The assessment of ICT literacy of Iranian teachers through the ISST model

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Abstract

Purpose – The purpose of this paper is to examine the views of experts of educational technology and teachers in Tehran, about the components of ICT literacy based on the ISST model.

Design/methodology/approach – This study conducted a descriptive methodology by using a survey method. The statistical population consisted of 9,800 teachers and 37 experts of educational technology in Tehran; owing to the small size of the experts’ population, all 37 experts were selected for research, and a sample of 266 teachers was selected based on the cluster sampling method. To collect the necessary data, the researcher designed a questionnaire based on four key components of the ISST model. To analyze the data, statistical procedures including the Kolmogrov-Smirnov test, one sample $t$-test and independent $t$-test were used.

Findings – The findings of research showed that from the viewpoint of experts all components of ICT literacy were significant. On the other hand, from the viewpoint of teachers, all components of ICT literacy except the component of information society were significant. Furthermore, the findings showed that, there were a significant difference ($p = 0.05$) between the views of experts and teachers about all components of ICT literacy, except the component of information processing.

Practical implications – The study showed that to equip all teachers with the components of ICT literacy such as information device, information society, information processing and information handling can help them to improve efficiency and effectiveness, and also the ISST model applied in this study can be used by other functional areas.

Originality/value – This study showed that fundamental training in the field of ICT literacy for teachers is very essential in the education system, because fluency of ICT skills can help them to increase better performance, and subsequently to increase self-value, motivation, feeling of success and productivity in the work environment.

Keywords Teachers, Experts, ICT literacy, Information and communication technology, ISST model

Paper type Research paper

1. Introduction

Nowadays science and technology, has been an explosive and uncontrollable process, so at this time, we are facing with a changing world which lead to the discovery and invention of tools and equipments, explaining the procedures, structures and familiar processes that without applying them solving problems it is not possible (Abbasi and Nazarzadeh Zare, 2012), this means that, society in the twenty-first century requires creativity, problem-solving abilities and communication skills. Information and communication technologies (ICT) literacy has been focussed on these fundamental characteristics to cultivate those comprehensive capacities (Hwang et al., 2010, p. 128). On the other hand, the emergence of ICT in education has transformed teaching and learning to a more viable and effective method and would likely set the standard for the future (Oni et al., 2013). Therefore, the main mission of the education system is to equip
the learners to do their appropriate role for the excellence of society. To achieve this mission in the current era, attending to ICT skills is necessary (Teo et al., 1997).

ICT has been defined as a broad-based technology (including its methods, management and application) that supports the creation, storage, manipulation and communication of information (Nwabueze and Ozioko, 2011). In other words, ICT refer to technologies such as the internet, intranets, extranets, ERP and other such technologies that cover the spectrum from basic infrastructure implementation to technologies that improve services and operations in an organization (Gupta et al., 2008). According to Hang and Keen in Oni et al. (2013), information technology means a set of tools that helps you work with information and perform tasks related to information processing.

ICT consists of three terms: technology is managing of systems input and output. This management includes use of the procedures, hardware, software and processing (such as computing, control, decision making, assessment and filtering); information is all the experiences, knowledge, sciences, hypothesis which is proved from practical research results (Mahajan, 2002); and communication is a reciprocal links between objective and non-objective institutions, structural factors and individuals in society (Norwegian Agency for Development Cooperation, 2002). Thus, due to optimal use of the technology, it is necessary to understand concepts and skills related to technology (Attaran, 2004).

ICT have been accepted so that now they seem in every aspect of public and private life. Application of new technologies of information and rapid changes causes great changes in all aspects of learning and education (Caruso and Kvavik, 2005), as a result, the use of technology leads to easiness and speediness of education (Alfassi, 2000). Therefore, ICT had transformed the attitudes related to education and human resource. This is true because the mission of educational systems is preparing people for future. So, the nature of the ICT is dynamic, flexible and chainable (Jalali and Abbasi, 2003).

