Artículo de investigación

Identification of Knowledge Measurement Indicators of Faculty Members of Iran Universities

Identificación de los indicadores de medición del conocimiento de los miembros de la facultad de las universidades de Irán

Identificação de Indicadores de Medição de Conhecimento de Membros do Corpo Docente das Universidades do Irã

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Abstract

Identifying and controlling knowledge assets is essential for any organization, and proper utilization of this capital, in the presence of appropriate criteria and indicators, will affect the performance and not merely a qualitative assessment. Therefore, the researchers seek to identify the indicators of knowledge measurement of faculty members in Iran's universities. The present research, based on the objective, is a fundamental research component, based on the nature is the descriptive research component and based on the type of argument, is a component of qualitative research. The data collection method is library resources and questionnaires and the technique used is Fuzzy Delphi method. The Delphi panel was established with 17 faculty members who were selected by a judiciary. The results of the research showed that among 61 indicators extracted from theoretical literature, two index such as: guidance the undergraduate theses and the ratio of postgraduate students to total students, do not affect the knowledge measurement of human resources at universities in Iran, and there are consensus about other indicators.

Resumen

Identificar y controlar los activos de conocimiento es esencial para cualquier organización, y la utilización adecuada de este capital, en presencia de criterios e indicadores apropiados, afectará el rendimiento y no meramente una evaluación cualitativa. Por lo tanto, los investigadores buscan identificar los indicadores de medición del conocimiento de los miembros de la facultad en las universidades de Irán. La presente investigación, basada en el objetivo, es un componente de investigación fundamental, basado en la naturaleza es el componente de investigación descriptiva y en función del tipo de argumento, es un componente de la investigación cualitativa. El método de recolección de datos son los recursos de la biblioteca y los cuestionarios, y la técnica utilizada es el método Fuzzy Delphi. El panel de Delphi se estableció con 17 miembros de la facultad que fueron seleccionados por un poder judicial. Los resultados de la investigación mostraron que entre 61 indicadores extraídos de la literatura teórica, dos índices tales como: orientación de las tesis de pregrado y la proporción de estudiantes de postgrado a estudiantes totales, no afectan la medición del

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conocimiento de los recursos humanos en las universidades de Irán, y hay consenso sobre otros indicadores.

Palabras clave: conocimiento, medición del conocimiento, universidad, método difuso de Delphi.

Resumo

Identificar e gerenciar ativos de conhecimento é essencial para qualquer organização e utilização adequada desta capital, na presença de critérios e indicadores apropriados, irá afetar o desempenho e não apenas uma avaliação qualitativa. Portanto, os pesquisadores buscam identificar indicadores de medição de conhecimento dos membros do corpo docente nas universidades iranianas. Esta pesquisa, com base no objetivo, é um componente da investigação fundamental, com base na natureza do componente é pesquisa descritiva e, dependendo do tipo de argumento, é um componente da pesquisa qualitativa. O método de coleta de dados são os recursos da biblioteca e os questionários, e a técnica utilizada é o método Delphi Difuso. O painel Delphi foi estabelecido com 17 membros do corpo docente que foram selecionados por um judiciário. Os resultados da pesquisa mostraram que entre 61 indicadores extraídos da literatura teórica, dois índices, como a orientação de teses de graduação e a proporção de estudantes de pós-graduação para o total de alunos não afetar a medição de conhecimento de recursos humanos em universidades no Irã, e há consenso sobre outros indicadores.

Palavras-chave: conhecimento, mensuração do conhecimento, universidade, método difuso de Delphi

Introduction

Increasing demand for university entry and rising customer expectations poses great challenges to higher education and, given the current challenges, the need for management and knowledge assessment in higher education is required. (Adhikari, 2010, p. 96) In order to establish a comprehensive system of quality assurance in higher education, the country's education assessment organization has begun extensive activities in this field and has introduced systematic procedures in assessing and improving the quality of educational groups of universities and higher education. In the specific and general dimensions of the performance assessment of the headquarters of the Ministry of Science and Technology and the queue of universities and institutes of higher education, the realization of 94.96 percent indicates the positive growth of most indicators in this area, including the research vice president and Technology with a score of 262.91 and a 100% realization of goals, and a teaching assistant with a score of 251.81 and 90.47%, are in the highest position. (Educational Evaluation Secretariat of the country's educational measurement organization, 2011)

The topic of knowledge measurement has led to the publication of many articles that have led to the implementation of various methods for measuring knowledge in organizations. In each of these studies, one of the measurement methods has been used in a typical organization, each with its own application. (Khadivar et al., 2007, p. 2). Ahn and Chang (2004) used the KP3 method in knowledge measurement, but this method is not directly applied in knowledge measurement, but shows how much knowledge is needed to improve performance the organization has been effective. (Khadivar et al., 2007, p. 3) In 2000, Gambardella & Torrisi measured the amount of knowledge of organizations by assessing their technical connections with other companies. Nilipour et al. (2014) presented a model for employee knowledge that highlights the utility of the model in small and medium businesses and is not suitable for universities and higher education institutions.

