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication) was computed and was entered as the corresponding LO sub-construct score for all the student respondents from that business school.

Step 2: The gender of students, type of business schools (undergraduate or post-graduate) and ownership of the business school (private or government) were entered in the model as control variables.

Step 3: Organizational climate for learning, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication were entered as indicators of latent construct of learning organization. Knowledge update method and self-regulated learning were taken as indicators of latent construct of lifelong learning attitude.

Step 4: Data were first subjected to diagnostic tests for applying regression technique such as assumption of constant variance, existence of outliers and normality ([Eckstein et al., 2015](#); [Cleveland and Devlin, 1988](#); [Ruppert et al., 2003](#)). We checked plots of residuals against predicted values, and statistics of skewness and kurtosis for testing normality. The maximum absolute values of skewness and kurtosis of the indicators indicated moderately normal data (skewness < 2, kurtosis < 7) ([Curran et al., 1996](#)). Hence, no significant deviations from the assumptions of regression can be concluded (see [Appendix 6](#)).

Step 5: The survey method adopted for this study may have common method bias such as consistency motif, implicit theories, social desirability, leniency biases and acquiescence biases. To check for severity of common method bias, Harman's single-factor test ([Podsakoff et al., 2003](#)) was performed. We loaded our variables into an exploratory factor analysis and examined the unrotated factor solution. A single factor explaining 42 per cent of the total variance was obtained which was considerably less than the threshold limit of 50 per cent.

Step 6: The structural equation modeling was run (see [Figure 2](#)). The model fit was acceptable. The Chi-square value is 238.317, $df = 33$ and $\chi^2/df = 7.222$. The goodness of fit index (GFI) of the model is 0.862, adjusted goodness of fit index (AGFI) = 0.725, comparative fit index (CFI) = 0.769 and root mean square of error (RMSEA) = 0.06. The model thus reflected a reasonably good fit to the data. The regression coefficients of the sub-constructs on the constructs (latent variables) of the learning organization and lifelong learning attitude were all significant. The structural composite reliability of the constructs of the learning organization and lifelong learning attitude was 0.86 and 0.60, respectively. The average variance explained for constructs of the learning organization and lifelong learning attitude was 0.55 and 0.43, respectively. Thus, the constructs satisfied requirement of convergent validity and discriminant validity. Hence, the newly developed multi-dimensional scale of learning organization with sub-constructs of organizational learning

climate, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication qualified the tests of internal consistency, convergent and discriminant validity.

The regression coefficients of the learning organization ($\beta = 0.26$) and perceived learning processes ($\beta = 0.397$) on lifelong learning are positively significant at 1 per cent level of significance. The regression coefficients of the learning organization ($\beta = 0.259$) on perceived learning process are positive and significant at 5 per cent level of significance. Hence, a learning organization (business school) with conducive learning environment for its members can stimulate innovative learning processes and develop lifelong learning skills and attitudes among students. However, the control variables such as gender of students, type of business schools (undergraduate or post-graduate) and ownership of the business school (private or government) were not significant in determining both perceived learning process and lifelong learning attitude (see Table III).

Test for mediation

The hypothesized mediating effect of perceived learning process was examined on the basis of Baron and Kenny's (1986) suggestions.

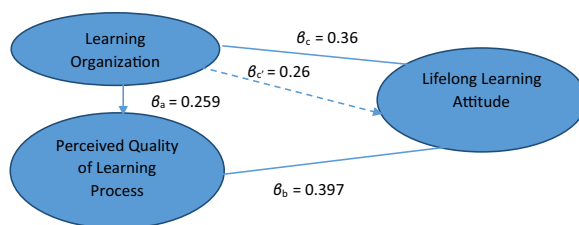


Figure 2. Relationship between the variables under study

Criterion variable	Predictors	Coefficient	Standard error	Critical value	p-value
Perceived learning process	Gender	-0.075	0.127	-0.594	0.552
	Ownership	-0.011	0.144	-0.076	0.939
	Type	-0.117	0.148	-0.79	0.43
	Learning organization	0.259	0.138	1.881	0.06
Lifelong learning	Learning organization	0.26	0.099	2.626	0.009
	Perceived learning process	0.397	0.051	7.862	<0.0001
	Gender	-0.048	0.088	-0.544	0.586
	Ownership	-0.115	0.1	-1.154	0.248
	Type	-0.154	0.103	-1.498	0.134
Vision communication	Learning organization	1			
	Applied research environment	1.08	0.123	8.805	<0.0001
Support for innovation	Learning organization	0.68	0.083	8.178	<0.0001
Leadership support for exchange	Learning organization	0.909	0.096	9.447	<0.0001
Organizational climate	Learning organization	0.689	0.086	8.034	<0.0001
Self-regulated learning	Lifelong learning	0.893	0.135	6.617	<0.0001
Knowledge update	Lifelong learning	1			