Certainly, ICT is regarded as an important factor to create educational opportunities and also can guide learners toward a wide range of educational resources. But, studies showed that lack of information literacy skills of students is rotted lack of information literacy skills of teachers. On the other hand, more teachers with the negative or neutral attitudes about the use of ICT in their education, has more technophobia features (Prober, 2009), also the results of study by Mann et al. (1999), showed that a little number of teachers have ICT skills. The other results also showed teachers who use of ICT based on their teaching strategies are placed in higher level than the others. As the same way Iran's education system in relation with the use of ICT is faced with the following challenges.

At the level of school, the first executive problem is that teachers cannot use ICT. Teachers need to be trained for using ICT in curriculum. The next problem prohibiting using ICT in schools is the number of students in each class, small educational space and few numbers of computers and other ICT instruments. The other problem is time pressure. Some of teachers, parents and students hesitate about new learning methods and IT application in education and consider it as wasting time to achieve basic skills. Anxiety and fear of teacher is another factor prohibiting using IT in class. Of course, various factors such as unwillingness to use computer and internet, negative attitude toward the effect of computer on educational return increase, lack of supporting mangers, and presenting weak software are involved. Finally, the other challenge is related to language. English language is the dominant language of computers and possesses a large proportion of educational software provided in the global market in English. Therefore, one of the serious barriers of the maximum use of global web in
Iran is the lack of users’ knowledge of English. Such a fact decreases the motivation of teachers and users to use the internet and educational software (Soleimani et al., 2015). In other words, if today low-quality education runs at all levels, the logical solution is that necessary reformation from primary education and with an emphasis on ICT and its integration with the curriculum should start (Ebrahimi and Gangi Khezerlak, 2015).

Thus, educating of ICT in the educational system is important for two reasons, first ICT is one of the important and vital skills to enter into the information society and second, the society requires all specialists and experts of all areas such as professional workers, and technicians (Underwood et al., 1996).

In general, the role of ICT in the educational system can be summarized as follows:

- Teacher is no longer an individual who seats in front of the students and teaches. He/she acts as a guide and helps students to find the right educational path and evaluate their learning. Teachers coming together to work in group and joint projects.
- Students are not inactive individuals who just listen to the teacher. They are active learners who work in groups to create new knowledge and engage in problem solving.
- Instead of being away from school and the community, schools enter to the community and workplace.
- Parents involve in learning of their children (Kamali et al., 2014).

According to these issues, the main question is that “how ICT literacy of the teachers is measured?” To answer the question, the studies conducted in this area are reviewed.

Khalkhali et al. (2008), in a study entitled “Assessment and comparison of ICT literacy between teachers and students in Iran’s secondary schools” concluded that out of 757 respondents, 68.7 percent were skillful in data retrieval, 66.4 percent were skillful in the field of data application and classification, 51.3 percent were qualified in data representation and interpretation, 53.5 percent were skillful in data quality and utility judgment and 42.8 were qualified in data designing and creation. And also, inferential statistics showed that there was a meaningful difference between teacher and student ICT literacy in five components and also showed that student literacy was higher than teachers’ literacy in five components.

Maleki and Garmabi (2009), in a study entitled “Tehran teachers and experts’ viewpoints on the status and application of information and communication technology at primary” concluded that ICT can be used in determining and developing the objectives and content proportional to the needs and interests of learners, the needs of society and everyday life. Moreover, ICT provides the possibility of individual learning, using active teaching methods, various types of assessments, question analysis, assessment tools and results and comparing educational progress of students among different schools. Furthermore, the ICT provides teachers with the ability to communicate their ideas about programs and content of the courses with each other.