Khadivar et al. (2007) compared different methods of measuring knowledge in terms of 8 indicators. Analysis of their statistical results shows that none of the investigated methods are capable of identifying the causes and weaknesses in the organization's knowledge status. Therefore, identification of measurement indicators is a researchable issue in the

theoretical field. This issue, especially at the level of universities and institutions of higher education, is significant because of the importance of knowledge-based organizations in implementing knowledge management and measurement systems as leading organizations. (Hooshmand et al., 2014, p. 3) So the main question is "What are the indicators of measuring human resource knowledge in universities and higher education institutions?" It is suggested that the subject of this research is the present.

Literature and Research Background

Universities and institutions of higher education, as the most important source of knowledge, include a large part of the information and knowledge necessary for the development and development of a community. (Mehrali-zadeh et al., 2011, p. 2). The importance of this issue becomes clearer when considering that the provision of indexed and even quantitative indicators that can justify the knowledge assets of different universities. (Shaemi Barzegari, 2005, p. 11) Davenport and Prusak (1998) argue that for survival in complex and dynamic environments, organizations need to have the necessary agility and flexibility, and operate efficiently in the knowledge management. On the other hand, the human factors of universities try to collect, maintain and expand knowledge at the university level; therefore, the need for knowledge, the development and improvement of knowledge, the distribution and dissemination of knowledge, the exploitation of knowledge, the preservation and storage of knowledge and evaluation, and Measuring knowledge is among these efforts. (Harris, 2006)

In this regard, Zohour Parvandeh (2014) conducted a study with the aim of identifying factors affecting the intellectual capital of Ferdowsi University. Findings and results showed that the four factors of human capital, structural capital, relationship capital and innovation capital and eleven competencies, skill, capability, motivation, attitude, IT infrastructure and infrastructure, internal processes, system and structure Organizational relationship with client, collaboration and networking, innovation mechanism and innovation culture have a significant role in measuring intellectual capital of universities. Salarzehi et al. (2014) investigated intellectual capital measurement models in evaluating the performance of universities and institutions of higher education, they concluded that intellectual asset is specific to each organization, so there is no homogeneous measurement and measurement model of intellectual capital in universities.

Esmaeilzade and Pourserajian (2013) presented a model for comparing small and medium enterprises in terms of knowledge assets. Their research led to the presentation of a five-step model for assessing the knowledge of small and medium enterprises. Abbasi et al. (2011) investigated the indicators of intellectual capital assessment in assessing the performance of universities and higher education institutions. The results of the research showed that the use of the Scandian model is useful in evaluating the intellectual capital performance of universities and the ranking of higher education institutions. Gupta et al. (2015) identified in their research knowledge indicators in India's higher education institutions. They showed that, given the intangible and vague nature of knowledge sources, the criteria used to measure knowledge are completely different from one another.

Research Object

Main object: Identification of knowledge measurement effective indexes of faculty members of universities and institutes of higher education of Iran

Secondary objects:
Extraction of knowledge measurement initial indexes of faculty members of universities from theoretical literature of research
Evaluation of Knowledge Testing Indicators of Faculty Members of Universities

Research Method:
The present research, based on purpose, is a fundamental research component, and based on the nature and method is the descriptive research component, and based on the type of reasoning, since the researcher describes and analyzes it and uses a deductive approach, it is a part of qualitative research. Data collection method, library resources and field studies and instrument used were Fuzzy Delphi questionnaire. In the first step, the researcher studied all available models in the domain of knowledge measurement through written sources and extracted knowledge measurement indicators from them. Then, the purpose of identifying the effective indexes of knowledge of faculty members of universities and institutes of higher education in Iran was to use Fuzzy Delphi Method. The researcher referred to a group of

specialists, experts and experts in the subject of research, so that 17 faculty members in the field of human resources management, which dominated the field of knowledge and human capital, were used as a panel judgment method Delphi was selected. The list of initial indices obtained from theoretical literature was sent to the experts through a questionnaire to implement the Fuzzy Delphi Method. After collecting and analyzing, a second phase of the Delphi fuzzy was implemented and finally, the effective indexes of the model. The opinion of experts was refined and identified.