Table III. Structural equation for the learning organization, perceived learning process and lifelong learning

The Sobel's test statistic (Sobel's statistics = 1.82, p -value = 0.068) show moderate mediation effect (28.33 per cent) of perceived learning process. Preacher and Kelley's (2011) Kappa-squared statistics (0.07) also suggest medium effect size of mediation of perceived learning process in the relationship between the learning organization and lifelong learning. Hence, learning organization has direct effect on lifelong learning attitudes of students. The effect of learning organization partially mediates through the perceived learning processes adopted by the schools.

Discussion

In this study, we found that organizational climate for learning, leadership support for knowledge exchange, support for innovation, applied research environment and vision communication are the five constructs of a learning organization in the context of a business school unlike the seven constructs suggested by the OECD guidelines. Our study has been able to suggest a new multi-dimensional scale for measuring learning organizations in higher education context. Contradictory to other studies (Brown, 1997; Freed, 2001; Jeris, 1998; Tagg, 2003; Watkins, 2005), our study reflects that faculty members in business schools in India generally have a positive view of their schools as learning organizations.

Further, our research recommends, that a business school to be a successful learning organization should have market-oriented generative learning approach as proposed by Slater and Narver (1995). Second, there should be mutual trust among members and they should be empowered to analyze, interpret and implement organizational vision also promoted in OECD guideline. Knowledge can be created and disseminated through collaborative reflective learning approach and faculty members prefer to exchange knowledge with peers from within and outside the organization through day-to-day work experiences, team meetings, short-term domain-specific development programs, faculty-exchange programs and through membership of task groups. Some of these aspects were also discussed by Garwin (1993). Third, faculty should be encouraged to continuously engage in professional dialogue, collaboration and knowledge exchange to bring in innovation in curriculum and teaching and learning process. The OECD guidelines of learning organizations are partially validated by this study. The constructs of "creating and supporting continuous learning opportunities for all staff" and "modeling and growing learning leadership" under OECD guideline combined to form the construct of "organizational climate for learning" in our study. Similarly, constructs of "promoting team learning and collaboration among all staff" and "embedding systems for collecting and exchanging knowledge and learning" under OECD guidelines combined to form "leadership support for knowledge exchange" in our study. Thus, the construct of learning organization defined in our study is a more simplified version of the OECD version that has been proved to be valid under Indian business school context. Our study converges with Gravin's (1998) thought of learning organization as creator, acquirer and transferor of knowledge and modifier of behavior to reflect on ever-evolving new knowledge. It also partially converges with Hussein *et al.* (2016)'s thought of learning organization as collaborative learning process and innovation inducing organizational environment.

Surprisingly, our research shows faculty at the level of Assistant Professor and Associate Professor feel more empowered to innovate than senior faculty members such as Heads of the Departments and Professors. With more administrative responsibilities and lack of supporting staffs such as research and teaching associates in most business schools in India, senior faculty members feel relatively less satisfied with their own engagement for bringing in innovation in teaching and curriculum development process. Fourth, organizational support for faculty and student engagements in applied research in terms of

resources and opportunities for interaction with industry and other stakeholders is another important pillar for a learning organization. The present regulations by national accreditation bodies such as National Assessment and Accreditation Council (NAAC) and international accreditation agencies such as Association to Advance Collegiate Schools of Business (AACSB) mandate research as the most important parameter for assessment. Further, faculty members' academic appraisal process in Indian higher education system consider research as an important criterion for faculty reward and promotion. Hence, most Business schools in India encourage research, though senior faculty members such as Professors and Heads of the Departments seem to be less satisfied with the available resources for research. Finally, business schools opine that a learning organization should be led by a vision that integrates perspectives of all stakeholders, such as faculty, students, parents and external stakeholders. However, unlike other studies such as [Holyoke et al. \(2012\)](#), our study reflects no significant genders, ownership structure and program delivery level differences on faculty members' perception about the learning organization.

