A Model to Evaluate Content Dimensions in Educational Institutes in order to establish a Knowledge Management System

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Abstract

Organizational knowledge is one of the most important assets of every organization; thus, its optimal management will lead to a comprehensive organizational improvement. Knowledge management is a powerful tool to achieve competitive advantages and it has been experienced that its use in academic environment has many advantages. However, the important issue prior to establishing a knowledge management system is to identify and determine the effective factors on the readiness of organizations to implement this project. Therefore, the main goal of this research is to provide a model to evaluate the readiness level of content dimension of educational centers in order to establish the knowledge management system. This research is a combination of quantitative and qualitative methods; and after exploratory studies, exploratory interviews with experts of knowledge management have been carried out. The data were coded and classified using the methods of grounded theory. As a result, four hundred and ninety two codes were obtained and the main model consisted of 7 main components and 18 sub-components. A questionnaire consisted of 54 questions was used in this research and its validity and reliability was calculated 0.929 through content method and Cronbach's alpha coefficient respectively. Data were analyzed through confirmatory factor analysis and the final model consisted of six main content dimensions. These dimensions are as follows in terms of importance and priority: Development of educational departments in accordance with environmental knowledge estimated as 1.193, senior management supportive strategies estimated as 0.469, institutionalization of processes and technology knowledge estimated as 0.461, evident and caching technologies estimated as 0.344, knowledge-oriented behaviors estimated as 0.297, participative culture in knowledge creation estimated as 0.237. Furthermore, twenty-eight sub-problems will be extracted in terms of importance and priority.

Keywords: Modeling, Content Dimensions, Educational Centers, Knowledge management system's establishment.

Introduction

Today, knowledge management is one of the most important assets of every organization and it is a driver to create competitive advantage, organizational development and innovation. This asset is a unique one in comparison to other assets, because the more it is used, the bigger its value become [1, 2]. Management of this intangible asset has attracted much attention during the past decades so that the implementation of an effective strategy for knowledge management and transforming into a knowledge-based organization is the essential condition for the success of organization in the so-called knowledge-based economy period [3, 4]. Organizational structure has a significant impact on the implementation of knowledge management. Implementation of any organizational process requires attention to its requirements and proper context. One of the most important aspects of any
organization is organizational structure [2]. Implementation of a complex process of knowledge management in organizations cannot be done overnight. Effective implementation and application of knowledge management requires an accurate and transparent understanding of the factors that affect knowledge management process. All organizations are not equally prepared for the successful implementation of knowledge management [5, 6].

Today, higher education institutions are facing many challenges so that the alignment of most higher education institutions with extensive development of online resources as well as creation of virtual universities showed the necessity of adoption of knowledge management at universities [7].

Using knowledge management, universities are able to increase admissions, application of efficient educated and technical workforce and maintaining them, and increase the application of new opportunities of e-learning and other web-based facilities. Among the web-based features, the replacement of existing operating systems with new information systems can be noted. Thus, not only such systems do provide information for managers, but also by providing information for other academicians including professors and students create the opportunity of competition in an environment in which various institutions are trying to feed you the information at any time and any places.

Our country is among the developing countries where few studies of its education system show defects and deficiencies in many areas of management, administration and training [8]. In addition, the main challenge facing the development of science and technology in the country is the creation of a creative, innovative, and self-reliance structure for education and research. Thus, it would be able to dynamically and continuously prepare the context of science and knowledge development upon the urgent needs and priorities of its community, and by researching in the context of noble ideas, play the role of a driving factor for innovation and economic development in the society [9]. Application of a model or method to create knowledge management and its implementation in organizations in order to achieve educational objectives and benefits is essential [10].

In terms of necessity of research in this field, Monacko believes that despite the popularity of knowledge management in the field of economy and trade, it still has not established its position in universities. While universities are considered a source of knowledge creation because of having research centers and should be the leader in the application of knowledge management in society [11].

Also, creation of knowledge management in universities, higher education institutions, and in general, in all knowledge-based organizations is necessary in order to create and maintain a framework so that all members will be able to apply knowledge in teaching, learning, research and access to information they need at any place and any time [12].

According to statistics and data comparison, it is primarily concluded that the process of knowledge production in Iran in terms of human and financial resources, structure, performance and efficiency has made many changes in comparison to its historical position and values that are based on valuing the knowledge and research. In a systematic perspective, this gap is controversial in terms of inputs, process of knowledge creation, and the outputs of a knowledge creation process in Iran [13].

Since no development in the society will be made without serious participation in higher education, the institutions who are more interactive with learning in the society, have a better chance to be introduced as learning organizations and to achieve efficient and better performance and decision making besides improving their scientific and administrative services by using knowledge management [14].

