Chapter III
Statement Of
The Problem
And Methodology
Of The Study
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STATEMENT OF THE PROBLEM AND
METHODOLOGY OF THE STUDY

The present study entitled "Meta-analysis of Studies on the Obstacles in Using Educational Technology in the Education Systems of Iran" is a quantitative review study with using meta-analytic approach. In this chapter an attempt has been made to explain the locale of the study, statement of problem, objectives, hypotheses of study, design and methodology, variables of study, tools used for the study, sample and statistical techniques employed for analysis of data.

3.1 LOCALE OF THE STUDY

This study considered the research studies conducted in "The Islamic Republic of Iran" and hence locale of the study is Iran. Iran is a country in Southern and Western Asia. Iran has a population of around 78 million. It is a country of particular geopolitical significance owing to its location in the Middle East and Central Eurasia. Iran is bordered on the north by Armenia, Azerbaijan and Turkmenistan. As Iran is a littoral state of the Caspian Sea, which is an inland sea, Kazakhstan and Russia are also Iran’s direct neighbors to the north. Iran is bordered on the east by Afghanistan and Pakistan, on the south by the Persian Gulf and the Gulf of Oman, on the west by Iraq and on the northwest by Turkey. Tehran is the capital, the country’s largest city and the political, cultural, commercial and industrial center of the nation. Iran is a regional power in Middle East.

Iran is divided into thirty one provinces (ostān), each governed by an appointed governor (ostāndār). The provinces are divided into counties (shahrestān), and subdivided into districts (bakhsh) and sub-districts (dehestān). The list of provinces according to alphabetical order is given below:

Alborz, Ardabil, East Azerbaijan, West Azerbaijan, Bushehr,
Chahar Mahaal and Bakhtiari, Fars, Gilan, Hamadan, Hormozgān, Ilam, Isfahan, Kerman, Kermanshah, Khorasan North, Khorasan Razavi, Khorasan South, Khuzestan, Kohgiluyeh and Boyer-Ahmad, Kurdistan, Lorestan, Markazi, Mazandaran, Qazvin, Qom, Semnan, Sistan o Baluchistan, Tehran, Yazd, Zanjan.

3.2 STATEMENT OF THE PROBLEM

It is found that the most of teachers at schools and universities in all level of education systems of Iran neither use equipments of Educational Technology nor use the principles of it. Why it is so. A few studies were done on obstacles that cause some teachers at schools and universities not to use Educational Technology in their classes. This research intends to arrive at a conclusion from the results of these studies through meta-analysis and it is entitled:

Meta-analysis of Studies on the Obstacles in Using Educational Technology in the Education Systems of Iran

In order to derive the objective and hypotheses of the present study, the first 2 steps of Howitt and Cramer's meta-analysis (1- Defining the variables of study. 2- Plan the database search) were considered.

3.2.1 Objectives of the Study

The main purpose of the study was to arrive at a conclusion from all the findings of the related studies on Obstacles in Using Educational Technology in Education Systems of Iran. After going through the related studies on this topic, certain variables influencing the use of Educational Technology in teaching were identified and the following specific objectives have been formulated for this study. The present study has been undertaken with the following objectives:

1. To analyze the relationship between Financial Limitations and the non-use of Educational Technology by Teachers of Schools and Universities.
2. To analyze the relationship between the Lack of Educational Technology Experts/Technologists and the non-use of Educational Technology by Teachers of Schools and Universities.
3. To analyze the relationship between the Lack of Necessary and
Appropriate Training Facilities and the non-use of Educational Technology by school Teachers of Schools and Universities.

4. To analyze the relationship between the Curriculum and Content of Books and the non-use of Educational Technology by Teachers of Schools and Universities.

5. To analyze the relationship between the Lack of Teachers' Knowledge about Learning Theories in connection with Educational Technology and the non-use of Educational Technology by Teachers of Schools and Universities.

3.2.2 Hypotheses Formulated

In the absence of theoretical or empirical evidence for the relationship between different variables and the Use of Educational Technology by Teachers of Schools and Universities following null hypotheses were formulated:

1. There is no significant relationship between Financial Limitations and the non-use of Educational Technology by Teachers of Schools and Universities.

