Pathology of Utilizing Information Technology in National Entrance Examination by Educational Testing Organization

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Abstract

The present study is conducted to address the pathology of the use of information technology in national entrance examination for educational testing organization and also it is among the quantitative and qualitative studies in terms of data collection. In order to address the issue the field methods and interviews are applied. In this study with regard to the novelty of the field of research and the lack of adequate theoretical and empirical literature in this area to obtain closer understanding of the reality, the theme analysis approach is applied. The study population (units of analysis) included the IT experts of the Educational Testing Organization. In this study a combination of purposive and theoretical sampling has been used. For interviews and finding research subjects snowball sampling method (which is one of the ways of purposive sampling) is applied. A total of 25 interviews are conducted and sampling continued until achieving the theoretical saturation and interpretability. Then the results of the data analysis are discussed. In this study the damages are addressed at three themes of technological, structural and human-social damages.

Keywords: pathology, information technology, National Entrance Examination, Educational Testing Organization.
Introduction
With the expansion of public education in the world, the tests that are part of the education process have had broad applications. Today, the tests are a criterion for admission to employment and educational levels (including university admission), confirmation of the proficiency in specific skills (such as language tests) and to evaluate the different educational programs. Thus, a large number of tests are considered as important factors affecting the life and future of people and such tests are called high-stakes tests (Mohammadi Roozbahani, 2011). Over the past few decades, university entrance exams in Iran have always been the main way of entry to higher education courses. Thus the score obtained by each participant that represents his performance in an a few hour test session is the person’s only priority index over other people applying for admission to college. Therefore, National Entrance Examination with its sensitivity and importance to the volunteers is among the crucial tests. In this regard other important tests in different levels are considered as high-stakes tests based on their importance and extent. The increase in the number of volunteers for higher education necessitates the need to expand educational centers.

Limited capacity of university admissions, graduate unemployment, and brain drain...indicate the need to choose qualified people from among applicants for admission to higher education institutions. This problem caused a high sensitivity to the performance of higher education in the public and government. Everyone expect that the most talented and capable volunteers are absorbed by academic centers of higher education by an appropriate process so that the higher goals of education are achieved. This is so serious and important that makes student enrollment practices in higher education to be constantly evaluated to obtain the most correct and most appropriate form and content. Today, with the increasing social demand for access to higher education and skilled manpower required for a broad range of advanced new jobs the need to choose the best options for the entry to higher education is considered. The use of tests especially their use on a large scale population has raised new issues and among the new threats against the tests is the use of Information and Communication Technology. In recent decades, the world has witnessed fundamental changes in various economic, social, cultural and educational fields. The experts believe that these changes are the overall result of development in information technology and communications. These changes that are created by computers and communications technologies and their assimilation in society are called information society in some cases (Rajai, 2001). In fact, the development of information technology and its application has profound effect on many aspects of human life such as education, so that in recent decades, access to information technology and the ability to use it is increasingly considered as means to participate in an information-based society (Basri, 2010).