Higher education plays an important role in developing countries as the best center of knowledge creation and development [15]. To accelerate the overall development of the country, the Islamic Republic of Iran’s twenty-year development vision considered knowledge the driver for development. In this document, knowledge, technology and
skills are considered the major factors to create value added. The first part of the fourth economic, social and cultural development plan (2004) is devoted to the knowledge-based national economy growth and the fourth section is devoted to knowledge-based development.

Thus, due to changes in management science and the structure of higher education in the world and also due to the strategic plans of the government in the context of achieving sustainable growth in the Islamic society of Iran, it is essential that higher education has an appropriate participation either in the public or the private sector in order to meet the twenty-year planed objectives to play a role in the economic development of the country.

In accordance with what has already mentioned, it is essential that we consider universities as learning organizations and such vision requires the application of knowledge management system in the university system of the country.

In this regard, Islamic Azad Universities first need to identify content dimensions indices and the factors affecting knowledge management and then provide a model in order to establish knowledge management system. Such recognition of the fitness of content dimensions will cause organizational decisions and strategies to be taken effectively. Thus, to achieve the main goal, researchers conducted two questions that are as follows:

- How much is the weight and importance of content dimensions affecting the implementation of knowledge management?
- What model and framework can be used in educational centers to assess the level of preparedness of the content dimensions in order to establish a knowledge management system?

In this study, using precise and comparative literature review of knowledge management and interviews with experts, we have tried to answer the main questions of this study according to the characteristics of educational centers in Iran.

**Literature Review**

Since 1970s with the rapid development of superior technologies in the world, especially in the fields of computing and communications, global economic growth pattern changed radically, and consequently knowledge became the most important alternative assets of physical and monetary assets since 1990s.

Knowledge management is a style of management that refers to attempts carried out to systematically look for, create, make available, and apply the intangible assets of an organization, and fostering a culture of continuous learning and knowledge sharing in organizations [16]. Knowledge management is absolutely critical as the organization's ability to create, store and distribute knowledge for a competitive advantage in the areas of quality, speed, innovation and price.

They believe that knowledge is the only competitive advantage of an organization and although the market is constantly undergoing changes, technologies are increasingly replaced with newer types, competitors are increasing in terms of diversity and multiplicity every day, and products undergo fundamental changes; a successful organizations is the one which continually engaged in the production of new knowledge. [17]

In today's competitive environment societies, research institutions and investors are competing to attract the best researchers, universities as well seek to obtain the best investors who are the teachers and students. Universities and higher education institutes, as well as other organizations involved in knowledge management, on the one hand are facing challenges such as the financial pressures, rapid growth of technology, the changing role of employees, competitive values and generally rapid changing.

On the other hand, they are trying to achieve their main objectives, namely education, research and services for society. Proper dealing with challenges and achieving goals is only possible if a university can consciously and clearly manage processes related to knowledge creation and propose an easy solution to accept the views and processes of management of knowledge [18].

As a result, the application of a method for
creating and implementing knowledge management in these institutions is necessary in order to achieve educational goals and achieve maximum benefits [10].

For educational institutions, knowledge management is defined as follows: A systematic and organized process to create and disseminate information, selection, purification and expansion of explicit and tacit knowledge to create a unique value that can be used to consolidate the learning environment and teaching [19].

Knowledge management in higher education is a set of organizational processes that support the creation, transfer of knowledge in these institutions, and make possible the achievement of organizational goals. One of the most important reasons for applying knowledge management in higher education institutions is to integrate and contribute to the integration of new knowledge with prior knowledge, which can lead to an increase in the relationship between work and education. [20]

Knowledge management in higher education is a set of organizational processes that support the creation, transfer of knowledge in these institutions, and make possible the achievement of organizational and academic goals. For educational institutions, knowledge management is defined as follows: A systematic and organized process to create and disseminate information, selection, purification and expansion of explicit and tacit knowledge to create a unique value that can be used to consolidate the learning environment and teaching [19,4].

Knowledge management increases managing capabilities of universities to learn from their environment and cause the increase of usage in academic processes using new technologies and tools as well. Knowledge management is used in the academic environment of universities to examine overlaps and relationships between teachers, students, training courses and programs.

The main purpose of knowledge management is a fast, effective, efficient and innovative productivity of resources and knowledge assets, infrastructure, processes and technologies in regard with academic purposes [21]. Feasibility models of knowledge management seek to assess the level of knowledge management infrastructure prior to implementation, so they could identify the readiness of these factors for the successful implementation of knowledge management. Holt defined preparedness as prerequisites for the success of a person or organization facing organizational changes. Various models are proposed by researchers in the context of organizational readiness for implementing knowledge management. The difference between these models is related to the type and number of parameters being selected.