Hsu (2011), in a research entitled “Who assigns the most ICT activities? Examining the relationship between teacher and student usage” concluded that teachers who infrequently use basic ICT tools such as the word processing rarely assign student ICT activities. While, teachers who create complicated multimedia materials are most likely to assign student multimedia activities. And also, regression results showed that teachers’ frequency of building websites is the best predictor for assigning ICT-based sharing activities to students, though the likelihood is greater for junior high school than elementary school teachers.
Hamissi et al. (2012), in a study entitled “Evaluation of ICT knowledge among undergraduate dental students in Iran” concluded that rate of respondents was 80 percent and there is a not significant difference in computers and internet users of both sex. 50 percent of users were able to use Microsoft Office production software. Only 30 percent of students had received the educational electronic material while 70 percent had not obtained them, not at all. The rate of Google search engine usage was 80.8 percent but the use of PubMed database was 54.6 percent and Medline/Ovid was 15.4 percent.

Zahed Babolan and Rajabi (2011), in a research entitled “Assessment of information literacy in students,” based on 22 indices falling under five standards observed in Information Literacy Competency Standards for Higher Education concluded that the information of students stood above the average in terms of the five standards mentioned. The results obtained from a MANOVA test run showed a statistically significant difference between males and females regarding the variable in focus. The difference appeared to be statistically different among freshmen, sophomores, juniors and seniors. The difference, however, did not reach statistical difference among the students of faculty of literature and humanities, faculty of science, faculty of agricultural engineering, technology, and engineering.

By studying these reaches, it seems to optimal use of ICT in educational system, two steps are needed: first, to identify ICT literacy skills from the perspectives of experts of educational technology and teachers, second, the improvement of ICT literacy skills.

It must be noted that there are different models of ICT literacy. Thus the conceptual model this research based on the ICT Skill Standard for Teacher (ISST) model presented by Kim et al. (2008). This model is shown in schematic form below (Figure 1).

This model includes components such as, information society (data protection, the moral of used software), information device (the computer system principles of operating systems, and components of the network), information processing (data structure, the data algorithm) and information handling (web management, information sharing):

- Information society is a society in which the creations, distribution, diffusion, use, integration and manipulation of information is a significant economic, political and cultural activity. Its main drivers are digital ICT (Mengxin, 2009).
- Information device offering much information in the various forms of text, audio, graphics and video (Lim and Ching, 2003).

![Figure 1. The conceptual model of the research](image-url)
Information processing is receiving the data, creating a process and finally changes the current information or consecrates it (Humes, 2005).

Information handling is use of knowledge global networks; so that, students acquiring the information that previously was not available (Loveless and Viv, 2001).

With regard to the first step for the optimal use of ICT and promotion of information literacy skills in education system should be identify the strengths and weaknesses of ICT from the views of teachers and experts of educational technology in Iran; And also with regard to the results of such research can be help teachers for promote the ICT literacy, therefore this research attempts as far as possible has reduced shortcomings of previous research in this field. Thus, the main purpose of this to study the views of teachers and experts about the components of ICT literacy based on the ISST model. According to the research objectives, this research will attempt to answer the following questions:

RQ1. To what extent the components of the ISST model are available in the teachers of Iran from the viewpoint of the experts of educational technology and teachers?

RQ2. Are there any significant differences between the views of experts of educational technology and teachers about the components of the ISST model?

2. Methodology

2.1 Research method

In this study, the researchers aimed to develop a systematic and objective the views of ICT experts and teachers about the components of the ISST model (information society, information device, information processing and information handling), thus the study used a descriptive methodology by applying a survey method to achieve its aim.

2.2 Participants

The statistical population of this study consisted of all the teachers and ICT experts of educational technology in Tehran, comprising 9,800 teachers and 37 experts. Considering the great number of the teachers’ statistical population in the Tehran zones; thus, the Tehran zones were categorized in five clusters included, North, South, East, West and Central. Then we selected the teachers from different clusters with using Cochran’s formula. A total of 360 teachers were selected from five clusters and then distribution of questionnaire among teachers, number of 299 responded to the questionnaire. Owing to the small size of the experts’ population, all 37 experts were selected for research.