One of the areas that gets wider every day due to the relentless growth of public education and need to be held in a more easy manner is the taking the tests such that the educational centers in the new millennium are faced with the question on how to overcome the changes and opportunities created by the IT and communications (Breen et al, 2001). In the new millennium, many changes in education, especially higher education has taken place, so that in some cases they have overshadowed the university's mission and goals (Peeraer & Petegem, 2011). The
accelerated growth and development of the curriculum and the views, opinions and different approaches in the field have provided the ground for the new concepts and areas for this nascent field. On the other hand, the newness of this area has created numerous problems in the face of events and new fields. One of the most important areas is the concept of the use of information technology and communications in taking the tests (Kourosh Fathi, 2006). Taking the national tests in the world can apply the opportunities provided in the field of ICT to recover and rebuild its own processes and eliminate the challenges using modern information technologies. Also the various threats that are dangerous for the Educational Testing Organization should be identified and solutions should be considered in the test taking approach to overcome these threats. On the other hand the use of ICT requires proper infrastructure in cultural, scientific and development skills. In other words, the prerequisite for the use of ICT is that the organization becomes aware of the techniques to take advantage of such phenomena. So it can be mentioned that if the proper infrastructure is not provided, it is not possible to hope that new technologies lead to changes in the organization and the examination method (Hassan Maleki, Garabi; 2009). Messick as one of the most influential experts in the field believes that when testing conditions and management are such that they prevent development of abilities, skills and knowledge of some of the participants, they are considered as the barrier conditions the removal of which will increase test validity (Messick, 1989 Quated in Sai Rossi, 2004). The utilization of information technology replaces the public judgment and biases in the education system with a systematic thinking theory (Stark & Lattuca, 1997) and any weaknesses and shortcomings in this area will cause serious problems in the education process. The entrance of the volunteers who lack outstanding academic records and abilities necessary to continue their education in college has a negative impact on the quality of academic work (Aghazadeh, 1998). Technology is known as one of the driving forces in the development of human societies. This trend is due to the advancement of knowledge and its application in various aspects of human life. In general, when it there is a discussion about technology, it is not the purely hardware technology, but also other aspects such as knowledge, concepts and methods are also considered (Mahdavi, 2000). Among the IT phenomena in the present era, there is no doubt than the ICT is one of the most important fields. This phenomenon first included the computer hardware and software that the scientific events gradually led to the formation of information technology. Since the late 1980s, the advent of communication such as the Internet and the development of computer networks using telecommunication technologies and telecommunication systems led to the emergence of the Information and Communication Technology (Jahangard, 2002). On the other hand with the expansion of public education in the world, the tests that are part of the educational process have had broad applications. Today, the test is used a criterion for admission to employment and educational levels (including admission), confirmation of proficiency in specific skills (such as language tests) and to evaluate the different educational programs. Thus, a large number of tests are considered as important factors affecting the life and future of people and such tests are called high-stakes tests (Movahedi et al, 2012). Now how is it possible to define the criteria and standards for testing? Since in each test the test candidate is the most important element in the assessment, identifying his specific needs is one of the main sources of investigating the test circumstances (satisfaction). The Higher education as a
center of scientific developments and research in each country is required to reorganize and renew its structure and its strategies in engaging with ICT (Macknight, 1995). The use of information technology has replaced the public judgment and biases in the education system with a systematic thinking theory (Stark & Lattuca, 1997) and any weaknesses and shortcomings in this area will cause serious problems in the education process. The entrance of the volunteers who lack outstanding academic records and abilities necessary to continue their education in college has a negative impact on the quality of academic work (Aghazadeh, 1998). During the last twenty years the university entrance exam in Iran has always been the main route of entry to higher education courses. Thus the score obtained by each participant that represents his performance in an a few hour test session is the person’s only priority index over other people applying for admission to college. Therefore, National Entrance Examination with its sensitivity and importance to the volunteers is among the crucial tests. In this regard other important tests in different levels are considered as high-stakes tests based on their importance and extent. Unfortunately, despite a history of nearly forty years of holding university entrance exams in Iran and the importance of this test and similar tests for various classes of society, the pathological study of the use of information technology in exams is not considered by the researchers of the country. The Educational Testing Organization authorities manage the tests based on their experience and there is no standard method for conducting tests. According to what has been mentioned so far the pathology of the information technology in holding the national entrance examination for Educational Testing Organization and providing the solutions are main purposes of this article.

Literature Review
- Test application
Test application especially on large scale population has caused new issues including the new threat to the credibility and reliability of the tests. Some researchers have considered preparedness of the participants and test condition as two major sources of threats to validity and reliability of critical tests both of which affect the individual performance and ultimately the test results (Haladyna et al, 1991). Accordingly, one of the most important and significant issues in the implementation of crucial tests is to establish the same conditions (standard) for all participants (Coleman, 1998; Cizek, 1996; Haladyna et al., 1991). Messick as one of the influential experts in this field believes that whenever the test conditions are such that they prevent the abilities, skills and knowledge of some of the participants, those conditions are considered as barriers the removal of which will increase test validity (Messick, 1989).
- Information technology
ICT has a variety of definitions that the following definitions are the most favorite ones:
IT as one of the newest man-made technologies has ability to collect, organize, store and reflect information in the form of sound, text and number and this can be achieved using computer tools and deployment of telecommunications systems (Zarei Zavaraki, 2001). Producing science and

1 K Mohammadi Roozbahani, National Organization for Educational Testing "Introduction to standardization of test performance"
technology is the prerequisite of the survival of the society and the growth condition and creation of knowledge in different countries determines the fate of that country. Technology development is the key factor for achieving sustainable development, economic development and fighting poverty. The American IT Strategic Approach considers the need to IT as a result of three factors:

1) IT is a strategic industry that is one of the world's most profitable industries.
2) IT is a key technology used in all global industries and services.
3) It is a fundamental infrastructure that allows all companies, institutions and economic units to contribute to the use of human knowledge and its transformation; IT reduces the costs and thus leads to increased productivity and product quality.

