

CASE STUDY

Implementation of the integrated management dashboard for learning processes based on ISO 29990

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ABSTRACT

The current study is trying to identify the effective modules (system modules) that form the integrated e-learning dashboard for educational processes and learning opportunities based on ISO 29990 in the municipality of Tehran. The educational process management system, which is currently providing classroom training services, is able to improve the situation by incorporating integrated management systems for human resources development processes. Based on the conceptual model, the construction of the four main factors, the process of management system, the learning management system, evaluation and effectiveness system, the employee competence development system are marked as the factors that included in the electronic management dashboard of learning processes are in interaction with their constructive components, which, according to the problem and research questions, they were tested in terms of factor load and their effect on each other after defining the variables in the software and recording data using factor analysis and multiple regression at a meaningful level. The most influential factors with the 0.875 was the Process Management System, and other factors with the difference in impact levels being prioritized in the next rankings. Also, the fit of the whole model was calculated based on the relevant index along with the validity of the research structure and the result were positively evaluated.

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INTRODUCTION

In organizational excellence models and standards for managing Information Technology (ISO 20001) and Learning Services ISO (29990), each organization can pursue its business goals closer to customers, manufacturers, stakeholders, employees, and other groups (Slater, *et al.*, (2010) and in the development of quality management software of customer relationships, they can benefit from tools and solutions

for organizational intelligence, in which intelligent processes are considered in the overall organization's strategies to understand each other's relationships with customers (service recipients) in the interactive communication path and the processes of data conversion to knowledge using the storage, extraction, searching and presentation tools in different stages and observing the aspects of user ability is done. In other words, integrated electronic systems have a business-oriented process of looking at the business (Linthicum, 2003; Liao, 2008), and it focuses on the

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organization's activities, including customer relationship management, documentation, performance measurement, modeling, and correlation relations, linking data, and designing management dashboards with graphical technology and software (Jerman-Blazic, and Klobucar, 2005; Osterwalder, 2005). The integrated management system of powerful and comprehensive learning processes, facilitates executive management of learning opportunities programs within the structures and helps staff and educators evaluate their educational progress and also plan for their future learning steps (Gladun *et al.*, 2009; Mertens, 2014; Johnson, *et al.*, 2016). The integrated Electronic-management system of learning opportunities processes, as its name implies, includes all software-based management modules (Chen, and Popovich, 2003), that incorporate multiple organizational information databases including: recruiting, retaining and organizing forces, promotion and appointment and evaluation of performance, welfare, treatment and compensation the service is provided and relied on this information manages the processes of the training center that is designed and implemented in accordance with the organization's strategies (Borka and Tomaz, 2004). On the other hand, the success of the implementation of the electronic management system is based on the establishment of essential infrastructures and process guidelines in order for electronic learning to achieve its goals, regardless of these infrastructures and standards (Clark, and Mayer, 2016; Laudon and Laudon, 2007). The organizational recommendation is that, along with the updating of the organizational processes, simultaneously, its simulation would be designed by the software and system modules are coded and implemented to gradually form the integrated management system and during the cycle of improvement and fixing, the program would be developed and completed in technical aspects (Raskino and Waller, 2016). The important thing before implementing intelligent systems is that organizations need to go through a process that guarantees future implementation and justification of future implementation by designing and investing before it starts. Many organizations, before implementing this system, have examined the level of readiness and the prerequisites for its implementation. Many studies have emphasized that the success of the establishment of intelligent Electronic learning systems in relation to the assessment of organizational readiness has been performed for this purpose (Dawes, 2003). On the