One of the most important factors for implementing knowledge management in organizations is organizational structure. Organizational structure can be helpful to knowledge management in various aspects to achieve their objectives. Organizational structure affects knowledge management processes and corporate leadership [22].

Organizational structure has two main aspects: the structure and the contents dimensions. A content dimension represents the entire organization, including the size of organization, technology, environment, culture and objectives of the organization, which introduce the position of that organization and affect the structural dimensions. Content dimensions represent the position of an organization, affect the structural dimensions of the organization, and will be influenced in return. They can be ambiguous because they represent an organization in which the structural dimensions are placed within it [23].

Hassan pour and colleagues evaluated factors such as culture, information technology, management, organizational structure, strategy, training, human resources, positive attitude towards changes, knowledge-based processes, and motivational rewards in a study entitled as "Identification and analysis of factors affecting the readiness of universities for the successful implementation of knowledge management".

The results indicated "leadership and management support for the implementation of knowledge management" and “Proper knowledge sharing among members” had the highest importance [24].
Mamaqani, Sami Zadeh and Saghfi [17] studied factors affecting the success of knowledge management in research centers in Iran, in order to create a basis to assess the readiness of centers for knowledge management. They concluded that the success factors in these centers include knowledge-based strategy, management support, motivational incentives for sharing knowledge and proper technical infrastructure. Azadshahraki conducted a study entitled as "Underlying factors for knowledge management in education and training organization of Bushehr".

The findings showed that, from the perspective of the entire staff of the studied organization, knowledge processes and organizational culture have more influence towards information technology in the implementation of knowledge management in that organization.

Mirpur [25] studied factors affecting the implementation of knowledge management in customs supervision of staff of Bushehr province according to administrators and staff. They concluded that three factors of organizational culture, management support and readiness of staff for the implementation of knowledge management in customs supervision of staff of Bushehr province are enumerated to a large extent but the two factors of organizational structure and technologies had not been considered properly.

Abdullah et al [26] conducted an experimental implementation of knowledge management in public higher education institutions in Malaysia. The findings indicated a lack of awareness in the implementation and application of knowledge management systems, which is because of the lack of understanding of some applications and technologies. Adjustment the framework of Knowledge management system emphasizes on the increase of awareness of system and the introduction of knowledge management’s benefits. The results also showed that encouragement and incentives play a critical role in the successful implementation of knowledge management system.

Salavati in his study, entitled as a model for knowledge management in governmental organizations of Iran, concluded that organizational factors have the most and direct effect on knowledge management. Therefore, the functioning of public institutions in terms of the culture of knowledge creation, knowledge leadership, knowledge resources, knowledge portals, knowledge-based structures and process is important to the knowledge management and affect its success. Environmental factors and knowledgeable citizens influence the knowledge management in governmental organizations of Iran through affecting organizational factors. Therefore, political, cultural, technological factors, and knowledgeable citizens indirectly affect knowledge management by affecting organizational factors.

Tan [27] studied the level of acceptance and success factors of knowledge management in SMEs in Malaysia. He concluded that the adoption of knowledge management in these companies is higher than average, and factors such as culture, leadership, employee involvement, ICT and organizational structure affect the processes of creation, transfer, share and application of knowledge. Prabnier proposed a simple model for knowledge management in organizations regarding the model of knowledge management framework APO "Asian Productivity Organization".

In this model, knowledge management is considered an integrated approach of creating, sharing and applying knowledge for growth, productivity and organizational profitability. Additionally, the importance of knowledge management in the success of organizations and highlighting key factors for the success of knowledge management system were emphasized. Abdullah and others [26] conducted a research in Malaysia entitled as "An experimental study on the implementation of knowledge management in higher education institutions of the state". A descriptive survey was conducted and some questionnaires were distributed in six state universities of Klang district in Malaysia.

Analysis of the results has shown that the implementation of knowledge management in public higher education institutions in Malaysia had been accepted. Although the culture of knowledge sharing in these institutions is not desirable. The organizational structure of public higher
education institutions in the Klang district of Malaysia for knowledge management implementation was not proper as well. However, the results showed that those institutions mentioned earlier had suitable infrastructure regarding the preparedness of information technology for implementing knowledge management in those institutions.

Piccoli et al [28] proposed a framework and a model in their studies for the development of knowledge management in higher education institutions. This study considered creating, managing and transforming of knowledge in relation to the activities of faculty and students in a web-based virtual learning environment. Their model is one of the key models because it comprehensively introduces the process of creating and transferring knowledge and it can be implemented with the help of students and faculty members in higher education administration.