Pathology
Pathology is an abnormal position or biological state in which an organism is prohibited to function and operate properly. This concept is used in clinical psychology and psychotherapy such that it includes the disorders that have specific biological agents. However it should be noted that the pathology can have a different interpretations depending on the specific field of science, experimental medicine, etc. (Guide, 1378). For example, the thing that is achieved in the pathology of human resources is a considerable amount of information that is the outcome of information that is the result of horizontal, vertical and diagonal communications that uses the feedback system. The pathologists become aware of the causes of the damage by analyzing this information and the purposes of the company through the logical relations and the ones that should be established (Jahangirfard et al., 2010).

Organizational pathology
Pathology is a process based on organizational behavior theories. In this process it is attempted to increase the individuals’ understanding of the system by collecting valid data on the individuals and re-injection of the collected data. In fact, the aim of organizational pathology is to create a common understanding of the system and decision-making about the need for change (Alderfer, 1980). Also Benjosa (2010) has defined organizational pathology as “a method for analysis of the organization to determine the shortcomings and deficiencies of organization and planning to solve them through changes and organizational development”.

Research background
Research has been done on the test implementation on the factors affecting the adoption of information technology. For example, Afshari et al. found that four factors of a high level of computer access, high awareness of the characteristics of ICT, a high level of computer skills and a high level of transformational leadership behavior affect the managers’ use of computer (Afshari et al., 2010). Wong’s research (2009) shows that the variable of the mental perception of ease of use of information technology has a positive and significant impact on use of IT. Dunn & Salem (2009) have conducted a study titled “standard policies of admission in public schools of Massachusetts” in the United States. In this paper while analyzing the data on student enrollment, they interviewed 12 university consultants and staff of the University and college admissions and surveyed them on the implementation of the policies and the effects of them on the admission procedures. The obtained results include:
Distribution of scores, enrollment rates and average points scores are affected by the implementation of new policies and thus the survival rates of people in public schools has increased.

Students who are admitted with the lowest score are required to pass prerequisite.

The universities differ with each other in terms of acceptability, as well as the implementation of new policy requirements.

According to Rawat (2006) the principal advantages of the application of ICT in education systems include: increased communication networks through tools such as e-mail, discussion groups, chat rooms, flexible access to study and reducing the barriers of time and places, improving the quality of college education, saving resources through the relocation, increasing number of libraries and thus moving towards electronic publishing and increasing learning speed.

Jones (2002) in his comprehensive studies on student in U.S higher education and universities concluded that they consider the Internet and virtual courses not as a substitute for traditional classes, but as a teaching assisted tool. This study shows that 79 percent of students believe that the Internet as a teaching aid has a positive impact on their academic experience. Clegg et al. (2000) believe that those who use ICT for teaching and scientific purposes have more effective training than those who rely on traditional forms of training and education.

Conceptual model
The theoretical framework is a conceptual model that is based on theoretical relationships between factors considered important in the issues of the study. The theoretical framework has a logical flow by the study of research records in the field of study. According to the survey conducted in this regard it is possible to present the most important damages presented in this area as follows:

**Damages of the Use of Information Technology in National Entrance**

- **Human and social damages**
- **Structural damages**
- **Technological damages**