other hand, in organizations with diverse operational and functional departments, the issue of managing inter-organizational processes in a traditional and bureaucratic way involves a lot of time and money, which will cause many difficulties, among such organizations Tehran Municipality can be a good example, which as the largest municipality of the country, its comprehensive management is complicated and it is somehow difficult to fully empower its employees. Hence, if the management of personnel training processes in a virtual way would be provided, it will have countless benefits for the Urban Management Organization. These benefits include: increasing human resource productivity, increasing the provision of educational services, drawing a career path, establishing additional learning opportunities based on ISO 29990, and providing fair and reasonable sharing of services to employees. National culture and organizational culture have a direct impact on the productivity of organizations and employees (Silverthorne, 2004). Manpower and knowledge and management processes are considered to be the most important intangible business assets that ultimately lead to evolving and worthwhile outcomes, since for the deployment of any intelligent system, there is a need for interconnectivity between the processes of business, staff and technology tools (Karlsson, 2007). Urban Management Organization, which consists of headquarters, operational areas, and social service units, utilizing the hierarchy and the process of planning and development plans for the development of a comprehensive urban planning document, definitely needs an electronic system that follows the two-dimensional goals of dimming and intelligence in order to integrate management systems in addition to continuous monitoring and also monitoring of day-to-day activities and excellent organizational goals are also to be met (Albrecht, 2003). In order to minimize organizational units and apply efficient management, it is necessary to deploy enterprise intelligence tools. The use of the best possible proposed solutions, the physical development of the organization would be reduced and skilled staff in intelligent units based on the management of urban services (traffic control - electronic services, civil engineering and project control, cultural, artistic and social affairs and human resource development) act agilely (Fox, 2005). Therefore, in order to manage the intelligent centers and networks in both real and virtual space, it is necessary at the outset that the city's headquarters is equipped with the necessary

tools and software to establish databases for each of the networks and centers, and establish a connection to the body of the decision-making department and the process of knowledge transfer would be continues. The nature of these systems is of a managerial nature and is defined in the areas of specialized urban management (Kline, 2010). Hence, it is necessary to design and deploy a technology-based systems based on the functional requirements of each queue and staff forces departments, intelligent solutions are essential for designing and deploying technology-based management systems. In this regard, electronic systems that incorporate databases are interconnected (join data base), so that they can handle service delivery processes using these portals. During the past 100 years, the municipality of Tehran has become a vast organization (Madanipour, 1999) and has always faced the challenge of designing an efficient structure and in that regard has witnessed many changes in his structure and plans. One of the most important changes that must be made to structural reforms, organizational intelligence and reducing the time required for administrative procedures and current costs, is the optimal training of employees based on learning opportunities and intelligent management systems with the latest scientific methods. In this regard, the feasibility of implementation Smart systems are prioritized. In the current situation, the comprehensive Human Resource (HR) system in the administrative and training departments (Referred to as Training Process Management System) is providing services to employees of Tehran Municipality subdivisions, which is required to develop additional plans for intelligent HR management processes, Other modules, if any, are connected to a comprehensive system and otherwise designed or installed in a timely manner. The training process management system is designed to optimize the processes defined in the Tehran Municipality Education System and their automation, which is providing the services to the staff from the design stage of the curriculum, the issuance of licenses for the selection of instructors, the affairs of contracts, and the registration of certificates in accordance with the educational standard 10015, which can be developed to the level of educational standard 29990 and components of the model of excellence in training and human resource development (Spataro, 2010). The current study has been carried out in Municipality of Tehran in 2018.

The research intends to identify

What factors (modules) are effective in developing the training process management system (the current system) as an integrated e-learning dashboard for training processes and learning opportunities based on the ISO 29990 standard? And what are the relationship between the proposed and complementary model and the system approach? The ideal goal of this research is to develop and complement the complementary systems of Tehran Municipality Education Management Process. The main objectives of this study are to identify the effective factors (system modules) that form the electronic management dashboard for integrated learning processes and learning opportunities based on the ISO 29990 standard. Other issues related to the applied research objectives include the following:

A) Determine the primary and secondary variables affecting the electronic switches integrated management processes, training and learning opportunities based on ISO 29990 standard

B) Determining the correlation coefficient between the effective variables of the technical management dashboard of education

C) Grouping the effective factors of the technology management dashboard

D) Determine the weight and importance of each of the effective factors of the technology management dashboard

Theoretical background and research method

In general, the purpose of visualizing information and using technological tools in visual management is to create the ability to aggregate information and a way to extract knowledge. Dashboards display the organizational intelligence components in graphically, map and graph forms. Functional dashboards are also composed of a set of measurement indicators for monitoring the internal and external information of the organization with a graphical representation (Silber and Kearny, 2009). When administrators want to see performance indicators in different sectors, such as the information desk, support and event logging, production lines or warehousing, the use of graphical dashboards is the best option, which follows the three- three rules;

- 1- Triple Forms: The three forms of monitoring, analysis, and management are aggregated.
- 2- Triple layers: Monitoring layers, analysis, and information allow users to root out the cause of the problem.
- 3- Triple types: Different types of strategic, operational and tactical decision support.