2. There is no significant relationship between the Lack of Educational Technology Experts /Technologists and the non-use of Educational Technology by Teachers of Schools and Universities.

3. There is no significant relationship between the Lack of Necessary and Appropriate Training Facilities and the non-use of Educational Technology by Teachers of Schools and Universities.

4. There is no significant relationship between the Curriculum and Content of Books and the non-use of Educational Technology by Teachers of Schools and Universities.

5. There is no significant relationship between the Lack of Teachers' Knowledge about Learning Theories in connection with Educational Technology and the non-use of Educational Technology by Teachers of Schools and Universities.
3.3 VARIABLES OF THE STUDY

After going through all the 24 selected research studies in detail, the following characteristics which have been researched upon were selected as variables of the present study.

- **Dependent Variable:** Non-use of Educational Technology by Teachers of Schools and Universities

- **Independent Variables:** Financial Limitation, Educational Technology Experts/Technologists, Training Facilities, Curriculum and Content of Books, Learning Theories.

3.4 OPERATIONAL DEFINITION OF KEY TERMS

**Meta-analysis:** Meta-analysis is the statistical procedure for combining data from multiple studies. When the treatment effect (or effect size) is consistent from one study to another, a meta-analysis can be used to identify the common effect. When the effect varies from one study to another, meta-analysis may be used to identify the reason for the variation. Meta-analysis, also referred as quantitative synthesis, is a general set of procedures for combining the results of many individual research studies addressing a single question (Glass, 1976, 1978).

**Effect size:** The effect size is the unit of currency in meta-analysis. It is a value which reflects the magnitude of the treatment effect or (more generally) the strength of a relationship between two variables in a statistical population. An effect size calculated from data is a descriptive statistics that conveys the estimated magnitude of a relationship without making any statement about whether the apparent relationship in the data reflects a true relationship in the population. In that way, effect sizes complement inferential statistic such as P value. In this study, it is represented by the most convenient measure of effect size i.e. Pearson correlation coefficient (r) between the two variables.

**Combined Effect:** In the present study, the combined effect is defined as per random effect model. It indicated the overall estimate of effect size represented by the mean of effect size of all the studies considered for this study. Here, the combined effect represents (by effect size) all the population
characteristics of studies: Some factors that prevent Teachers of Schools and Universities from Using Educational Technology in their classes are considered as obstacles. These obstacles are termed as characteristics of studies which are nothing but the variables considered in the study:

- **Financial Limitations**: The limitations in terms of money that Teachers of Schools and Universities face in their careers at individual/ institutional level.

- **Educational Technology Expert / Technologist**: A specialist in using and maintaining technical gadgets like Computer, Video, LCD, OHP, Printer, Video camera, etc to facilitate teaching-learning process.

- **Training Facilities**: include training programs organized, materials used, resource persons to give training, opportunities for teachers of schools and universities to attend training, duration of the training, etc.

- **Curriculum**: Sum total of all the equipments provided to students inside and outside classroom. It is run-a-way to achieve the intended goals of any program etc.

- **Learning Theory**: A learning theory is an attempt to describe how people and animals learn; thereby it helps us understand the inherently complex process of learning. There are three main categories or philosophical frameworks under which learning theories fall: behaviorism, cognitivism, and constructivism. Behaviorism focuses only on the objectively observable behavior of learning. Cognitive theories look beyond behavior to explain brain-based learning. And constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts (WWW. Wikipedia.com).

- **Educational Technology**: Educational Technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing and etc (WWW. Wikipedia.com).

**Education System of Iran**: The details of the Education Systems of Iran are presented at two levels (a) School level, (b) University level/Teacher Training.
**a: School Level:** These are 4 stages - (i) Primary school, (ii) Secondary school, (iii) High school/Conservatory school, (iv) Pre-university school

*Primary school:* It is for children from 7-12 years old. It has 5 grades (1, 2, 3, 4, and 5) with general lessons.

*Secondary school:* It is for adolescents from 12-14 years old in 3 grades (1, 2, and 3). It has general lessons for all students.

*(a) High schools:* It is for teenage students from 14 – 16. It has 3 grades (1, 2, and 3) in 3 disciplines - Literature (humanities), Experimental discipline (science), Mathematics.