Further, our study reflects that a business school that pursue positive learning organization practices can stimulate better perceived learning processes among students. Students were found to be satisfied with their learning processes and prefer a self-reflective active learning process that gives them opportunities to learn by interacting with stakeholders. Both the learning organization and perceived learning processes have significant positive relationship with lifelong learning attitudes among students. The relationship between a learning organization and lifelong learning attitude partially mediates through perceived learning processes. This somewhat converges with the thoughts of [Brooks and Everett \(2008\)](#) who described how experiences of higher education affect attitudes toward learning in the years after graduation. The two most important sub-constructs of lifelong learning attitude are knowledge update method and self-regulated learning. Students in business schools prefer to learn through internet sources such as social media and Facebook and integrate them with existing knowledge. Preferred process of learning is self-directed, self-paced for enjoyment and persuasion of meaningfulness.

However, no significant differences in terms of genders, ownership structure and program level of business schools were found regarding perceived learning processes and lifelong learning attitude.

Practical implications

In earlier research by [Bhattacharya and Neelam \(2018\)](#), it has been observed that during recruitment, organizations are asking employees to learn certain job-related skills through MOOC as organizations are incapable of providing immediate training. Hence, with the advent of Industry 4.0 and rapidly changing technological and business environment, managers and technocrats are expected to learn and relearn continuously to remain employable and hence onus lies in academic institutes to develop attitudes in students to get engaged in self-directed learning throughout their lives. In our study, also ICT and technology-based learning had the highest factor loading for the construct of applied research environment. The regulating bodies for higher education in India such as NAAC and University Grant Commission (UGC) are emphasizing on imparting lifelong learning skills to students at higher education which will be beneficial in all disciplines. These bodies also recommend that faculty develop MOOC-based learning modules which would help learners globally through out their career. Some of the identified skills include data analytics and management, disaster management, design thinking, capability to innovate, cultural consciousness, self-management, ethical understanding, linguistic capability, communication skill, etc. Further, some of

industry-identified competencies for continuous employability found in various researches are planning and organization, analytical ability, decision-making, achievement drive, adaptability to change, learning orientation, communication, creativity and innovation and building collaborative leadership. Business school leadership and members are required to adopt themselves to the changing demand and inculcate the spirit of learning. Business schools should invest in learning and upgrading skills of its members and encourage them to bring in curriculum and pedagogical changes to cater to new age demand. Hence, academic appraisal of teaching and non-teaching staff should give recognition to efforts toward learning and development, knowledge creation and innovation, which are implied through the constructs developed in our study for learning organization.

Theoretical implications of the study

Rumberger (2004) had pointed out that to get better student outcome, changes are to be made not only at student level but also at institute level. Through this research, we have developed a five-construct multidimensional scale for the learning organization in the context of business schools which can be tested for other higher education institutes. To our knowledge, it is the first attempt to empirically test the ideas shared by OECD on learning organization not only in business school context but also in higher education context. Further relating the concepts of learning organization, learning processes and lifelong learning has not been previously attempted. We have found that strong positive relationship between learning organization and lifelong learning attitude mediates through the learning processes adopted by the higher education institutes. Because the study takes into account views of business school leaders, faculty members and students to discuss the interrelationship between learning organization, lifelong learning attitude and learning processes, it has a more holistic view on these interrelated concepts and minimizes existence of common method bias. The study, thus, adds to the volume of knowledge of both learning organization and lifelong learning.

Limitations of the study

The OECD-developed scale was meant for 36 member nations, most of which are high-income economies. We have found that the scale is valid in emerging economies such as India also. The scale has been tested and validated in business schools located in urban areas of India. It needs to be validated in other universities and institutes at both rural and urban levels, locally and globally.

Conclusion

The study shows that a learning organization is marked by shared vision and a conducive environment for faculty to innovate, learn, share and create knowledge. We recommend a collaborative learning environment where both faculty and students can collaborate and interact with various stakeholders and get an opportunity of reflective learning. In the present dynamic business environment, it is necessary professionals continuously update knowledge, skills and attitudes to remain employable. Our study recommends that a learning organization can stimulate lifelong learning attitude among prospective managers. As online sources form an integral part of learning of millennials and the next generation, a blended mode of self-paced, self-regulated learning pedagogy is suggested for both higher education institutes and corporate organizations.