The technology tools include software and application forms that provide the necessary information for organizational intelligence and subsequent analysis and display the results of analyzes. In the other words, they are tools such as databases, data mining technology, and process and transaction systems that create intelligent capabilities (organization memory, information integrity, insight creation, display). Technology utilizes the above tools and, through the transfer of acquired information and knowledge, leads to the empowerment of decision making in the organization. Although decisions can directly derive from data or information, but these decisions are valuable when they are based on knowledge. In fact, the knowledge needed to make better decisions is the output and the product of the management dashboard that comes from the input of data and information (Laudon, and Laudon, 2007). The data is generated from internal and external resources of the organization or from other sources and databases and entered as inputs to the integrated management system modules. To gain Knowledge the data must be refined. These data are extracted from various sources including electronic systems, dashboards, concession cards, etc (Yolles, 2005). Learning Management System (LMS), Learning Management System is an integrated software that records, tracks, and tracks learner activity (Siemens, 2013). On the other hand, this system, which is a common and fundamental structure for most e-learning programs, automatically manages the learning and teaching process. Also, other modules (context Management System CMS., assessment and effectiveness of learning opportunities, providing learning services, mobile, licensing and certification systems, etc.) are integrated in the capability of design and development, as a set of process facilities for experts and managers of educational centers and the range of services provided to learners and contacts is affordable (Lopes, 2007). Comprehensive learning management system facilitates executive management of educational programs within an organization and helps staff and educators to evaluate their educational progress and plan for the next steps in learning. This system enables them to collaborate with their same level learners. In addition, for managers and administrators of the curriculum, it provides the opportunity to target the distribution of educational content, the choice of appropriate methods for teaching and analyzing the curriculum and can have access to their staff learning status reports in their organization and collections

(Keyes, 2006; So and Swatman 2006). This system supports multimedia environments and network-based technology, facilitates the proper distribution of programs and educational content, and organizes and evaluates user performance. Users can interact with a browser using an educational management system. After entering the network, they are able to view the lessons and educational materials and select and study their subject. At the same time, user activity and its results will be recorded in its database. This mechanism makes it possible to reuse data without modifying or reformation it. Subscribers or educators can also enter the management system by using the network browser and control the users or functions (Stricker *et al.*, 2011). Each organization or institution needs to adopt a coherent and integrated policy before implementing and executing the E-Learning management system, which clearly identifies its goals and expectations throughout the project. To achieve this policy, the organization must first determine its goals and anticipate the impact of the curriculum on its learners and audience. It is also important to determine the approximate amount of financial investment resulting from the implementation of a learning opportunity (Lopes, 2007). The impact of increasing the productivity of employees, improving their efficiency, and increasing the entrepreneurial interest generated by this program can be in line with the objectives of the institution that employs the E-learning system. The second step to achieving convergent policies is to create the necessary and relevant educational content. That is, the content of the training should be independent of each component, but generally follow a single goal. The design of the learning opportunity must be precise and complete, and different educational content and must have the depth and emphasis on each subject and have a logical relationship. The next basic stage is the establishment of an internal testing and evaluation methodology by the organization to determine the success rate for achieving the goals. At this stage, changes are needed in the program or in its various stages, in such a way as to help the organization achieve its predetermined goals (Stricker *et al.*, 2011).

MATERIALS AND METHODS

This research is an applied and descriptive-survey method. In this method, partial least squares technique is used to estimate the model and its component parts.