After 2010, the existing pre-university education was added to this stage itself as fourth grade.

*(b) Conservatory:* It is parallel for high school from 14-16 with the following subjects:

Art discipline, Accounting, Computer, Construction planning, Management & planning in family, Technical discipline, etc.

*Pre-university:* It is for teenage students 16-17. It is 1 grade in different disciplines. It was canceled as a separate level of education itself and added to high school level itself in 2010.

*b (i) University level:* It is for students of age group 16 and above. It canceled and added to high school in 2010 - **Associate Degree:** 2 years, **Bachelor Degree:** 4 years, **Master in Art or Science:** 2 years, **PhD:** 3-4 years, (these programs are offered in: Mathematics, Humanities, Biotechnology, Etc.).

*b (ii) Teacher Training* is for training the students who want to be teachers. It is 2 years program, after high school/ conservatory.

### 3.5 POPULATION

Systematic review of methodology is at the heart of meta-analysis. This stresses the need to take great care to find all the relevant studies (published and unpublished), and to assess the methodological quality of the design and execution of each study (Mulrow, 1994). The population of the present study is all theses, articles and project works available during 1993-2009 on Obstacles.
in Using Educational Technology in Education Systems in Iran. After reviewing all the studies from first and second hand sources, 55 studies which are suitable according to methodological issues like design of the study, devices used, selection of variables and statistical techniques used, and sampling method were selected and this formed the population of the study. The details of these studies are presented in table 3-1.

**Table 3.1: Details of theses, articles, project works constituting the population of the Study**

<table>
<thead>
<tr>
<th>Studies</th>
<th>Frequencies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theses</td>
<td>37</td>
<td>67.27</td>
</tr>
<tr>
<td>Articles</td>
<td>10</td>
<td>18.18</td>
</tr>
<tr>
<td>Project works</td>
<td>8</td>
<td>14.54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>55</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Among these studies, most of them (37) belonged to theses (67.27%) and the least (8) belonged to project works (14.54%).

### 3.6 SAMPLE OF THE STUDY

After reviewing 55 articles, studies, and theses, which constituted the population of the study, 24 research studies which are suitable according to methodological issues which insist upon the application of inferential statistics for analysis of data were selected. This constituted the sample of the study. It is interesting to note that most of the studies constituting the sample of the study belonged to theses group.
Table 3.2: The details of the sample of the study

<table>
<thead>
<tr>
<th>Type of studies</th>
<th>Frequencies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theses</td>
<td>21</td>
<td>87.50</td>
</tr>
<tr>
<td>Project work</td>
<td>1</td>
<td>4.16</td>
</tr>
<tr>
<td>Research Articles</td>
<td>2</td>
<td>8.33</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100</td>
</tr>
</tbody>
</table>

3.7 THE DEVICE USED FOR COLLECTION DATA

In order to get the information on the methodological details of the research studies related to "Obstacles in Using Educational Technology in Education Systems in Iran" a checklist with the required details was prepared by the investigator. Then discussed with the Experts and guide, the researcher edited the list to ensure the validity of the checklist prepared (Appendix I) for the purpose. The details included in the check list in the final form are as follows:

- The title of research article/theses/dissertation/project
- The name of the Researcher
- The year of research
- The place of research
- Research questions and hypotheses of the study
- The devices used for collection of data
- The population and sample of the study
- The sampling methods used
- The methodology of research
- The variables considered in the research
- The statistical methods used for analysis of data
- The statistical significance level of findings
3.8 DESIGN AND METHODOLOGY

- The present study is a quantitative review study (providing a report of primary research using statistical methodology) which is analytical in nature and involved the method of meta-analysis. As in primary research, a meta-analysis begins with a well-formulated question and design; meta-analysis is the statistical analysis of a large collection of analysis results of different studies for the purpose of integrating the findings (Glass, 1976) and draw conclusions.

- The basic purpose of meta-analysis is to provide the same methodological rigor to a literature review that we require for an experimental research. By far, the most common use of meta-analysis has been in quantitative literature reviews. These are review articles or studies where the authors select a research finding or an effect that has been investigated in primary research under a large number of different circumstances. They then use meta-analysis to help them describe the overall strength of the effect, and under what circumstances it is stronger and weaker.