Research method
The research method us descriptive because the purpose is to investigate the relationship between the variables in the study, the pathology of the use of information technology in national entrance examination for Educational Testing Organization and providing the improvement solutions based on the conducted interviews in the study. In this study with regard to the novelty of the field of research and the lack of adequate theoretical and empirical literature in this area to obtain closer understanding of the reality the grounded theory is applied. In simple words the grounded theory is the discovery of theories from the data that are produced deductively based on research data. "The production of a theory by research data means that most assumptions and concepts are
not only obtained by the field data, but also formed on the basis of data obtained during the investigation” (Zakaei, 2002: 54). Thus the grounded theory unlike the methods to test the hypothesis is more focused on the theory production. In this study a combination of purposive and theoretical sampling has been used. For interviews and finding research subjects snowball sampling method (which is one of the ways of purposive sampling) is applied. In this way first the interview is performed by the participant about whom the researcher has a deep knowledge and effort is made that the interviewees are not aware of each other’s interviews and they are selected from different parts of the organization. First numerous questions are asked them about IT application in national entrance examination for Educational Testing Organization to determine whether they are proper subject for study or not and then they are interviewed. Then each of the interviewees is asked to identify the damages in this area. Then it is attempted to determine the nature of the damages to the organization by various questions in case of the existence of current shortcomings. Then the interviews continued up to the data saturation level and no new issue is added. A total of 25 interviews are conducted and sampling continues until the theoretical saturation and interpretability. In this study three types of coding are used for the analysis: 1) open coding, 2) axial coding and 3) selective coding. These are different procedures for working with contextual data that the researcher displaces or combines them in case of need. However the interpretation process begins with open coding and discussed by selective coding analysis by approaching the final stages. Open encoding is after conceptualizing the data and phenomena. In this section the questions are as follows:

<table>
<thead>
<tr>
<th>Row</th>
<th>Question</th>
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<tbody>
<tr>
<td>1</td>
<td>Is it possible to use consider damage for the IT in national entrance examination in Educational Testing Organization?</td>
</tr>
<tr>
<td>2</td>
<td>What are these damages?</td>
</tr>
<tr>
<td>3</td>
<td>What is your suggestion to fix these damages in the organization?</td>
</tr>
</tbody>
</table>

In axial coding beginning the process is through putting together the type of data that are divided in open coding, in axial coding the categories are linked to sub categories so that more detailed explanation of data are formed and in axial coding it is attempted to find and discover the categories based on a paradigm. It is attempted to find and determine a main phenomenon through considering the conditions that create the phenomenon and the concept or the context is the properties of a phenomenon in which the behavioral and interactive behaviors strategies occur; mediating or intervening conditions are conditions or factors that have exacerbated strategies, the action/reaction strategies that the category is controlled and managed through it and finally the outcome of these strategies.

Selective coding is the last stage of encoding and it is conducted in a more abstract level of axial coding. At this stage the theory is confirmed and the researcher is dealt with fewer categories (Mohammadpur, 2010: 340).
<table>
<thead>
<tr>
<th>Row</th>
<th>Question</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>If we want to categorize the damages regarding the use of IT in national entrance examination at three levels of technological, structural and human and social areas, what are the damages associated with the technological field?</td>
</tr>
<tr>
<td>2</td>
<td>What are the damages of using IT in national entrance examination in the structural field?</td>
</tr>
<tr>
<td>3</td>
<td>What are the damages of using IT in national entrance examination in the human social field?</td>
</tr>
</tbody>
</table>

**Results**

In this part the research results are discussed. These results are the result of in-depth interviews with IT staff and the relevant sectors in the Educational Testing Organization.

**Open coding**

First the interviewees in this field are asked questions about the existing damage. By perfuming the interviews in the research process and transcribing their discussion for data analysis a total of 1296 open codes are extracted from the test of the interviews. It should be noted that in some cases the points mentioned by the interviewees are consistent with other people that these responses are not presented separately for the purpose of briefness. It is attempted to consider the information from different aspects.