Research Findings

Choosing Research sample:

Some of the main features for choosing the experts are as follows: they are involved with the issue, have continuous information about the issue to continue to work together, have enough motivation to participate in the Delphi process, and feel that the information generated by the process for them Also worthwhile.

Another feature of the elected experts is the complete knowledge of human knowledge and human resources, so in a judgment, there were 17 faculty members who had sufficient knowledge and knowledge in order to implement a fuzzy Delphi Method. They were selected and the necessary information was provided to them.

Extracting and Explaining Suggested Options

Based on the study of research theoretical literature, which includes knowledge measurement models and intellectual capital models of universities and higher education institutions, 77 initial indicators of knowledge measurement were extracted from faculty members. The above indicators before the implementation of the Fuzzy Delphi were sent to the 7 experts and experts in the area of knowledge and human capital to validate the questionnaire and after modifying and reviewing the comments and discussions. Major opinion of the experts indicates that the indicators were too long and they were long, as well as the coincidence of some indices. Therefore, while correcting the conceptual terms of the indices (due to the ambiguity and lack of clarity of the expressions), some were deleted and the segments that were coherent were merged; and the following 5 indicators, which, according to the experts, the knowledge of the faculty members of the universities (not mentioned in any of the existing models) was added to the questionnaire:

Number of articles published in Islamic countries (ISC)
Arbitration of articles in journals and conferences
Editorial Board
Secretary, editor and editor in charge of publications
Join the scientific community
The final questionnaire including 61 indicators for measuring human resources knowledge of universities and higher education institutions was developed as described in Table 1:

Table 1. Primary Index of Human Resources Knowledge of Universities and Higher Education Institutions

Row	Index for Knowledge Measurement	Row	Index for Knowledge Measurement
1	education degree	32	Presenting lectures in prestigious scientific assemblies
2	Experience and years of service (scientific basis)	33	Arbitration of articles in journals and conferences
3	Training courses	34	Subscribe to the editorial board for scientific publications
4	Introduction to second and third foreign languages	35	Secretary, editor and editor in chief
5	Varied courses taught	36	ISI articles
6	Mastery, experience and teaching skills	37	Scientific Papers - Foreign Research Non-ISI (Latin)
7	Teaching Lesson Seminar MSc and Ph.D.	38	Scientific - Research Papers

8	The proportion of postgraduate students to the total students	39	ISC articles
9	Guidance for Graduate Theses	40	Scientific - Promotion Papers
10	Guidance Graduate Dissertations	41	Papers Presented at international conferences abroad
11	Tips for graduated doctorate dissertations	42	Papers Presented at International Domestic Conferences
12	Consultation of graduated theses	43	Papers Presented at National Conferences
13	Consultation of Ph.D. Graduate Theses	44	Papers published at international conferences abroad
14	Special knowledge (specialization in specialty field)	45	Papers published at international conferences in the country
15	Continuous promotion of skills	46	Papers published at national conferences
16	Knowledge of behavioral science in interaction and communication with students[97]	47	Articles with high references
17	Knowledge of behavioral science in interaction and communication with colleagues[98]	48	Official reports and documentation provided in the press, media and knowledge bases
18	Ability to perform assigned tasks	49	Compilation of books
19	Ability to do workgroup	50	Book translating
20	Leadership and Management Knowledge	51	Book Reprint
21	Knowledge of decision making and problem solving	52	Review, critique, edit and critically correct books and magazines
22	Knowledge of technology use	53	Compilation and compilation of the pamphlet
23	Offer to promote and improve the university's position	54	Projects and research projects
24	Aristocrats over long-term and short-term university goals	55	Study Opportunities
25	Understanding the organizational structure of the university	56	Original art, artistic and literary work
26	The ability to discover opportunities and threats	57	Provide ideas and innovate
27	The ability to recognize the strengths and weaknesses	58	Number of Inventions, Discoveries and New Scientific Theory
28	Research skill (quantitative and qualitative)	59	Membership in specialized national and international organizations
29	Purposefulness of studies and research	60	Membership in selected academic committees (such as evaluation committees, etc.)
30	Conducting specialized conferences and seminars, courses and workshops, and specialized exhibitions.	61	Join the scientific community
31	Participate in conferences, seminars and specialized exhibitions		

Definition of Linguistic Variables

As stated, the use of variables with definite values in the questionnaire, with the aim of consulting the experts about identifying effective indicators of human resource knowledge measurement, makes it difficult for experts to comment. For this reason, qualitative variables such as "very high", "high", "moderate", "low" and "very low" were used for the degree of agreement of experts with each indicator. By defining the range

[97] Solving problems, consulting, paying attention to wishes and attitudes, satisfaction, handling complaints and critiques, creating competition, receiving feedback, motivating and stimulating