Methodology

This study was conducted in two stages: qualitative and quantitative. This study is considered a fundamental-applicable research in terms of objectives since it seeks to provide a new method for evaluating fitness level of content dimension of educational centers.

In terms of data collection, this research is placed in the category of descriptive studies. The population consists of professors and experts in the field of knowledge management. In the qualitative section of this study, snowball sampling was used and the selected sample consists of 10 experts in the field of knowledge management.

In the qualitative section, a semi-structured interview with five main questions was used as a data gathering tool, and a questionnaire based on Likert scale with 54 five-choice questions was used in the quantitative section.

To assess the validity of content in this study, content method was used and the questionnaire was created according to supervisors and advisors. The reliability of the questionnaire was calculated 0.929 using the Cronbach’s alpha coefficient that indicates high internal consistency of the tools used in this study. Grounded theory was used in the qualitative section to analyze data. In the quantitative, confirmatory factor analysis was used to analyze data.

Data Analysis

Results were evaluated in both qualitative and quantitative section. In the qualitative section, results of exploratory data extracted from deep and semi-structured interviews from experts of knowledge management were analyzed. To do so, concepts and categories of interviews, open and theoretical coding of knowledge management model were first extracted using the analysis of indicators method. Then, open coding was done based on the inference and deduction of basic concepts.

Categorization of concepts and the related components was conducted based on the obtained codes, and finally 492 open coding was conducted. In the next phase, the obtained sub-components were thoroughly encoded with scientific precision and sensitivity and then they were categorized after many repetitions and formed the components of knowledge management. Among the 492 open codes resulted from identifying the basic concepts, 18 concepts as sub-components and 7 concepts entitled as organizational culture, technology, strategy, external environment, size of the organization, organizational behavior and the knowledge economy were identified as the components resulted from inference and deduction.

In the quantitative section of the study, the data were analyzed using the second order factor analysis and SPSS software. To create the model, every individual components identified in the previous section were first evaluated and designed.

Due to the necessity of developing a single model to assess the fitness level of content of establishing knowledge management in universities, aggregation and combination of obtained components was carried out. After reviewing the principal regression weights of components and according to the optimization indices of variance and covariance coefficients between components and errors, the following model was proposed in Figure...
The fitness results of model’s indices are shown in table 1.

Table 1: The size of the model parameters

<table>
<thead>
<tr>
<th>Index</th>
<th>RMSEA</th>
<th>CFI</th>
<th>GFI</th>
<th>RMR</th>
<th>CMIN/df</th>
<th>Df</th>
<th>NPAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>0.13</td>
<td>0.87</td>
<td>0.79</td>
<td>0.3</td>
<td>3.18</td>
<td>117</td>
<td>54</td>
</tr>
</tbody>
</table>

Due to the fact that resulting indices have differences with the acceptable level, this solution is not acceptable. According to content and meaning of each item that is in fact based on the ideas and theories of knowledge management, and their validity and reliability that was approved by experts, seven pre-identified factors were re-separted and renamed and led to the redesign of the model. Forty-four proposed models were evaluated using the characteristic search and the four following different models shown in Table 2 were selected.

Table 2: Proposed models with the highest indices

<table>
<thead>
<tr>
<th>Model</th>
<th>df</th>
<th>X2</th>
<th>X2-df</th>
<th>Bcc0</th>
<th>Bic0</th>
<th>X2/df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>775</td>
<td>2911</td>
<td>2136</td>
<td>294</td>
<td>0.0000</td>
<td>3.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>2</td>
<td>774</td>
<td>2907</td>
<td>2133</td>
<td>293</td>
<td>0.983</td>
<td>3.2</td>
<td>0.000</td>
</tr>
<tr>
<td>3</td>
<td>773</td>
<td>2911</td>
<td>2134</td>
<td>297</td>
<td>4.949</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>4</td>
<td>772</td>
<td>2906</td>
<td>2141</td>
<td>301</td>
<td>8.55</td>
<td>205</td>
<td>0.000</td>
</tr>
</tbody>
</table>
According to the recommendations and interpretation of Raftari, model No. 4 is identified as the best model to fit the data with a confidence level of 0.000 and a high-level power analysis. Figure 2 is related to model no. 4. As it is obvious in the figure, the intelligent knowledge economy factor was removed due to a smaller load factor and its sub-components were removed as well. Ultimately, we tried to modify the fitness of model using optimization indices and creating relations of dependence and correlation among the components and errors of the model and as a result figure two was obtained.