Future studies may compare concept of learning organization as envisioned by higher education institutes of various domains, in emerging economies context as well as in

developed nations context, for further validation. Researches in future may also focus on finding out the impact of learning organization in developing futuristic skills that will ensure lifelong employability of learners and employed workforce.

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Table AI.
Descriptive statistics
of items of learning
organization

Items of learning organization	Mean	SD	Skewness	Kurtosis
Faculty get scope of working and learning as a team	5.36	1.198	-0.973	1.155
Teaching and learning process gives enough scope for face-to-face interaction as well as use of ICT	5.61	1.137	-0.934	1.230
There is mutual trust and respect among faculty	5.53	1.141	-0.665	0.047
Faculty reflect together on how to make their own learning more powerful	5.87	1.183	-1.345	2.319
The institute allocates time and other resources for collaborative working and collective learning	5.55	1.095	-1.026	2.147
Faculty are encouraged to experiment and innovate in their practice	5.53	1.227	-0.769	0.274
There are institutional forums for exchange of knowledge and research ideas	5.53	1.294	-1.020	0.967
Faculty have the capacity and opportunities for engaging in continuous improvement of curriculum and teaching and learning process	5.34	1.368	-0.970	0.692
The institute recognizes faculty for taking academic initiatives	5.51	1.234	-1.006	0.740
Faculty engage in continuous research and consultancy for enhancing teaching and learning experience, knowledge generation and innovation	5.55	1.064	-0.639	0.393
Faculty engage in experimenting and doing things differently	5.66	1.196	-0.874	0.535
Problems and mistakes are seen as opportunities for learning	5.41	1.203	-0.635	0.076
Students are actively engaged in research	5.50	1.185	-0.642	-0.216
Systems are in place to examine process of continuous improvement	5.10	1.374	-0.543	0.015
Institutional best practices are made available to all faculty	5.29	1.113	-0.625	0.369
Sufficient research databases and statistical software are available for supporting research	5.51	1.111	-0.748	0.660
The institute has a system in place for bench marking, assessing and updating academic process	5.58	1.131	-1.220	2.216
The institute continuously engages in review and assessment of mission, learning goals and outcomes	5.37	1.141	-0.768	0.945
The institute is flexible to respond quickly to challenges and opportunities of external environment	5.54	1.141	-0.826	0.468
The institute collaborates with industry experts for curriculum development, research and teaching and learning process	5.46	1.103	-0.808	1.019
The institute collaborates and interacts with local community as partners in the education process and the organization of the school	5.64	1.191	-0.795	0.395
Faculty collaborate, learn and exchange knowledge with peers from other institutes	5.18	1.221	-0.219	-0.775
The institute has faculty and student exchange programs for learning and research	5.41	1.167	-0.856	0.888
ICT tools such as MOODLE is widely used to facilitate communication, knowledge exchange and collaboration with the external environment	5.45	1.274	-0.765	0.288
All faculty engage in continuous professional learning	5.31	1.165	-0.314	-0.769
New faculty receive induction and mentoring support	5.68	1.255	-1.209	1.748
Professional learning is focused on teaching pedagogy and area of specialization	5.73	1.140	-0.744	-0.201
Faculty have autonomy for setting up aims and priorities for their own professional learning	5.77	1.196	-1.151	0.993

(continued)

Items of learning organization	Mean	SD	Skewness	Kurtosis
Professional learning process instills creative and innovative thinking	5.52	1.088	-0.476	-0.024
Professional learning is a balanced mix of on-the-job learning/mentoring and external expertise	5.71	1.035	-0.615	-0.033
Professional learning is based on student feedback and past performance	5.60	1.167	-0.824	0.170
Time and financial support are provided to promote professional learning	5.55	1.274	-0.687	-0.187
The institute encourages leadership development among faculty, non-teaching staff and students	5.28	1.340	-0.694	0.312
Institute leaders are proactive and creative change agents	5.45	1.072	-0.656	0.746
The institute has a culture and well-defined structure to facilitate professional dialogue, collaboration and knowledge exchange	5.45	1.219	-0.941	1.144
Institute leaders ensure that the organization's actions are consistent with its vision, missions goals and values	5.66	1.159	-1.271	2.524
Institute leaders encourage continuous learning, research and innovation	5.55	1.191	-0.882	1.403
Institute leaders promote collaboration with other institutes, the community, higher education institutions and industry partners	5.50	1.104	-0.569	0.419
School leaders promote experiential learning	5.58	1.168	-1.040	1.102
Vision ideation is the outcome of a process involving all faculty	5.69	1.324	-1.535	1.949
Vision ideation is the outcome of a process involving feedback of students	5.59	1.155	-0.714	0.049
Vision ideation is the outcome of a process involving feedback of parents	5.39	1.357	-1.094	1.197
Vision ideation is the outcome of a process involving the external community	4.96	1.587	-0.726	-0.162

Table AI.