- Methodology used in this research is based on the steps and process of Howitt and Cramer's meta-analysis (2000):

3.8.1 Define the Variables of the Study

In this stage, the research variables were chosen in relation to the subject of the research. In the present research, after preliminary review of studies in the field of Educational Technology and discussion with certain experts as well as experienced teachers in the field, based on the common observation of the investigator as a teacher, certain variables (5) were identified Financial Limitations, Educational Technology Experts and Technologists, Training Facilities, Curriculum and Content of Books, Learning Theories, which are assumed to be influencing teachers of Schools and Universities not to use Educational Technology in teaching-learning process were identified as independent variables and the non-use of Educational Technology was considered as dependent variable, which is major focus of the research.
3.8.2 Plan the database search

The researcher planned the database search and prepared preliminary list of studies related to the topic through the available resources. The researcher planned the search for more number of relevant studies involving the chosen variables. In order to collect data and suitable studies for this research, the researcher went to the following sources* and prepared the preliminary list of 55 studies reported during 1993-2009 related to the selected topic: *The Obstacles in Using Educational Technology in the Education Systems of Iran*

* Sources:
  
  o visited Research Centers like the Institute of Education Ministry of Education and National Libraries.
  
  o visited a number of universities including Tehran, Isfahan, Allameh Tabatabai, Tarbiat Modarres, Khorasgan Islamic Azad University, Najaf Abad Islamic Azad University, Teacher Training centers, etc.
  
  
  o referred the list of studies conducted in other province research centers.
  
  
  o used the site of Training Institute, databases, indexed list and CDs like database of university of Mysore, database of different countries.

3.8.3 Obtain research reports and select the studies for analysis

The researcher obtained copies of research reports of all the listed 55 studies, reviewed them in detail and selected 24 studies with inferential statistics for analyses of data (required condition for meta-analysis). The list of all the studies selected was prepared with name of the researcher, year of research and title of the research.
### Table 3.3: List of the Studies Selected for the Research