2.3 Data collection and analysis

To collect the necessary data, the researcher designed a questionnaire based on four key components of the ISST model. The questionnaire included sections on ICT literacy such as, information society, information device, information processing and information handling. To evaluate the validity of the research instrument, several copies of the questionnaire were filled out by the researcher’s supervisor and advisor and also by some experts. Then, according to the received questionnaires, necessary modifications were made to the questionnaire.
Cronbach’s $\alpha$ was used to evaluate the reliability of the research instrument. In total, 30 copies of the questionnaire were distributed among the participants. Analysis of the collected data revealed a reliability coefficient equal to 0.99, which indicates high reliability for the research instrument. It should be mentioned that Cronbach’s $\alpha$ coefficient for each component of ICT literacy based on the ISST model was calculated (see, Table I).

The present research was conducted on two levels of analysis. On the descriptive level, the data were analyzed by virtue of statistical features such as tables, frequency, percentage, mean and standard deviation. On the inferential level, the data were analyzed using the Kolmogorov-Smirnov test, one sample $t$-test and independent $t$-test in SPSS version 17 software.

3. Findings

The descriptive findings in Table II show that 67.6 percent of experts in the study are female and 32.4 percent are male. Also 66.9 percent of teachers in the study are female and 33.1 percent are male:

**RQ1.** To what extent the components of the ISST model are available in the teachers of Iran from the viewpoint of the experts of educational technology and teachers?

The findings of Table III show that from the viewpoint of experts, the information device is the more important than other components of the ISST model, while from the viewpoint of teachers the information handling is the more important than other components of the ISST model. Furthermore, other findings show that the age mean of teachers is higher than the age mean of experts. Also the work experience mean of teachers is higher than the work experience mean of experts.

For doing some parametric tests on data, considering that usage of parametric tests is acceptance the presumption of variables normality, so this acceptance was studied by the help of Kolmogorov-Smirnov test. As the results of Kolmogorov-Smirnov test of this acceptance was studied, the research variables distribution in level of 0.05 was

<table>
<thead>
<tr>
<th>ICT literacy components</th>
<th>Experts $\alpha$</th>
<th>Teachers $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information society</td>
<td>0.855</td>
<td>0.948</td>
</tr>
<tr>
<td>Information device</td>
<td>0.875</td>
<td>0.975</td>
</tr>
<tr>
<td>Information processing</td>
<td>0.942</td>
<td>0.981</td>
</tr>
<tr>
<td>Information handling</td>
<td>0.802</td>
<td>0.986</td>
</tr>
<tr>
<td>Total</td>
<td>0.93</td>
<td>0.99</td>
</tr>
</tbody>
</table>

**Table I.** Cronbach’s $\alpha$ coefficient of ICT literacy components

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>%</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>25</td>
<td>67.6</td>
<td>12</td>
<td>32.4</td>
</tr>
<tr>
<td>Male</td>
<td>198</td>
<td>66.9</td>
<td>98</td>
<td>33.1</td>
</tr>
</tbody>
</table>

**Table II.** Descriptive study of the sample based on the gender variable
normal, thus for studying and testing the research questions, we use parametric tests. By considering the comparison of a group with a supposed amount (3), we used one sample $t$-test.

The findings of Table IV show that all components of the ISST model (information society, information device, information processing and information handling) according to the level of $p$ (significance level) are lower than 0.05, thus the test has been significant. In other words, the experts believe all components of the ISST model for teachers are essential.

The findings of Table V shows that the components of information device, information processing and information handling according to the level of $p$ (significance level) are lower than 0.05, thus the test has been significant. In other words, teachers believe these components of the ISST model for them are essential. Furthermore, other findings of Table V show that the component of information society according to the level of $p$ (significance level) is more than 0.05, thus the test has not been significant. In other words, teachers believe this component of the ISST model for them is not essential:

**RQ2.** Are there any significant differences between the views of experts of educational technology and teachers about the components of the ISST model?