Table AII.
Factor loadings of
sub-constructs of
learning organization

Items	Organizational climate for learning	Leadership support for knowledge exchange	Support for innovation environment	Applied research environment	Vision communication
New faculty receive induction and mentoring support	0.526				
Learning and teaching processes are oriented toward realizing the vision	0.539				
Faculty have autonomy for setting up aims and priorities for their own professional learning	0.559				
Vision ideation is the outcome of a process involving all faculty	0.582				
Problems and mistakes are seen as opportunities for learning	0.621				
Professional learning is a balanced mix of on-the-job learning/mentoring and external expertise	0.652				
There is mutual trust and respect among faculty	0.693				
Professional learning is focused on teaching pedagogy and area of specialization	0.752				
The institute encourages leadership development among faculty, non-teaching staff and students		0.506			
Professional learning process instills creative and innovative thinking		0.531			
The institute allocates time and other resources for collaborative working and collective learning		0.538			
The institute has faculty and student exchange programs for learning and research		0.552			
Institute leaders encourage continuous learning, research and innovation		0.552			
Time and financial support are provided to promote professional learning		0.560			
Faculty collaborate, learn and exchange knowledge with peers from other institutes		0.593			
Institute leaders promote collaboration with other institutes, the community, higher education institutions and industry partners		0.617			
School leaders promote experiential learning		0.624			
Faculty engage in experimenting and doing things differently			0.552		
Faculty are encouraged to experiment and innovate in their practice			0.562		
The institute has a culture and well-defined structure to facilitate professional dialogue, collaboration and knowledge exchange			0.592		

(continued)

Items	Organizational climate for learning	Leadership support for knowledge exchange	Support for innovation	Applied research environment	Vision communication
Faculty have the capacity and opportunities for engaging in continuous improvement of curriculum and teaching and learning process			0.606		
Institutional best practices are made available to all faculty			0.729		
Students are actively engaged in research				0.517	
Sufficient research databases and statistical software are available for supporting research				0.520	
There are institutional forums for exchange of knowledge and research ideas				0.535	
The institute collaborates with industry experts for curriculum development, research and teaching and learning process				0.561	
The institute collaborates and interacts with local community as partners in the education process and the organization of the school				0.604	
ICT tools such as MOODLE is widely used to facilitate communication, knowledge exchange and collaboration with the external environment				0.753	
Professional learning is based on student feedback and past performance					0.538
Vision ideation is the outcome of a process involving feedback of students					0.570
Vision ideation is the outcome of a process involving the external community					0.612
Vision ideation is the outcome of a process involving feedback of parents					0.768

Table AII.

594

Table AIII.
ANOVA table for
differences in sub-
constructs of
learning organization
among faculty of
different designation

Interactions			Sum of squares	df	Mean square	F	Sig.
Organization climate for learning × Designation	Between groups	(Combined)	6.201	5	1.240	1.773	0.123
	Within groups		85.349	122	0.700		
	Total		91.550	127			
Knowledge exchange support × Designation	Between groups	(Combined)	5.403	5	1.081	1.629	0.158
	Within groups		74.961	113	0.663		
	Total		80.364	118			
Innovation support × Designation	Between groups	(Combined)	13.783	5	2.757	3.830	<i>0.003</i>
	Within groups		81.332	113	0.720		
	Total		95.115	118			
Applied research support × Designation	Between groups	(Combined)	10.713	5	2.143	2.525	<i>0.033</i>
	Within groups		95.907	113	0.849		
	Total		106.620	118			
Vision communication × Designation	Between groups	(Combined)	10.259	5	2.052	2.168	0.062
	Within groups		115.466	122	0.946		
	Total		125.725	127			

Note: Italics means interaction effect is significant Sig. (< 0.05)