[98] Recognizing colleagues, creating motivations and stimuli, satisfaction, the ability to create the environment and the desired physical environment, creating a healthy environment, managing stress and stress, working ethics

of qualitative variables, experts with the same mindset will answer questions. Therefore, qualitative variables were defined as triangular Fuzzy numbers defined in table 2 and figure 1:

Table 2. Fuzzy Triangular Numbers Equivalent to Five Likert Scale (Chang and Chen, 1994)

Verbal Variabke	Fuzzy Triangular Numbers ($\alpha.m.\beta$)			Defuzzified Number
Very Low	0	0	0.25	0.083333333
Low	0	0.25	0.5	0.25
Moderate	0.25	0.5	0.75	0.5
High	0.5	0.75	1	0.75
Very High	0.75	1	1	0.916666667

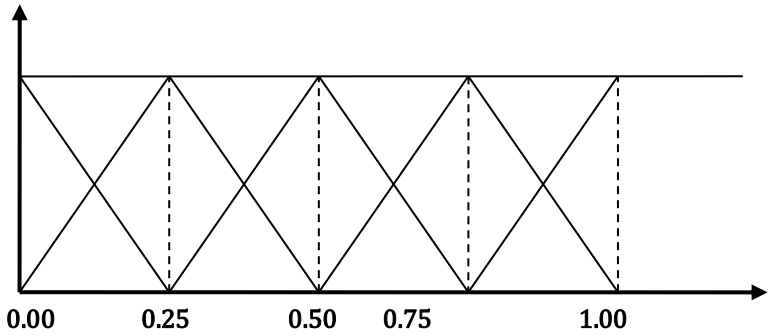

Figure 1. Fuzzy Triangular Numbers Equivalent to Five-Likert Scale (Chang and Chen, 1994)

The following formula was used to calculate defuzzified numbers:
Formula 1:

$$x = \frac{\alpha + m + \beta}{3}$$

Calculate the Mean of Effective Components

According to 61 indicators of knowledge measurement and linguistic variables, a questionnaire was sent to the members of the Delphi Panel and asked the experts to agree on any indicator as an effective indicator of human resource knowledge of universities and Higher education institutions in Iran is defined as "very high", "high", "moderate", "low" and "very low" options.

Then, the average of expert opinions for each indicator was calculated according to formulas 2 and 3, which is shown in Table 3. (Cheng and Lin, 2002, p. 147):

Formula 2:

$$A^{(i)} = \left(a_1^{(i)}.a_2^{(i)}.a_3^{(i)}\right).\ i=1,2,3,\ldots,n$$

Formula 3:

$$A_m = (a_{m1}.a_{m2}.a_{m3}) = (\frac{1}{n}\sum a_1^{(i)}.\frac{1}{n}\sum a_2^{(i)}.\frac{1}{n}\sum a_3^{(i)})$$

In this formula, $A^{(i)}$ represents the expert opinion i-th and A_m represent the average views of the experts. In Table 3, the triangular fuzzy mean is defuzzified according to Formula 1. The defuzzified average (definite mean) indicates the level of agreement of experts with each of the indicators of knowledge measurement in the first stage.