**Table III.**
Descriptive study of research variables

<table>
<thead>
<tr>
<th>Group</th>
<th>ICT literacy components</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts</td>
<td>Information society</td>
<td>3.82</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>Information device</td>
<td>4.06</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>Information processing</td>
<td>3.71</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>Information handling</td>
<td>3.96</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>31.08</td>
<td>6.36</td>
</tr>
<tr>
<td></td>
<td>Experience</td>
<td>8.62</td>
<td>5.44</td>
</tr>
<tr>
<td>Teachers</td>
<td>Information society</td>
<td>3.0563</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td>Information device</td>
<td>3.2491</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>Information processing</td>
<td>3.4451</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>Information handling</td>
<td>3.5988</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>40.1742</td>
<td>6.96</td>
</tr>
<tr>
<td></td>
<td>Experience</td>
<td>17.2799</td>
<td>6.85</td>
</tr>
</tbody>
</table>

**Table IV.**
One sample $t$-test for comparison of the ICT literacy components from the viewpoint of experts

<table>
<thead>
<tr>
<th>ICT Components</th>
<th>Mean</th>
<th>SD</th>
<th>$t$</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information society</td>
<td>3.82</td>
<td>0.64</td>
<td>6.41</td>
<td>24</td>
<td>0.000</td>
</tr>
<tr>
<td>Information device</td>
<td>4.06</td>
<td>0.54</td>
<td>9.84</td>
<td>24</td>
<td>0.000</td>
</tr>
<tr>
<td>Information processing</td>
<td>3.71</td>
<td>0.82</td>
<td>5.27</td>
<td>36</td>
<td>0.000</td>
</tr>
<tr>
<td>Information handling</td>
<td>3.96</td>
<td>0.61</td>
<td>9.62</td>
<td>37</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Table V.**
One sample $t$-test for comparison of the ICT literacy components from the viewpoint of teachers

<table>
<thead>
<tr>
<th>ICT Components</th>
<th>Mean</th>
<th>$t$</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information society</td>
<td>3.0563</td>
<td>0.834</td>
<td>283</td>
<td>0.405</td>
</tr>
<tr>
<td>Information device</td>
<td>3.2491</td>
<td>3.877</td>
<td>275</td>
<td>0.000</td>
</tr>
<tr>
<td>Information processing</td>
<td>3.4451</td>
<td>6.141</td>
<td>269</td>
<td>0.000</td>
</tr>
<tr>
<td>Information handling</td>
<td>3.5988</td>
<td>8.308</td>
<td>278</td>
<td>0.000</td>
</tr>
</tbody>
</table>
According to the findings in Table VI, the observed $t$-values for the information society, information device and information handling are significant at the ($p < 0.05$) level. Thus, there is significant difference between the views of experts and teachers regarding these components. Also the observed $t$-values for the information processing component is not significant at the ($p < 0.05$) level. Thus, there is no significant difference between the views of experts and teachers regarding this component.

4. Discussion
In this research, the components of ICT literacy based on the ISST model from the viewpoint of experts of educational technology and teachers were studied. The findings of the study, after examining their viewpoint, showed that all components of ICT literacy were more than the mean level.

In relation to all components of ICT literacy based on the ISST model (first research question), the findings showed that from the viewpoint of experts all components of ICT literacy for teachers were essential. Also from their viewpoint the information device had the highest mean ($m = 4.06$) in comparison with other components of ICT literacy. Therefore, it has been concluded that from the viewpoint of experts, four components of ICT literacy-based on the ISST model for teachers was essential. Although from their viewpoint the information device which included computer architecture, operating systems and computer parts, had particular importance. In other words, the experts believed, having the basic computer skills for deepening ICT literacy was essential.

While from the viewpoint of teachers, except the component of information society, other components of ICT literacy based on the ISST model for teachers was essential. Also from their viewpoint the information handling had the highest mean ($m = 3.59$) in comparison with other components of ICT literacy based on the ISST model. In other words, from their viewpoint the information handling, which included information sharing and managing web pages, had particular importance.

Nowadays staff’s mastery in computer skills is an essential element in each organization and one of the key factors for development. ICT skills can lead to increase and strengthen of self-confidence of employee in the communities. Thus, improvement of employees with these skills and abilities, can help them in better performance, and subsequently will lead to increase the efficiency and effectiveness and productivity of the organization. In other words, mastery of ICT skills can lead to increase self-value, improvement of motivation, feeling of success and reducing the cost in their work environment.