Appendix 4

Table AIV.
Factor loadings of
items for measuring
perceived learning
processes

	Component 1
Encouraged to participate in self-reflection activities	0.718
Engaged in active learning outside of classroom settings	0.718
Encouraged to consider different perspectives and points of view	0.716
Encouraged to consider issues related to social justice and diversity	0.712
Had influential interaction with peers	0.691
Encouraged to participate in classroom discussions	0.687
Was led to re-think my views of myself and other	0.668
Engaged in positive interactions with faculty	0.667
Engaged in active learning in classroom settings	0.667

Appendix 5. Factor structure of lifelong learning

The first factor was named “knowledge update method.” Some of the items loaded against this factor are “I am able to professionally benefit from social utility websites such as Facebook and Twitter” and “I use mobile phones in accessing to new information.” The Cronbach’s alpha for items was 0.673. The inter-items correlation coefficient ranged between 0.175 and 0.396. The item correlation coefficients ranged between 0.582 and 0.712.

The second factor was named “self-regulated learning.” Some of the items loaded against this factor are “I am able to impose meaning upon what others see as disorder” and “I can deal with the unexpected and solve problems as they arise.” The Cronbach’s alpha for items was 0.667. The inter-items correlation coefficient ranged between 0.253 and 0.413. The item correlation coefficients ranged between 0.669 and 0.743.

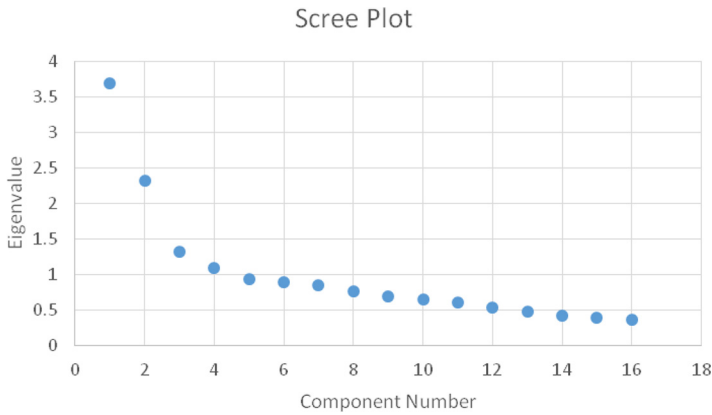


Figure A1.
Scree plot for lifelong
learning

Table AV.
Factor loadings of
items for lifelong
learning scale

		Component			
		1	2	3	4
LL16	I am able to professionally benefit from social utility websites such as Facebook and Twitter	0.701			
LL15	I use mobile phones in accessing to new information	0.673			
LL13	It is my responsibility to make sense of what I learn at college	0.643			
LL14	When I learn something new, I try to focus on the details rather than on the big picture	0.537			
LL12	When I approach new material, I try to relate it to what I already know	0.503			
LL5	I am able to impose meaning upon what others see as disorder		0.727		
LL3	I can deal with the unexpected and solve problems as they arise		0.699		
LL9	I love learning for its own sake		0.640		
LL7	I feel I am a self-directed learner		0.504		
LL10	I try to relate academic learning to practical issues				
LL11	I often find it difficult to locate information when I need it			0.734	
LL8	I feel others are in a better position than I am to evaluate my success as a student			0.642	
LL4	I feel uncomfortable under conditions of uncertainty			0.617	
LL6	I seldom think about my own learning and how to improve it			0.564	
LL1	I prefer to have others plan my learning				0.887
LL2	I prefer problems for which there is only one solution				0.748

Appendix 6

Table AVI.
Descriptive statistics
of the exogenous and
endogenous
variables

Variables	Mean	Std. deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Standard error	Statistic	Standard error
Organizational climate	5.76	0.49	-1.35	0.16	2.53	0.32
Leadership support for exchange	5.52	0.47	-0.25	0.16	0.34	0.32
Support for innovation	5.72	0.47	-0.88	0.16	1.80	0.32
Applied research environment	5.41	0.67	-0.46	0.16	0.24	0.32
Vision communication	5.33	0.84	-1.40	0.16	1.28	0.32
Perceived learning process	5.40	0.94	-1.87	0.16	5.85	0.32
Knowledge update method	5.37	0.86	-1.54	0.16	4.62	0.32
Self-regulated learning	5.10	0.90	-0.78	0.16	1.60	0.32

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