

*Original Article*

## **Effective Factors in Applying Information Technology in Developing Iran's Educational System Human Source**

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### **ABSTRACT**

Present article is investigating important factors of applying information technology in developing human source of Iran's educational system all principles point of view of the experts and according to information technology professionals who are studying at PhD level. Main aim of this study is answering 3 questions: What are effective factors in applying information technology in developing human source in Iran's educational system? What indicators made these factors? And how's the priority of these factors and indices. In the end of paper, results are discussed and useful recommendations are suggested.

**Key words:** Information technology, Human source, Educational system

### **INTRODUCTION**

One of the distinct characteristics of the present time is rapid change and transformations within the communities from the various dimensions. Such developments have influenced practically from the renaissance up to present century. Meanwhile, Information Technology (IT) is the driving force for the current developments. The efficient and effective management in Training Organization is not possible practically, regardless of access to the updated information. The more accessible and accurate information is available for an organization, the better opportunity exists for the manager of the organization to improve the strategies and makes the more logical and effective decisions about them. In fact, the increase in volume, variation, and operational speed for an organization to do its tasks has cause the information to play properly and accurately very essential role in doing the given operation. Accordingly, today information has been introduced as one of the most crucial and vital sources and capitals in the organization.

According Eric resources [1], 21st century is the century of information bombardment where those organizations will succeed if they manage to make their own Human Resources be equipped with updated technology and information. Mirkamali [2] argues that human resources are deemed as spirit and heart for the organizations. Of course, the efficient and effective human resources have been intended in this sense. He believes that efficient personnel on organization are those who proficient and skilled in to date techniques and technologies. Thus, the order preference of to date organizations extremely differs from in the past since in twenty first century those Human Resources are required, which specialized in adoption of today technology and knowledge. For this reason, the present essay deals with the effective factors on application of IT fields in human resources development. Many studies have been carried out concerning to the effective factors in development of human resources so we purpose some of them in the followings: Research indicates that ICT can change the way teachers teach and that it is especially useful in supporting more Student-centered approaches to instruction and in developing the higher order skills and promoting collaborative activities. Haddad [3] showed that ICT teacher training can take many forms. Teachers can be trained to learn how to use ICT or teachers can be trained via ICT. ICT can be used as a core or a complementary means to the teacher training process. Collis and Jung [4], in another research, under title of "Impact of IT on structured issues in an organization" have pointed to similar results. Fallah Hemat Abadi [5] indicated that: 1. IT has a significant and reverse relationship with focus on tactical decisions- making. 2. ICT has a significant and reverse relationship with focus on tactical decisions-

making. 3. ICT has a significant and reverse relationship with complication in an organization. 4. ICT has a significant and reverse relationship with organizational formality. In a study that is called "A survey on development and application fundamentals of ICT in Training Organization's System", Shabani [6] showed that computer public application and training of electronic contents production to teachers and experts are some of requirements so it should be taken step along with technology widespread speed and acceleration in the current world. In another survey under title of "the relationship between ICT and personnel's productivity", Fooladian [7] indicated that there is a positive and significant relationship between productivity and application of ICT. Rahmani Arab [8] in a study, called "The impact of ICT in- service training courses in educational and research activities" indicated that: ICT in- service training courses (ICDL) might have positive effect on educational design (pre- teaching skills), teaching presentation (in- service teaching skills), in evaluation activities (post- teaching skills), and in teachers' researching measure. In a survey under title of "Review of ICT application effects on personnel's occupational enabling", Mazid Abadi Farahani [9] showed that ICT significantly affects on these indices. In a study on the impact of entrance of ICT into training system, Scofield [10] showed that modern technologies gradually affect on educational system and ICT might make curriculum transfer more effective as well as create social new backgrounds for learners. Research and experience has shown that ICTs, if well-utilized in the classroom, have the potential to enhance the learning process in the following ways: 1) Motivate and engage students in learning. It has been shown that students are motivated when learning activities are authentic, challenging, multi-disciplinary and multi-sensorial. 2) Bring abstract concepts to life, especially when concepts go against immediate intuition and common knowledge. 3) Foster inquiry and exploration. 4) Allow students to use the information acquired to solve problems, formulate new problems, and explain the world around them. 5) Provide access to world-wide and local information sources. 6) Provide a means to communicate, share research, and join projects across geographical borders Education leadership, management and governance can also be improved through ICT by enhancing educational content development and supporting administrative processes in schools and other educational establishments. By supporting management and reforming administrative procedures more effectively, ICT would serve as an incentive for leaders and staff at all levels to institutionalize its use [11]. Haddad and Jurich [12] using ICTs to achieve learning objectives can happen at various levels. At the simplest level it allows for storage and display of information. However, using ICTs also fosters exploration of materials and ideas. If a student is consciously pursuing information on the Internet or on CD-ROMs, they gain a greater understanding of certain questions, issues, or concepts. ICTs allow learners to apply a concept or understanding to a new situation; to analysis ideas by organizing them and manipulating them; and to learn how to evaluate and problem solve.