Research in this area suggests that teaching technology to teachers should require educational component; otherwise, applying them to the learning environment is

<table>
<thead>
<tr>
<th>ICT literacy components</th>
<th>Group</th>
<th>Mean</th>
<th>$t$</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information society</td>
<td>Experts</td>
<td>3.8242</td>
<td>5.287</td>
<td>38.818</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>3.0563</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information device</td>
<td>Experts</td>
<td>4.0672</td>
<td>6.49</td>
<td>43.335</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>3.2491</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information processing</td>
<td>Experts</td>
<td>3.7179</td>
<td>1.769</td>
<td>58.7</td>
<td>0.082</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>3.4451</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information handling</td>
<td>Experts</td>
<td>3.9671</td>
<td>3.01</td>
<td>82.113</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>3.5946</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table VI. Testing the significant difference of ICT literacy components between two groups of experts and teachers.
unlikely by teachers. If during training information technologies to teachers, will show them in a way that their training is relevant to their work, they are much interested and desired to enter new technology in learning environment. In other words, when the boundary between training for technology and education curriculum fades, teachers are more motivated to learn to use technology in the classroom. The effective and efficient method in training technology is its application in the field of purposeful and relevant learning. Instead of learning technology applications, should emphasized on the application of technology for learning and access process of teacher needs on curriculum to be placed in the context of technology training. Studies have shown that if teachers are not equipped to the skills and required knowledge during the process, changes in training usually fail. Teacher preparing is an important factor for IT in schools (Ebrahimi and Gangi Khezerlak, 2015).

In relation to the differences between the views of experts and teachers about the components of ICT literacy based on the ISST model (RQ2), the findings showed that, except the component of information processing, in other components of ICT literacy (information device, information society and information handling) a significant difference (p ≤ 0.05) between the views of experts and teachers had been seen, and also from the viewpoint of experts these components had the highest mean in comparison with teachers. Thus, we can conclude, the experts in comparison with teachers had more emphasis on these components.

Due to rapidly increasing knowledge and development of global communication networks, inquiring ICT knowledge and skills, has been considered as a need and a kind of literacy. ICT literacy in education can be used in learning, presenting content and learning integrated curriculum with technology. Considering the benefits of ICT literacy, the educational and research system in Iran should evaluate the need for information technology in its infrastructures to include it in its structure. In other words, to recognize the role of information technology in educational system, its role in the quantitative and qualitative development of research and education field should be identified and explained (Kamali et al., 2014).

5. Conclusion
Consider the fact the culture of using ICT in Iran is new, and the curriculum of the future should be prepared based on global changes, cultural diversity, quality of life, promotion of technology, lifelong learning, global economic and interaction with national environment, so fundamental training in the field of ICT literacy for teachers and students of Iran is more essential in the education system.

While, most of the problems that teachers have in this field, are philosophical issues in education training. Superficial preparation of teachers in terms of hardware and software, to create fundamental changes in the classroom is not enough and there are differences of opinion on this subject. Teachers often have to transform the imagination of teacher’s role, and during the learning process change what and how it can be learned by students. Thus, necessity for helping teachers to understand the deep meaning of these changes is a long period of training teachers (Ebrahimi and Gangi Khezerlak, 2015). The following suggestions are made based on the findings of this study to improve ICT literacy among teachers:

- according to the findings of this study, in order to improve ICT literacy, models, especially ISST model should be noticed, due to its main characteristic which is its ability to operate in different levels;
for the planning and implementation of ICT education courses for teachers, components such as information society, information device, information processing and information handling should be considered; and
given that, using of ICT by teachers, lead to improve their motivation, self-confident, problem-solving abilities, presentation of content, communication and social skills, learners’ learning and performance and finally increasing productivity, thus it has been suggested that the education system need to hold the annual educational courses of ICDL skills for teachers.

References


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