![Figure 2: The final structural model to assess the fitness of content](image)

Fitness indices of the model were calculated and evaluated. Table 3 shows the results of calculations.

<table>
<thead>
<tr>
<th>Fitness Indices</th>
<th>X²</th>
<th>DF</th>
<th>X²/DF</th>
<th>RMSEA</th>
<th>GFI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>998</td>
<td>332</td>
<td>3.00</td>
<td>0.078</td>
<td>0.89</td>
<td>0.9</td>
</tr>
</tbody>
</table>

The results showed that the adjusted value of chi-square is three, which indicates the acceptable fitness of model. According to CFI=0.9, GFI=0.89, and RMSEA=0.078, it can be concluded that the model has an appropriate fitness with data.

**Conclusion**

Today, one of the wishes of organizations is to define a good knowledge management system and manage it successfully. Undoubtedly, universities and educational and research centers known as knowledge-based organizations, should play the role of leaders in designing and establishing an appropriate knowledge management system.

Such a thing requires the evaluation of main factors of knowledge management and taking actions based on these effective factors in different phases of designing and establishing of knowledge management system. In this study, we design a model to assess the readiness of content dimensions of
educational centers to establish knowledge management.

In this study, after exploratory studies and evaluation of existing models, knowledge management experts were interviewed. The data obtained by the grounded theory method, were summarized and encoded and as a result 492 codes were obtained and were summarized into 7 content dimension and 18 sub-components. Then, using confirmatory factor analysis in the end, the final model with 6 content dimensions was proposed.

As shown in Figure 3, the final model has six main and 28 sub-components. These dimensions include:

- Appropriate development of educational departments with environmental knowledge
- Quality and content of knowledge
- Insight and attitude of staff towards valuable knowledge
- Comparable indicators and university rank in terms of knowledge-creation
- The frequency and multiplicity of highly qualified experts
- Maintaining knowledgeable workers, intellectuals and professionals
- Localization and application of external knowledge
- Understanding the complexity and mutations of knowledge in the competitive international environment
- The possibility to seize and measure knowledge outside the university
- Software and hardware for quick communications
- The frequency and multiplicity of curricula in academic fields
- Understanding the interaction of transnational and international centers.

- Senior management supportive strategies
- Support of managers and leaders to establish knowledge management
- Supportive vision of organizational in terms of knowledge management
• Teachers and elite commitment to respect the rights of intellectual works of other professors at university

• Institutionalizing processes and knowledge-based technologies

• Access to dynamic technologies for assessing the performance of system

• Processes and procedures based on knowledge management

• Access to technologies to support decision using knowledge-based data

• Access to technologies for intelligent response using artificial intelligence

• Institutionalizing culture of knowledge in all educational processes of university

• Evident and caching technologies for knowledge

• Technologies for storage, retrieval, and display of knowledge-based data

• Disclosing culture of tacit knowledge of experts and professionals

• Knowledge-based Behaviors

• The positive attitude of managers and leaders toward the establishment of knowledge management

• Organizational belonging and loyalty of employees to produce and share knowledge

• Staff's patience toward the gradual establishment of knowledge management

• Cooperative Culture in knowledge creation

• Software and hardware for knowledge transmission and networking among teachers

• Culture of research and knowledge production among teachers and students

• Cooperative culture and cooperation spirit among elites for the establishment of knowledge management

• Team orientation and group working to implement knowledge management

According to the final and fitted model, the weight and importance of every component can be determined and prioritized based on the maximum likelihood absolute value of standardized regression weights. In this regard, appropriate development of educational departments with environmental knowledge with 1.193 estimation is considered the main content dimension.

Senior management supportive strategies with an estimation of 0.496, institutionalizing processes and knowledge-based technologies with an estimation of 0.461, evident and caching technologies for knowledge with an estimation of 0.344, Knowledge-based Behaviors with an estimation of 0.297, and cooperative Culture in knowledge creation with an estimation of 0.237 are prioritized respectively in terms of priority and importance.

This model provided weighting and prioritization of factors and it can be useful and beneficial for university managers prior to knowledge management establishment. Since a lot of factors should be modified prior to knowledge management establishment and managing these factors at a same time is pretty hard, this ranking can be used as a guideline for universities to prioritize and adjusting activities.

In addition, managers can identify critical success factors based on the ranking provided in this research. In future research, the provided factors in this study can be used as a basis for assessing the fitness of a particular university, in order to establish a knowledge management system.

It is worth to extend the content dimensions defined in this model, and study the relation between structural and content dimensions in terms of establishing a better knowledge management system. In order to understand better and achieve more comprehensiveness, it is suggested to study about the failure of organizations in the establishment of a knowledge management system.

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