Table 3: Average Views of Experts from The First Survey

Indicators of Knowledge Measurement	Average of Experts' Opinion		
	Triangular Fuzzy Mean ($\alpha.m.\beta$)	Definite Mean	Verbal Variable
education degree	)0.544118 ،0.794118،0.955882(	0.764	high
Experience and years of service (scientific basis)	)0.514706 ،0.764706 ،0.911765(	0.73	high
Training courses	)0.470588 ،0.720588 ،0.926471(	0.705	high
Introduction to second and third foreign languages	)0.588235 ،0.838235 ،0.970588(	0.799	high
Varied courses taught	)0.455882 ،0.705882 ،0.911765(	0.691	high
Mastery, experience and teaching skills	)0.617647 ،0.867647 ،0.985294(	0.823	high
Teaching Lesson Seminar MSc and Ph.D.	)0.441176 ،0.691176 ،0.897059(	0.676	high
The proportion of postgraduate students to the total students	)0.323529 ،0.558824 ،0.794118(	0.558	moderate
Guidance for Graduate Theses	)0.338235 ،0.588235 ،0.823529(	0.583	moderate
Guidance Graduate Dissertations	)0.558824 ،0.808824 ،1(	0.789	high
Tips for graduated doctorate dissertations	)0.617647 ،0.867647 ،0.985294(	0.823	high
Consultation of graduated theses	)0.426471 ،0.676471 ،0.911765(	0.671	high
Consultation of Ph.D. Graduate Theses	)0.455882 ،0.705882 ،0.941176(	0.700	high
Special knowledge (specialization in specialty field)	)0.691176 ،0.941176 ،1(	0.877	very high
Continuous promotion of skills	)0.647059 ،0.897059 ،1(	0.848	very high
Knowledge of behavioral science in interaction and communication with students	)0.544118 ،0.794118 ،0.970588(	0.769	high
Knowledge of behavioral science in interaction and communication with colleagues	)0.558824 ،0.808824 ،0.985294(	0.784	high
Ability to perform assigned tasks	)0.455882 ،0.705882 ،0.926471(	0.696	high
Ability to do workgroup	)0.514706، 0.764706، 0.955882(	0.745	high
Leadership and Management Knowledge	)0.544118 ،0.794118 ،0.955882(	0.764	high
Knowledge of decision making and problem solving	)0.573529 ،0.823529 ،0.955882(	0.784	high
Knowledge of technology use	)0.602941 ،0.852941 ،1(	0.818	high
Offer to promote and improve the university's position	)0.5 ،0.75 ،0.955882(	0.735	high
Aristocrats over long-term and short-term university goals	)0.455882 ،0.705882 ،0.911765(	0.691	high
Understanding the organizational structure of the university	)0.397059 ،0.632353 ،0.852941(	0.627	high
The ability to discover opportunities and threats	)0.617647 ،0.867647 ،0.985294(	0.823	high
The ability to recognize the strengths and weaknesses	)0.602941 ،0.852941 ،0.985294(	0.813	high
Research skill (quantitative and qualitative)	)0.735294 ،0.985294 ،1(	0.906	very high
Purposefulness of studies and research	)0.661765 ،0.911765 ،1(	0.857	very high
Conducting specialized conferences and seminars, courses and workshops, and specialized exhibitions.	)0.514706 ،0.764706 ،0.955882(	0.745	high
Participate in conferences, seminars and exhibition exhibitions	)0.529412 ،0.779412 ،0.970588(	0.759	high
Presenting lectures in prestigious scientific assemblies	)0.602941 ،0.852941 ،1(	0.818	high
Arbitration of articles in journals and conferences	)0.588235 ،0.838235 ،0.985294(	0.803	high
Subscribe to the editorial board for scientific publications	)0.558824 ،0.808824 ،0.955882(	0.774	high
Secretary, editor and editor in chief	)0.5 ،0.75 ،0.926471(	0.725	high
ISI articles	)0.647059 ،0.897059 ،1(	0.848	very high

Scientific Papers - Foreign Research Non-ISI (Latin)	)0.544118 ،0.794118 ،0.955882(	0.764	high
Scientific Papers - Research	)0.573529 ،0.823529 ،0.970588(	0.789	high
ISC articles	)0.602941 ،0.852941 ،1(	0.818	high
Scientific - Promotion Papers	)0.602941 ،0.852941 ،1(	0.818	high
Papers Presented at international conferences abroad	)0.573529 ،0.823529 ،0.985294(	0.794	high
Papers Presented at International Domestic Conferences	)0.485294 ،0.735294 ،0.926471(	0.715	high
Papers Presented at National Conferences	)0.5 ،0.75 ،0.955882(	0.7352	high
Papers published at international conferences abroad	)0.5 ،0.75 ،0.955882(	0.735	high
Papers published at international conferences in the country	)0.470588 ،0.720588 ،0.955882(	0.715	high
Papers published at national conferences	)0.455882 ،0.705882 ،0.941176(	0.7009	high
Articles with high references	)0.588235 ،0.838235 ،0.970588(	0.799	high
Official reports and documentation provided in the press, media and knowledge bases	)0.455882 ،0.705882 ،0.911765(	0.691	high
Compilation of books	)0.647059 ،0.897059 ،1(	0.848	very high
Book translating	)0.573529 ،0.823529 ،0.970588(	0.789	high
Book Reprint	)0.558824 ،0.808824 ،0.941176(	0.769	high
Review, critique, edit and critically correct books and magazines	)0.647059 ،0.897059 ،0.985294(	0.843	very high
Compilation and compilation of the pamphlet	)0.485294 ،0.735294 ،0/926471(	0.715	high
Projects and research projects	)0.632353 ،0.882353 ،1(	0.838	very high
Study Opportunities	)0.573529 ،0.823529 ،0.970588(	0.789	high
Original art, artistic and literary work	)0.514706 ،0.764706 ،0.941176(	0.740	high
Provide ideas and innovate	)0.632353 ،0.882353 ،1(	0.838	very high
Number of Inventions, Discoveries and New Scientific Theory	)0.647059 ،0.897059 ،0.985294(	0.843	very high
Membership in specialized national and international organizations	)0.441176 ،0.691176 ،0.911765(	0.681	high
Membership in the Academic Selection Committees (such as evaluation committees, etc.)	)0.426471 ،0.676471 ،0.897059(	0.666	high
Join the scientific community	)0.485294 ،0.735294 ،0.955882(	0.725	high