At the highest level, ICTs are used to foster the design or construction of integrating projects, whereby students must explore wide range of ideas and resources, analysis and evaluate them, and synthesize them in a project. ICTs can fully utilize the multimedia environment to support this process [13]. All the cases discussed above use ICT as part of training methods and promote teachers' ICT- pedagogy integration in the classroom by demonstrating examples and allowing discussions among teachers throughout the whole training process. Participants of the training are asked to actually use ICT to learn about ICT skills and develop ICT-integrated pedagogies. These training strategies seem to be supported by previous research that argues that teachers are likely to benefit by actively experiencing ICT skills as a learner. Jung [14] considering what was said the main purpose of this study is to answer the following questions 1- What are some of effective factors on adoption of IT in HR development in Iranian Training System? 2- Of which parameters such factors may be composed? 3-What is the preference order among these factors and indices?

## MATERIALS AND METHODS

The present research is of applied type in terms of goals, and it is quantitative with respect to data, and it is of survey type in terms of nature and methodology. Prospective Questionnaire Assessment of Attitude (PQAA) is the measuring tool in this study that includes 71 questions and its validity and reliability have been verified by using Cronbach's Alpha coefficient, of course. The validity rate of the current study is 97%. The statistical test of exploratory factor analysis of synthesis type into main factors has been adopted for analysis of the collected data and its findings suggest that 9 components (i.e. security improvement, control & management improvement, capacity- making and supportive infrastructures, improvement of information storage, improved decision-making, information combination and interaction, information enablers, improved informative supervision, and improved analysis) along with their preference- ordered parameters influence on adoption of IT in HR development . For data analysis, by adoption of LISREL software, the statistical test has been administered, that is called factor analysis type of synthesis into the main factors (components).

## RESULTS

In the present survey, findings are given in two parts as follows: a) Data explanation by adoption of the prevalent descriptive statistics and it is given in Table 1.

Numbers are given in Table 1 suggest the following points: 1) Scores for the participants in the studied sample group ranges from 1 to 7. 2) The comparison among means indicates that third factor has the highest score while the lowest score is attributed to fifth factor. 3) A comparison among standard deviation values with the sample group may characterize that dispersion in fifth factor is the highest among others. 4) Skewness parameter signifies that distribution is skewed toward left side of normal distribution while kurtosis parameter denotes that kurtosis in at this distribution is higher than in normal distribution.

**Table 1.** Statistical characteristics of total scores

Factor	Range	Mean	Variance	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
First	4.52	5.79	0.85	0.92	0.56	-0.75	2.48	7
Second	5.38	6.09	0.77	0.87	5.18	-1.56	1.62	7
Third	5.50	6.22	0.66	0.81	7.51	-2.28	1.50	7
Forth	5.09	6.19	0.61	0.78	4.48	-1.71	1.91	7
Fifth	5.33	5.62	10.5	1.02	1.21	-0.9	1.67	7
Sixth	4.17	6.00	0.69	0.83	1.22	-1.08	2.83	7
Seventh	4.80	5.79	0.83	0.91	0.47	-1.01	2.20	7
Eighth	6.00	6.00	0.90	0.95	4.05	-1.50	1.00	7
Ninth	5.25	5.98	0.90	0.94	1.44	-1.11	1.75	7

b) Data analysis: In order to verify data description and population analysis out of which the given sample has been extracted, a statistical test, called factor analysis has been adopted and results of this test are given in the following tables:

**Table 2.** Sampling adequacy test values (KMO) and results of Kervit- Bartlett's test of Sphericity

Bartlett's Test of Sphericity		
KMO	Sphericity	Sig.
0.934	23362.071	P = 000

Numbers are given in Table 2 suggest that execution of factor analysis is justifiable and in order to identify this fact that measurement tool has been saturated by several significant factors, three following parameters have been taken into consideration: 1) Eigen value(s) 2) Variance assigned by any factor and 3) Rotated graph of Eigen values Eventually, to determine materials in the questionnaire, nine factors may be selected by using Scree Chart.