A partial least squares method based on regression modeling is analyzed by software of the same name (smart partial squares software). The most important reason for choosing this method is the existence of hidden variables and model structures that are not sensitive to abnormal and inadequate data and can be verified by any kind of data distribution. The structural equation model is composed of two parts of the model of measurement and structural model, and the variables of the model are divided into two types: hidden and explicit variables. This method is appropriate for measuring the imbedded effects of the structures, because one can consider the measurement error of each of the variables (Borka and Tomaz, 2004). In addition, for factor analysis and in order to understand the underlying variables of the main variable of the research (electronic dashboard of learning process management) and the measurement of the structure of the model are calculated using factor loadings tested by the software. The statistical population of this research is 1500 men and women of the staff and managers of the queues and headquarters of the Tehran Municipality. For the sampling and estimation of sample size the Krejcie and Morgan method and related tables (in cases where there is no society variance or percentage error and the size of society is known) were used. 306 employees and managers of the headquarters and 22 districts of Tehran Municipality in the field of human resource development, were selected randomly and 24 items of electronic dashboard of learning process management were tested. In this research, library studies including a range of books, articles and theses specialized in urban management, learning opportunities and information technology, as well as internet search on valid sites, have been used. In this regard, a questionnaire was prepared based on experts' opinions in two public and specialized sections in the Likert spectrum. According to the research topic, the objectives of the research as well as the thematic literature and theorizing theories such as Gartner (2001), the conceptual model of research for the main variable and the

hidden variables (Table.1), can be summarized in the following way (Wu et al., 2008).

RESULTS AND DISCUSSION

In order to perform the structural validity of the research model, the Fornell and Larcker (1981) techniques were used in partial least squares method and the software was based on the average of the extracted variance, which calculated the average value of the factors (quadruple variables) of 5.192, which is due to being larger than the validity index (0.5) can be considered as the reliability of the structure's validity (Tomaz, 2004). The statistical description of the data shows that 87% of the subjects have been sampled with a background of familiarity with employee performance evaluation models, educational management processes, learning opportunities, and assessment of learner-level and effective teaching curriculum. 46 percent of respondents are interested in learning and deploying process management based on ISO 29990 standard requirements. 73% of staff have a history of familiarity with the e-learning system and consider the training experience as important as classroom education. 54% of staff expressed the ability to complete standard forms and management training processes along with documentary and archival documents. The main factors of the research (electronic dashboard management of learning processes) that have been extracted from the theoretical studies and the various proposed models which Their arrangement is based on the choice of the scholar and the collective opinion of the expert experts of the Tehran Municipality, including dimensions; process management system, learning management system, the evaluation and effectiveness system, employee competence development system along with the following sub-components are grouped and registered in the software (Ruiz and Soler, 2007). In order to discover the constituent factors of each construct, a confirmed factor analysis was used. The results of the combined test of T-statistic and factor analysis were obtained according to Table 2. In other

Table 1. ELearning dashboard management processes

Business Needs Assessment, Calendar Design, Licensing, Contracts, Certificate Registration	Learner assessment, course effectiveness, record of standard discrepancies, corrective actions	Electronic learning system, content, mobile, webinar	Results of performance evaluation, learning outcomes, assessment center results
Process Management System	Learning Management System	Evaluation and effectiveness system	Competence Development System

words, in determining the reliability of each of the measurements and terms of these four identified factors, the factor load of those measures is used. This criterion indicates the degree of correlation of the measure in the corresponding structure. Regarding the analytical results of the confirmatory factor it can be mentioned that to determine which index has a significant contribution to measuring the research structures and which index does not. The factor load for each measure should be more than 0.4, otherwise it should be tested again (Borka and Tomaz, 2004).

As an example, among the components of the operating system management system that affect the dashboard of learning processes management, the component of job needing is of the utmost importance under the indicators of this factor, as more factor in the measurement of its structure (process management system factor) has a more significant and significant

role. In addition, multiple regression analysis of the relationship between the hidden variables and the main variables of the research was carried out through meaningful statistics and linear path determination statistics. Also, the conceptual model of research was fitted according to the relevant index according to the formula. The results of Table 3 reflect the output values of the software.

Fit for the model is realized when the path coefficient is significant, the explained variance is acceptable and the internal consistency is higher than 0.05 for each structure. Adequate values of the factor loads given in Table 2 also indicate that the fit is appropriate to the model (Borka and Tomaz, 2004). In addition, the GOF index is also an indicator for examining fit of the model to predict endogenous variables. The three values of 0.25, 0.36 and 0.01, have been presented as weak, moderate and strong