Calculate the Disagreement of Each Expert

According to Formula 4, one can differentiate each expert's opinion with the average expert opinion. (Cheng & Lin, 2002). In fact, based on this formula, each expert can measure his or her opinion with the average of the comments and modify their previous opinions.
Formula (4)

$$e = \left(a_{m1} - a_1^{(i)} . a_{m2} - a_2^{(i)} . a_{m3} - a_3^{(i)}\right) = \left(\frac{1}{n}\sum a_1^{(i)} - a_1^{(i)} . \frac{1}{n}\sum a_2^{(i)} - a_2^{(i)} . \frac{1}{n}\sum a_3^{(i)} - a_3^{(i)}\right)$$

Using the above formula, the views of experts were calculated and adjusted in a questionnaire. In the second phase, the members of the Delphi panel responded to the second questionnaire, according to their previous opinions and the average expert opinion. The average of the opinions of the experts of the first stage was calculated using formulas 2 and 3 and can be seen in Table 4:

Table 4: Average Views of Experts from The Second Survey

Indicators of Knowledge Measurement	Average of Experts' Opinion		
	Triangular Fuzzy Mean ($\alpha.m.\beta$)	Definite Mean	Verbal Variable
education degree	(0/544117،0/79411764 ،0/970588)	0.769	high
Experience and years of service (scientific basis)	(0/558823 ،0/8088235 ،0/9705882)	0.779	high
Training courses	(0/5 ،0/75 ،0/955882353)	0.735	high
Introduction to second and third foreign languages	(0/529411765 ،0/779411 ،0/970588)	0.759	high
Varied courses taught	(0/4558823 ،0/7058823 ،0/926470)	0.696	high
Mastery, experience and teaching skills	(0/63235294 ،0/88235294 ،1)	0.838	very high
Teaching Lesson Seminar MSc and Ph.D.	(0/455882 ،0/705882 ،0/911764706)	0.691	high
The proportion of postgraduate students to the total students	(0/382352 ،0/63235294 ،0/852941)	0.622	moderate
Guidance for Graduate Theses	(0/308823 ،0/558823 ،0/808823529)	0.558	moderate
Guidance Graduate Dissertations	(0/5294117 ،0/7794117 ،0/8088235	0.764	high
Tips for graduated doctorate dissertations	(0/6029411 ،0/8529411 ،0/9852941)	0.813	high
Consultation of graduated theses	(0/4264705 ،0/6764705 ،0/8970588)	0.666	high
Consultation of Ph.D. Graduate Theses	(0/4852941 ،0/7352941 ،0/9411764)	0.720	high
Special knowledge (specialization in specialty field)	(0/69117647 ،0/94117647 ،1)	0.877	very high
Continuous promotion of skills	(0/661764706 ،0/911764706 ،1)	0.857	very high
Knowledge of behavioral science in interaction and communication with students	(0/5588235 ،0/8088235 ،0/9852941)	0.784	high
Knowledge of behavioral science in interaction and communication with colleagues	(0/5 ،0/75 ،0/985294118)	0.745	high
Ability to perform assigned tasks	(0/4411764 ،0/6911764 ،0/9411764)	0.691	high
Ability to do workgroup	(0/5147058 ،0/7647058 ،0/9705882)	0.75	high
Leadership and Management Knowledge	(0/5441176 ،0/7941176 ،0/9705882)	0.769	high
Knowledge of decision making and problem solving	(0/5735294 ،0/8235294 ،0/9705882)	0.789	high
Knowledge of technology use	(0/588235294 ،0/838235294 ،1)	0.808	high
Offer to promote and improve the university's position	(0/5147058 ،0/7647058 ،0/9705882)	0.75	high
Aristocrats over long-term and short-term university goals	(0/5 ،0/75 ،0/941176471)	0.730	high
Understanding the organizational structure of the university	(0/4411764 ،0/6764705 ،0/8823529)	0.666	high
The ability to discover opportunities and threats	(0/6029411 ،0/8529411 ،0/9852941)	0.813	high
The ability to recognize the strengths and weaknesses	(0/5735294 ،0/8235294 ،0/9705882)	0.789	high
Research skill (quantitative and qualitative)	(0/735294118 ،0/985294118 ،1)	0.906	very high
Purposefulness of studies and research	(0/676470588 ،0/926470588 ،1)	0.867	very high
Conducting specialized conferences and seminars, courses and workshops, and specialized exhibitions.	(0/514705882 ،0/764705882 ،8)	0.754	high
Participate in conferences, seminars and exhibition exhibitions	(0/5 ،0/75 ،0/985294118)	0.745	high
Presenting lectures in prestigious scientific assemblies	(0/588235294 ،0/838235294 ،1)	0.808	high
Arbitration of articles in journals and conferences	(0/5588235 ،0/8088235 ،0/9852941)	0.784	high
Subscribe to the editorial board for scientific publications	(0/5294117 ،0/7794117 ،0/9558823)	0.754	high