<table>
<thead>
<tr>
<th>Row</th>
<th>Interviewee</th>
<th>Central issues</th>
</tr>
</thead>
</table>
| 1   | P1          | Internet outages  
Lack of appropriate communication protocols to communicate with the bank by the organization  
Lack of qualified human resources  
The existence of some human errors in verifying the candidate information |
| 2   | P2          | Lack of proper access to the Internet and Internet outages  
Lack on Internet knowledge  
The conflict between the units during registration because of overlap in these sectors |
| 3   | P3          | Human errors in the verification of the volunteer information  
Some organizations’ lack of cooperation with the Educational Testing Organization (Department of Civil Registration, Education, Universities and higher education institutions) |
| 4   | P4          | Personalization of the test booklets and proper coordination with volunteer data (number of seats …)  
Selecting and determining the appropriate test location by the system |
<p>| 5   | P5          | Lack of access to the volunteer’s information by Educational Testing |</p>
<table>
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<tr>
<th>Page</th>
<th>P6</th>
<th>P7</th>
<th>P8</th>
<th>P9</th>
<th>P10</th>
<th>P11</th>
<th>P12</th>
<th>P13</th>
<th>P14</th>
<th>P15</th>
<th>P16</th>
<th>P17</th>
<th>P18</th>
</tr>
</thead>
</table>
| 6    | Organization  
The high costs of maintenance of existing servers  
Sanctions in the import of equipment related to network | Lack of appropriate support of the banking services when buying credit cards and registration  
Confirmation of the accuracy of the information entered into the system by volunteers  
Lack of appropriate communication protocols to communicate with the bank | Lack of registration credit card information at the time receiving the card and personal attendance  
Problems arising from an observation of record because of (bad scanned answer sheets, illegibility and folding…) | Viral photo submitted by the volunteers  
Lack of resources to support server at the time of registration and announcement of the results…  
Choosing the appropriate testing area by the system | The failure of site protocols because of bugs in the system | Problems arising from an observation of record because of (bad scanned answer sheets, illegibility and folding…) | Limited Internet bandwidth available to the organization | Network Security  
Lack of security devises and identifying the security bugs | The failure of site protocols because of bugs in the system  
Selecting and determining the appropriate test location by the system  
Verification of data entered into the system  
Some organizations’ lack of cooperation with the Educational Testing Organization (Department of Civil Registration, Education, Universities and higher education institutions) | Reviewing all submitted photos and compliance with the name and gender of the person | System error in identifying the selected field code | The volunteers access to the Internet and Internet outages  
Lack of internet knowledge  
Lack of appropriate communication protocols to communicate with the bank by the organization | The existence of some human errors in verifying the candidate information  
The presence of relatively weak site design due to extensive services in this section |
Lack of qualified human resources

Network security
Lack of security devises and detecting the security bugs
Lack of qualified human resources

Network security
Lack of security devises and detecting the security bugs

The presence of relatively weak site design due to extensive services in this section

Cyber challenges and high attacks
Limited Internet bandwidth available to the organization

Problems with uploading the photo and some restrictions
Personal attendance of the volunteers to correct some errors manually

Personal attendance of the volunteers to correct some errors manually

Verification of data entered into the system by the volunteer
Some organizations’ lack of cooperation with the Educational Testing Organization (Department of Civil Registration, Education, Universities and higher education institutions)

**Axial coding**

In the second stage of preparation the data are extracted to analyze the open codes at the first stage and located under the central category. It is important to understand that the experts’ opinions in this study are based on the existing damages. Thus some of the experts in this field (the chief technology officer and four experts with the experience and expertise in the organization are asked to categorize the information written as the discussed damages.
The damages mentioned by the interviewees are summarized in the chart below:
1. The influx of cyber-attacks on the site
2. Lack of proper record loading by the system
3. Site slowness

1. Getting the folded and distorted answer sheet,
2. The distortion of the answer sheets by the correction unit
3. Failure to correctly fill out the answer sheet by volunteers

1. The lack of information consistency with the cases mentioned by the organization
2. Late announcement
3. Site slowness

1. The occurrence of cyber-attacks by hackers
2. Slow servers because of the influx of volunteers, especially at the end of the period
3. Lack of appropriate security servers and devices because of sanctions

1. The lack of Internet literacy
2. The wrong data entry and uploaded photos

1. Disconnection with the bank
2. Disconnection with Shaparak
3. Disconnection with switch banks

1. The lack of communication with the Office of Civil Registration and Education and the universities to verify the information entered by the volunteers
2. The expert fails to confirm the information and confirms the false information

1. Filling the profile wrong and giving the wrong information
Now based on the mentioned process it is possible to classify the damages in the system which lead to the lack of proper formation of the cycle into three main factors:

1. Damages in the technology used for the test
2. Damage to the infrastructure of the Educational Testing Organization to hold the exam
3. Human damages in the process that process that cause the lack of proper formation of the cycle

It should be noted that these factors have been approved by the organization's experts and they believe that the damage is either related to the infrastructure, employed technology or the human factor in this process. The interviews conducted with the subjects individually are discussed separately as the damages and they are approved by experts as follows:

<table>
<thead>
<tr>
<th>Row</th>
<th>Interviewee</th>
<th>Central issues</th>
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<tbody>
<tr>
<td>1</td>
<td>P1-P2-P17</td>
<td>Internet outages</td>
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<tr>
<td>2</td>
<td>P1-P6-P17</td>
<td>Lack of appropriate support of the banking services when buying credit cards and registration</td>
</tr>
<tr>
<td>3</td>
<td>P1-P3-P18</td>
<td>The existence of some human errors in verifying the candidate information</td>
</tr>
<tr>
<td>4</td>
<td>P1-P18-P19</td>
<td>Lack of qualified human resources</td>
</tr>
<tr>
<td>5</td>
<td>P2-P17</td>
<td>Lack on Internet knowledge</td>
</tr>
<tr>
<td>6</td>
<td>P3-P14-P25</td>
<td>Some organizations’ lack of cooperation with the Educational Testing Organization (Department of Civil Registration, Education, Universities and higher education institutions)</td>
</tr>
<tr>
<td>7</td>
<td>P4-P9-P14</td>
<td>Selecting and determining the appropriate test location by the system</td>
</tr>
<tr>
<td>8</td>
<td>P6-P14-P25</td>
<td>Verification of data entered into the system by the volunteer</td>
</tr>
<tr>
<td>9</td>
<td>P7-P11</td>
<td>Problems arising from an observation of record because of (bad scanned answer sheets, illegibility and folding…)</td>
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<tr>
<td>10</td>
<td>P8-P23</td>
<td>Problems with uploading the photo and some restrictions</td>
</tr>
<tr>
<td>11</td>
<td>P10-P14</td>
<td>The failure of site protocols because of bugs in the system</td>
</tr>
<tr>
<td>12</td>
<td>P12-P22</td>
<td>Limited Internet bandwidth available to the organization</td>
</tr>
<tr>
<td>13</td>
<td>P18-P21</td>
<td>The presence of relatively weak site design due to extensive services in this section</td>
</tr>
<tr>
<td>14</td>
<td>P13-P19-P20</td>
<td>Network Security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of security devises and identifying the security bugs</td>
</tr>
<tr>
<td>15</td>
<td>P23-P24</td>
<td>Personal attendance of the volunteers to correct some errors manually</td>
</tr>
</tbody>
</table>

Selective coding
During the first two stages to integrate the analysis of the central issues are related in the form of three themes (technological damage, structural damage, human and social damage). Each of the core issues included different dimensions and angles that are categorized into three themes by the experts. Then the results of the categories are presented to the interviewees and the results
obtained in this field are informed to the interviewees in the organization to obtain their comments in this regard.

<table>
<thead>
<tr>
<th>Row</th>
<th>Themes</th>
<th>Central issues</th>
</tr>
</thead>
</table>
| 1   | Technological damage    | Lack of access to the volunteers’ educational information by the Educational Testing Organization  
Problems with uploading the photo and some restrictions  
Reviewing all submitted photos and compliance with the name and gender of the person  
Problems arising from an observation of record because of (bad scanned answer sheets, illegibility and folding…)  
Cyber-attacks on the site  
Verification of data entered into the system by the volunteer  
Viral photo submitted by the volunteers  
Problems with uploading the photo and some restrictions  
Personal attendance of the volunteers to correct some errors manually  
The presence of error in the system while entering the codes of the selected field  
Site security  
The failure of site protocols because of bugs in the system  
Personalization of the test booklets and proper coordination with volunteer data (number of seats …) |
| 2   | Structural damage       | Internet outage and disconnection with Shaparak while buying the card  
The volunteers access to the Internet and Internet outages  
Lack of internet knowledge  
Disconnection with switch banks and the communication in the website  
Lack of appropriate communication protocols to communicate with the bank by the organization  
Lack of communication with the Office of Civil Registration Organization  
Limited Internet bandwidth available to the organization  
The high costs of maintenance of existing servers and Lack of access to the volunteer’s information by Educational Testing Organization  
The high costs of maintenance of existing servers sanctions in the import of equipment related to network  
Problem in the selection and determination of test location  
The presence of relatively weak site design due to extensive services in this section  
Problems in the answer sheet of volunteers (transportation, equipment, etc.) |
| 3   | Human and social damage | The conflict between the units during registration because of overlap in these sectors                                                             |
Lack of qualified human resources in some areas such as support and organization…
The existence of some human errors in verifying the candidate information
Some organizations’ lack of cooperation with the Educational Testing Organization

Finally, according to the survey conducted in this regard the most important damages identified in this area are presented below. Finally based on the survey conducted in this regard it is possible to present the most important damages as follows. It should be noted that the weighting method is used to rate the components. The maximum weight is given to the completely agreed option (Weight 5 based on Likert scale) and minimum weight is given to the completely disagreed option (Weight 1).