**Table 3.** Final traits of factor analysis to extract indices of "effective factors on adoption of IT in HR developments at Training System

Factor	Eigen value	Variance ratio	Cumulative percentage
1	8.056	11.346	11.246
2	8.851	9.649	20.995
3	6.314	8.892	29.887
4	5.446	7.670	37.558
5	4.681	6.593	44.151
6	3.404	4.795	48.946
7	3.192	4.496	53.442
8	2.274	3.203	56.645
9	1.989	2.802	59.447

As it observed in the above table, variance ratio for any factor that identifies share value of any factor and the rotated graph of 9 factors has been determined, based on 3 factors of Eigen value, which have been assumed greater than unit (1).

At the above table, the question for each of factors has been identified and correlation value has been shown among any question to each of factors.

**Table 4.** Factor analysis of rotated factors in 71- question system by varimax technique

Q	F1	Q	F2	Q	F3	Q	F4	Q	F5	Q	F6	Q	F7	Q	F8	Q	F9
67	.848	41	.743	4	.705	21	.718	33	.802	38	.594	27	.688	46	.523	11	.604
66	.784	40	.735	1	.671	24	.678	32	.772	59	.543	28	.614	60	.447	12	.504
65	.701	42	.683	6	.670	25	.645	36	.697	37	.529	26	.552	47	.417	13	.434
68	.684	43	.662	2	.654	22	.637	35	.684	57	.497	29	.461			8	.372
69	.676	48	.623	7	.636	18	.604	31	.649	58	.446	16	.395				
70	.649	44	.604	3	.628	19	.583	30	.466	56	.416						
62	.623	49	.552	9	.565	20	.522										
71	.620	52	.529	14	.521	17	.518										
63	.580	53	.524	10	.513	23	.508										
64	.528	50	.508	5	.430	34	.456										
61	.520	51	.506			15	.453										
55	.469	45	.478														
54	.451	39	.462														

Q = Question F = Factor

## DISCUSSION

To give response to study questions as well as for determining the rate of relationship and share of each of factors in application of IT in HR development at Training System, the statistical test, called factor analysis, was adopted that is kind of analysis converted into main factors type. Test results suggest the following points: 1) Of total 71 effective extracted parameters in “adoption of IT in HR development at Training System”, 9 factors have been obtained, including first factor (37.379), second factor (5.885), third factor (2.5), fourth factor (7.7), fifth factor (6.6), sixth factor (4.8), seventh factor (4.5), eighth factor (3.2), and ninth factor (3.8) respectively and they have been nominated by the aid of the specialists and experts in the respective field and the aforesaid factors generally affect on adoption of IT in HR development at Training Organization of Qom Province at approximately 60% level. Furthermore, the results of the present research completely comply with findings from the former studies. 2) Each of nine factors includes the following parameters, respectively: 1. *First factor* i.e. security improvement contains the following characteristics: 1) it facilitates execution of security plans. 2) It minimizes forging of information at the lowest level. 3) Observance of demarcation principle may lead to improvement of information security. 4) It prevents from ability of denial. 5) It guarantees integration of information. 6) It makes vulnerability and planning possible. 7) Observance of authenticity principle may enhance information security. 8) It causes to enforce control easily to grant accessibility to information users. 9) Observance of privacy principle may improve information security. 10) To follow information accessibility principle may enhance information security. 11) It raises level of knowledge and information in decision- building and decision- making. 12) It facilitates preventive control and avoidance from executive deviations. 13) It provides prospective, present-oriented and retrospective controls. 2- The *second factor* is the improved control and management, including the following parameters: 1) It facilitates distribution of arbitrary information and news. 2) It provides more possible interaction. 3) It is followed by elimination of distances. 4) It facilitates the quick access to the processed information. 5) It makes the distance between supervision and control less effective. 6) It increases the speed and capacity of information transfer. 7) It updates information control. 8) It lowers costs of regulation. 9) It facilitates the comparison between the conducted operation and the predetermined goals and creates constant improvement in performance. 10) It improves control efficiency and effectiveness. 11) It creates flexibility, innovation, and creativity in supervision. 12) It raises speed in reporting. 13) It lowers distribution costs. *Third factor*: It is capacity- making and supportive infrastructures, including the following parameters: 1) It provides possibility for connection of networks. 2) It facilitates the collection (of data). 3) It provides the synchronous access to information. 4) It lowers cost of collection of information. 5) It provides the integration of computers and remote communications. 6) It increases the speed of collecting information. 7) It facilitates classification of information. 8) It improves the ability for discovery of the relationship among the existing information. 9) It makes possible for rapid and all- inclusive processing. 10) It decreases risk of (data) collection. *Fourth factor*: It is factor of improvement of information, including the questions about the followings: 1) It lowers costs of transmission and displacement. 2) It accelerates creation of documents center. 3) It facilitates information retrieval. 4) It provides access to information without need to physical presence. 5) It facilitates access to information. 6) It lowers costs of storage. 7) It decreases physical space for storage. 8) It facilitates maintenance of information. 9) It prevents from information unwanted corruption (failure). 10) It provides quick access to the processed information. 11) It improves the ability searching based on subject. *Fifth factor*: It is improved decision-making, comprising of the following questions: 1) It identifies risky conditions in decision- making. 2) It provides confident situations for decision- making. 3) It facilitates speed and ease in decision making at conflicting conditions. 4) It contributes to selection of appropriate solution (strategy). 5) It provides access to individual strengths and weaknesses. 6) It makes possible for several people to participate the decision- making process. *sixth factor*: It consists of information combination and interaction or improvement of interactions between