Secretary, editor and editor in chief	(0/5 ،0/75 ،0/941176471)	0.730	high
ISI articles	(0/6323529 ،0/8823529 ،0/9852941)	0.833	very high
Scientific Papers - Foreign Research Non-ISI (Latin)	(0/5 ،0/75 ،0/941176471)	0.730	high
Scientific Papers - Research	(0/558823529 ،0/808823529 ،)	0.779	high
ISC articles	(0/544117647 ،0/794117647 ،1)	0.774	high
Scientific - Promotion Papers	(0/5441176 ،0/7941176 ،0/9852941)	0.774	high
Papers Presented at international conferences abroad	(0/5294117 ،0/7794117 ،0/9705882)	0.759	high
Papers Presented at International Domestic Conferences	(0/4705882 ،0/7205882 ،0/9264705)	0.705	high
Papers Presented at National Conferences	(0/4705882 ،0/7205882 ،0/9411764)	0.710	high
Papers published at international conferences abroad	(0/4558823 ،0/7058823 ،0/9411764)	0.700	high
Papers published at international conferences in the country	(0/4705882 ،0/7205882 ،0/9558823)	0.715	high
Papers published at national conferences	(0/4411764 ،0/6911764 ،0/9264705)	0.686	high
Articles with high references	(0/602941176 ،0/852941176 ،1)	0.818	high
Official reports and documentation provided in the press, media and knowledge bases	(0/4705882 ،0/7205882 ،0/9411764)	0.710	high
Compilation of books	(0/647058824 ،0/897058824 ،1)	0.848	very high
Book translating	(0/5588235 ،0/8088235 ،0/9705882)	0.779	high
Book Reprint	(0/5441176 ،0/7941176 ،0/9411764)	0.759	high
Review, critique, edit and critically correct books and magazines	(0/6470588 ،0/8970588 ،0/9852941)	0.843	very high
Compilation and compilation of the pamphlet	(0/4558823 ،0/7058823 ،0/9264705)	0.6960	high
Projects and research projects	(0/6176470 ،0/8676470 ،0/9852941)	0.823	very high
Study Opportunities	(0/5588235 ،0/8088235 ،0/9705882)	0.779	high
Original art, artistic and literary work	(0/5588235 ،0/8088235 ،0/9852941)	0.784	high
Provide ideas and innovate	(0/632352941 ،0/882352941 ،1)	0.838	very high
Number of Inventions, Discoveries and New Scientific Theory	(0/676470588 ،0/926470588 ،1)	0.867	very high
Membership in specialized national and international organizations	(0/4558823 ،0/7058823 ،0/9264705)	0.696	high
Membership in the Academic Selection Committees (such as evaluation committees, etc.)	(0/4411764 ،0/6911764 ،0/9117647)	0.681	high
Join the scientific community	(0/4852941 ،0/7352941 ،0/9558823)	0.72	high

Calculate the Average Consensus of Experts

After completing the second phase of the survey and calculating the average of experts' opinions to the second questionnaire, the consensus of experts (the difference between the average views of debauched experts in the first and second rounds) was calculated using formula 5, which is expressed in Table 5:
Formula (5)

$$(A_{m2}.A_{m1}) = \left|\frac{1}{3}[(a_{m21} + a_{m22} + a_{m23}) - (a_{m11} + a_{m12} + a_{m13})]\right|$$

Table 5: The Average Difference in The Opinions of Experts in The First and Second Stages