Table 2. Results of factor loads

Factors	Dashboard Components for Managing Learning Processes	Factor loads	T Statistics	Significance statistics (sig)	Result	Priority (Factor load rating)
Process Management System	Job Needs Assessment	0.910	24.89	0.01	Meaningful	1
	Calendar of Opportunities	0.864	23.45	0.01	Meaningful	3
	Licensing opportunities	0.890	24.69	0.01	Meaningful	2
	Contractual matters	0.671	17.30	0.01	Meaningful	5
	Registration of certificates	0.814	22.84	0.01	Meaningful	4
Evaluation and effectiveness system	Assessment of learner response level	0.797	18.74	0.01	Meaningful	1
	The effectiveness of opportunities	0.634	16.95	0.01	Meaningful	2
	Standard Non-Compliance Record	0.513	14.60	0.01	Meaningful	3
	Corrective actions	0.492	11.90	0.01	Meaningful	4
Learning Management System	Electronic learning system	0.764	17.82	0.01	Meaningful	2
	Mobile software	0.786	18.34	0.01	Meaningful	1
	Webinar	0.481	0.92	0.01	Meaningful	4
	Electronic content	0.559	10.30	0.01	Meaningful	3
Competence Development System	Results of staff performance appraisal	0.632	5.43	0.01	Meaningful	1
	Results of learning opportunities	0.538	13.55	0.01	Meaningful	2
	Evaluation of center results	0.522	12.75	0.01	Meaningful	3

Table 3. Results of regression test

Factors	Path coefficient (impact)	Communalities	Amount of R2
Process management system	0.875	23.45	0.01
Evaluation and effectiveness system	0.797	18.74	0.01
Learning management system	0.764	17.82	0.01
Competence development System	0.632	15.43	0.01

values for the model fitness respectively (Daudi *et al.*, 2013). Based on Eq. 1 and the numbers are derived from Table 3.

$$GOF = \sqrt{\text{communalities} * r^2} \quad (1)$$

The result of the fitting index is 0.559, which is greater than 0.36 and shows an appropriate fit for the research model, as well as all path coefficients are significant, and the explained variance is acceptable and the internal consistency of the structures is higher than 0.04. According to the problem and research questions, their grouping based on factor loads and their effect on each other after defining the variables in the software and recording the data based on factor analysis and multiple regression test.

CONCLUSION

In the current situation, which the educational process management system provides classroom training services, in order to bridge the gap between the current and the desired situation, it is necessary to implement a new comprehensive plan that addresses the integrated Human Resources management systems. Based on the conceptual model of the current research, the construction of the four main factors of the process management system, the management system of learning, the system of evaluation and effectiveness, the system of competence development of employees with their constructive components are interacting. According to the topic of research and also the research questions and their categorization based on factor load and their effect on each other after defining the variables in the software and the data entry based on factor analysis and multiple regression, in order to promote and develop the educational management system in Tehran Municipality and also based on the need for an electronic dashboard, the management of learning processes based on the ISO 29990 standard, with the approach of module intelligence and system integration, based on research findings (tested variables and results table) the following are suggested:

1) According to the process management system, each educational process and every educational and learning opportunities for the staff of Tehran Municipality, after implementation of the update and development of executive manuals as web-based software modules should be implemented in a way that supplementary modules such as database of

business needs to be added to existing modules for each season.

2) Regarding the system of evaluation and effectiveness based on the key indicators of ISO 29990, assessing the level of reaction, behavior and performance of learners from the point of view of self-expression, and managing and evaluating the effectiveness of courses, according to the coding of modules under the software, must be added to the current system.

3) According to the management system of learning, the providing learning services to employees of Tehran Municipality subdivisions due to the comprehensiveness and content of electronic content for the audience in the dashboard space should be designed and some of the courses along with other facilities such as webinar and mobile software for learners should be conducted in this manner just like other virtual training centers.

4) According to the Employee excellence development system, the results of staff performance appraisal, learning opportunities and outcomes of assessment centers for the development of competencies and any promotion and appointment in the administrative processes and in the staff archive must be recorded, therefore the empowerment of employees can be reported to the system according to the timetable.

5) In each phase of the implementation stages of the modules and the completion of the system with the technological facilities, the necessary training along with the motivational cases must be provided by the senior managers of the senior human resources development directors of Tehran Municipality to the experts and the beneficiary managers for agility and intelligence purposes of the units under their management.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript. In addition, the ethical issues; including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy have been completely observed by the authors.

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