information and environment, including the following indices: 1) It provides appropriate distribution of information based on kind of users. 2) It makes it possible to consider integration of goals at the same time. 3) It facilitates management of information. 4) It provides navigation of unexpected activities. 5) It facilitates management of information services. 6) It facilitates recording of all events. *Seventh factor*: It comprises information enablers (facilitators), including the following parameters: 1) It creates eases and speed in ideas exchange and consultation. 2) It provides the easily exposure to complicated flows of decision. 3) It facilitates discovery of opportunities rapidly. 4) It contributes to forethought and futurology. 5) It facilitates discovery of intangible factors. *Eighth factor*: It denotes the improved supervision over information, including the following parameters: 1) It provides supervision over wider range. 3) It increases sovereignty and governance of authority. 3) It improves precision and speed in supervision and control. *Ninth factor*: It is information analysis or improved processing, comprising of the parameters in the following: 1) It facilitates interpretation of information. 2) It makes easy the comparison among different situations. 3) It provides logical analysis of information and selection of appropriate strategies. 4) It facilitates assessment of information authenticity. These findings are in compliance with the background findings of studies conducted by Eric resources [1], Fallah Hemat Abadi [5], Shaabani [6], Fooladian [7], Rahmani Arab [8], Mazid Abadi Farahani [9], Scofield [10], Haddad [11], Haddad and Jurich [12] and Jung [14].

**Restrictions:** 1) Despite of all those efforts made toward observance of the relevant principles to randomized selection of sample, the existing shortages and barriers hindered implementation of this study in larger scale. 2) Empirical data in this study were obtained due to execution of a 71- elements scale on randomized sample group where it interprets about 60% of technology impact on HR development. Thus, it will be more appropriate if some other scales are used with different content and greater length. 3) Doubtlessly, many factors and parameters may influence on HR development of Training System; however, difficulty in quantization of such variables caused only 60% of variance of independent variable was interpreted by factors at the current survey. Therefore, role of other important factors should also be taken into consideration. 4) One of those factors, which may create a type of one- way error in study results, is lack of carefulness of participants in giving answer to the questions so that some of researching works may be suffered from this.

**Suggestions:** 1) In particular, several researches should be conducted concerning to the considered factors separately by Training Organization. 2) Some of the needed efforts shall be made in order to improve motivation among personnel to be equipped with IT knowledge and it shall be tried to make this field of organization and among personnel to be always updated. 3) Security is logically as one of the most essential constant concerns in organizations in the field of IT, so this concern naturally exists also in Training Organization. Thus, it is necessary to handle and always consider several security bottlenecks by reliance on domestic experts through localization, hardware and software products, and by strengthening infrastructures in this field. 4) To hold seasonal workshops in relation to ICT and training for the latest state and achievements in this field. 5) Preparation and codification of Outlook Document, organizational strategies and policies based on IT so that this system not to be suffered from various tastes by replacement of chairmen and managers. 6) To create IT academic discipline with different needed majors including network security, IT management etc. 7) Redefinition of organizational structure in IT field. 8) Knowledge- based training of manpower in different parts of the organization. 9) To interpret the needed mechanisms for execution of mission by Training Organization in cyberspace.

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