Index for Knowledge Measurement	Average Difference in The First and Second Stages	Index for Knowledge Measurement	Average Difference in The First and Second Stages
education degree	0/004	Presenting lectures in prestigious scientific assemblies	-0/009
Experience and years of service (scientific basis)	0/04	Arbitration of articles in journals and conferences	-0/0196
Training courses	0/02	Subscribe to the editorial board for scientific publications	-0/0196
Introduction to second and third foreign languages	-0/03	Secretary, editor and editor in chief	0/004
Varied courses taught	0/004	ISI articles	-0/014
Mastery, experience and teaching skills	0/014	Scientific Papers - Foreign Research Non-ISI (Latin)	-0/034
Teaching Lesson Seminar MSc and Ph.D.	0/014	Scientific - Research Papers	-0/009
The proportion of postgraduate students to the total students	0/063	ISC articles	-0/044
Guidance for Graduate Theses	-0/024	Scientific - Promotion Papers	-0/044
Guidance Graduate Dissertations	-0/024	Papers Presented at international conferences abroad	-0/034
Tips for graduated doctorate dissertations	-0/009	Papers Presented at International Domestic Conferences	-0/009
Consultation of graduated theses	-0/004	Papers Presented at National Conferences	-0/024
Consultation of Ph.D. Graduate Theses	0/019	Papers published at international conferences abroad	-0/034
Special knowledge (specialization in specialty field)	0	Papers published at international conferences in the country	0
Continuous promotion of skills	0/00	Papers published at national conferences	-0/014
Knowledge of behavioral science in interaction and communication with students	0/014	Articles with high references	0/019
Knowledge of behavioral science in interaction and communication with colleagues	-0/039	Official reports and documentation provided in the press, media and knowledge bases	0/019
Ability to perform assigned tasks	-0/004	Compilation of books	0
Ability to do workgroup	0/004	Book translating	-0/009
Leadership and Management Knowledge	0/004	Book Reprint	-0/009
Knowledge of decision making and problem solving	0/004	Review, critique, edit and critically correct books and magazines	0
Knowledge of technology use	-0/009	Compilation and compilation of the pamphlet	-0/019
Offer to promote and improve the university's position	0/014	Projects and research projects	-0/0142
Aristocrats over long-term and short-term university goals	0/039	Study Opportunities	-0/009

Understanding the organizational structure of the university	0/039	Original art, artistic and literary work	0/044
The ability to discover opportunities and threats	-0/0092	Provide ideas and innovate	0
The ability to recognize the strengths and weaknesses	-0/024	Number of Inventions, Discoveries and New Scientific Theory	0/024
Research skill (quantitative and qualitative)	0	Membership in specialized national and international organizations	0/014
Purposefulness of studies and research	0/0092	Membership in selected academic committees (such as evaluation committees, etc.)	0/014
Conducting specialized conferences and seminars, courses and workshops, and specialized exhibitions.	0/009	Join the scientific community	0
Participate in conferences, seminars and specialized exhibitions	-0/014		

According to the views presented in the first and second stages of the fuzzy Delphi technique, if the average difference between the two steps is less than the threshold of 0.2, the experts have reached a consensus and the fuzzy Delphi process is stopped. (Cheng & Li, 2002). According to Table 5, the experts attained a very good consensus at the end of the second stage, and the average difference in all indices was less than 0.2, and in some indices the mean difference was zero. Therefore, the fuzzy Delphi process was stopped at this stage and effective indicators of human resource knowledge of Iranian universities and institutes of higher education were extracted according to the experts' opinion.

Conclusion

In order to fulfill their dynamic and dynamic tasks, universities need the appropriate model and tools for evaluating and assuring the quality of the processes associated with the efficiency and effectiveness of the students. In such a situation, knowledge of indicators that can assess the human resource knowledge of universities and institutions of higher education, especially faculty members is the main pillar of the creation and dissemination of knowledge in society and the critical factor in improving the performance of universities. In this regard, the researchers, using the Fuzzy Delphi method and using the views of the 17 faculty members in the field of university management as members of the Delphi panel, identified effective indicators of human resource knowledge of universities and Higher education institutions in Iran. Initially, they interviewed 7 experts to refine and integrate 77 indexes from theoretical literature, and distributed Delphi questionnaire with 61 indicators in two stages among the experts and analyzed the results.

Since the difference in the average score of the experts in the first and second stages was less than 0.2, the Delphi technique stopped in the second round and the results showed that the highest agreement of the experts in the second phase of the Delphi technique, with the indicators: the skill of conducting the research (Quantitative and qualitative) with a mean of 0.906, special knowledge (specialization in the field and specialty) with an average of 0.877, purposefulness of studies and researches with an average of 0.8679, the number of inventions, discoveries and new scientific theory with an average of 0.867, continuous improvement of skills with average of 0.857, compilation or compilation of the book with an average of 0.848, review, critique, editing and critical correction of books and magazines with an average of 0.843, presentation of ideas and innovation with an average of 0.838, experience and skill in teaching with an average of 0.838 and ISI articles with an average of 0.833; and the lowest level of experts agree with the benchmarks: Graduate graduate theses guidance with an average of 0.558, and the ratio of postgraduate students to total students With an average of 0.622, the two above-mentioned

indicators were eliminated and 59 effective indicators of human resources knowledge were extracted from universities and higher education institutions.

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