<table>
<thead>
<tr>
<th>Ranking damages of the use of IT in in national entrance examination for educational testing organization</th>
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<tbody>
<tr>
<td>Rank</td>
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<tr>
<td>1</td>
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</tbody>
</table>
3 Limited Internet bandwidth available to the organization
4 The high costs of maintenance of existing servers and Lack of access to the volunteer’s information by Educational Testing Organization
5 Disconnection with switch banks and the communication in the website
6 The volunteers access to the Internet and the internet knowledge
7 Internet outage and disconnection with Shaparak while buying the card
8 Problem in the selection and determination of test location
9 The presence of relatively weak site design due to extensive services in this section
10 Problems in the answer sheet of volunteers (transportation, equipment, etc.)

Human and social damage
1 The conflict between the units
2 Lack of qualified human resources and frustrated staff
3 The existence of some human errors in verifying the candidate information
4 Some organizations’ lack of cooperation with the Educational Testing Organization

Discussion and conclusion
Based on this classification it can be stated that based on the experts’ opinion each of these problems have caused damages to the organization the solution of which might have no specific priority. Now based on the obtained results and the experts’ opinion in this field the following strategies are proposed for the identified damages.

The provided solutions for the technological damages
- Setting up a national network can make the organization aware of the validity of the entered information. Connecting the Testing Organization to the Education Organization and universities to report on the status of volunteers is very important which is resolved in case of setting up a national network of information.
- Requiring the schools to educate students on the proper use of the Internet can reduce the amount of errors when sending documents, uploading photos and providing information and… as well as building a culture on the proper use of the Internet and its security.
- Use of backup teams can be a great help. In this regard, it is possible to use the companies active in the field of cyber and cyber security to provide services such as stronger firewalls, updated servers and updating the existing servers.
- Another solution to approve volunteer information is to create information databases by the organization. Thus the organization requires the volunteers to provide information to the organization before registering the examination. Or through the protocols between themselves and education organization would save a one copy of the record of final exam in order to create a data center in which the educational information can be stored.
Due to lifting sanctions and implementation of Joint Comprehensive Plan of Action it is possible to expect the organization to buy new servers and security systems through receiving government financing.

Employing programming specialists and support teams can help to fix bugs in the system. Large international companies usually ask the white hat hackers to fix the bugs in the system that identify bugs in exchange for money. The Educational Testing Organization could also take similar measures.

In the field of identifying the volunteers’ photos it is possible to ask the volunteer during the sign-up process to verify his/her information two or three times and consider a time period in case of error to fix it. One of the simplest ways is to send the registration data of the user (after registration) to his/her email.

One of the solutions that can be used to determine the test location is to replace the system data in terms of distance by the information from local experts. Or ask the volunteers to determine their test location based on their residence.

In terms of personalization of the test booklets and proper coordination with volunteer data the organization has been very active recently and has reduced the errors in this field by the appropriate software.

The provided solutions for the structural damages

- Request of the Ministry of Communications to provide appropriate bandwidth at the time of national entrance examination can help a lot as it has been so far.
- The situation is different regarding the relationship with the banks because this is a problem that exists in the whole country. To fix this problem, the banks have implemented Shaparak system which is still faced with disruptions. But one of the ways to resolve this problem is to establish a communication protocol between the organization and the banks in this field.
- The problem of connection with the Office of Civil Registration is resolvable by establishing the communication with national information network.
- Using the consultant teams in designing the website can be useful.
- It is possible to prepare answer sheet checking systems for each test location to minimize their dislocation and reduce the damage caused by dislocation. Also the amount of time spent on the identification of the defective answer sheets by the organization (due to high volume of the answer sheets) is reduced.

The provided solutions for the human-social damage

- A revision of the organizational chart can reduce the organizational conflicts. Currently, the organizational structure is vertical by making this structure agile and turning it into a horizontal structure it is possible to save the organization against such conflicts.
- Using the expert consultant teams it is possible to reduce the need for human resource in the organization (because the organization needs support in specific time intervals). This leads to less stress on the staff and reduces their rate of error.
- With the proper use of datacenters and using the experienced programmers in this field it is possible to prepare a program to minimize human intervention to verify information. This problem only requires investment to be resolved.
- By creating security protocols and strong relationship with the organization it is possible to solve the problem of lack of cooperation or coordination among the organizations.
References
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