<table>
<thead>
<tr>
<th>Research code</th>
<th>Name of Researcher</th>
<th>The Title of Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parviz Mashaiekhi</td>
<td>The survey of factors prevent the use of Educational Technology in Elementary school in teaching-learning process in view of teachers in Mazandaran province</td>
</tr>
<tr>
<td>2</td>
<td>Mashaala Farahani Vasheghani</td>
<td>The survey of obstacles to use Educational Technology in teaching-learning process from the perspective of middle school teachers in Arak</td>
</tr>
<tr>
<td>3</td>
<td>Reza Pour Naghshband</td>
<td>The survey of the factors inhibiting the use of Teaching aids in primary school</td>
</tr>
<tr>
<td>4</td>
<td>Ashraf Mirheidari</td>
<td>Obstacles of using Educational Technology in the teaching-learning process from the perspective of teachers of new system of high school in Isfahan in the year 1996-97</td>
</tr>
<tr>
<td>5</td>
<td>Nasrin Mirdamadi</td>
<td>obstacles to utilization Educational Technology in the process of teaching-learning in views of primary school teachers in Isfahan in 1997-1998</td>
</tr>
<tr>
<td>6</td>
<td>Ghodrate HajiHosseinlo</td>
<td>The survey of obstacles in using Educational Technology in teaching-learning process from the perspective of Khoy city elementary teachers</td>
</tr>
<tr>
<td>7</td>
<td>Hassan Abdolahi Mehr</td>
<td>The survey of obstacles in using of Educational Technology in the process of teaching-learning Process in the perspective of teachers in Qom, 1 district</td>
</tr>
<tr>
<td>8</td>
<td>Reihaneh Baradaran</td>
<td>The survey and identify obstacles in using Educational Technology aids from the perspective of principals in the Girl-high schools in Tehran</td>
</tr>
<tr>
<td>9</td>
<td>Mossa Piri</td>
<td>Technological obstacles of Educational Technology in the process of teaching-learning from the perspective of high school teachers in West Azarbaijan province in 1998-99</td>
</tr>
<tr>
<td>10</td>
<td>Hossein Lashkari</td>
<td>The survey on the amount of use &amp; the obstacles in Using Educational Technology application and evaluation of existing facilities in view of elementary school teachers and</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Title</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>Toran Soleimani</td>
<td>The survey of obstacles in using of Educational Technology in teaching and learning process from the perspective of guidance school teachers in Ardebil city</td>
</tr>
<tr>
<td>12</td>
<td>Mansor Kazemzadeh</td>
<td>The survey of obstacles in using Educational Technology in view of teachers in high school in Tehran city</td>
</tr>
<tr>
<td>13</td>
<td>Fatemeh Soghra Dadpour</td>
<td>The survey of obstacles in the use of Educational Technology in teaching-learning process in the perspective of high school teachers in Ghaemshahr city</td>
</tr>
<tr>
<td>14</td>
<td>Hassan Pourjavadi</td>
<td>The survey of obstacles in using Educational Technology in the process of teaching-learning process in the perspective of guidance school teachers in Tabriz</td>
</tr>
<tr>
<td>15</td>
<td>Marzieh Taghvaei</td>
<td>The survey of obstacles for using Educational Technology in the process of virtual teaching in the perspective of high school teachers in Tehran</td>
</tr>
<tr>
<td>16</td>
<td>Masoud Samiee</td>
<td>The survey of obstacles in establishing the virtual teaching system in view of teachers</td>
</tr>
<tr>
<td>17</td>
<td>Yazden Moradi</td>
<td>The survey of obstacles of entrepreneurial attitudes of computer students in Tehran applications University</td>
</tr>
<tr>
<td>18</td>
<td>Neda Sheikh sadeghi</td>
<td>The amount of the use and obstacles in using Educational Technology and the survey of existing facilities in Exceptional schools in Isfahan</td>
</tr>
<tr>
<td>19</td>
<td>Mehdi Karimi</td>
<td>The survey of prospects in applying Information and Communication Technology in the process of teaching-learning at the Isfahan University and Sanati Isfahan University</td>
</tr>
<tr>
<td>20</td>
<td>Parviz Abdolmaleki</td>
<td>The survey of obstacles for using Educational Technology and teaching aids in view of elementary school teachers in 2007-2008</td>
</tr>
<tr>
<td>21</td>
<td>Ayat Anbaj Chamani</td>
<td>The survey of obstacles in the use of Educational Technology in teaching-learning Process from the perspective of high school teachers in Tehran city - 8 district</td>
</tr>
<tr>
<td>22</td>
<td>Mohammad Rahmanpour</td>
<td>The survey of challenging the development of Information Technology faces in higher education with emphasis on social -</td>
</tr>
</tbody>
</table>
3.8.4 Subject to Statistical Analysis

Then the selected 24 studies were subjected of statistical analysis, which again is based on the steps of Howitt and Cramer’ meta-analysis (2000). In order to get supported for the consolidated finding of meta-analysis and also to know the details about the variables regarding they influence the use of Educational Technology by teachers, an informal interview was.

3.9 STATISTICAL TECHNIQUES USED FOR ANALYSIS OF THE DATA

Analyses of the data involved 2 types of analysis:

1. Descriptive Analysis of the studies related to the study.
2. Statistical analysis in terms of effect size, combined effect size and its significance for testing hypotheses (actual meta-analyses).

The effect size can be calculated by different measures like variance, significant deviation and average, but the most convenient and feasible measure is *Pearson Correlation Coefficient* and hence the same was used in the present study. The formula use $d$ to calculate Pearson correlation coefficient from different test of significance is presented in table No.3.4.
### Table 3.4: Formulate used to calculate from different tests of significant

**Source (Howitt & et al., 2000, p.384)**

<table>
<thead>
<tr>
<th>Test of Significance</th>
<th>Formula for converting to Pearson correlation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-test</td>
<td>[ r = \frac{t^2}{\sqrt{t^2 + df}} ]</td>
<td>Can be used for ‘t’ test with both related or unrelated Means</td>
</tr>
<tr>
<td>Chi-square Test</td>
<td>[ r = \sqrt{\frac{\text{chi-square}}{n}} ]</td>
<td>this formula is used for 2*2 Chi-square Test only</td>
</tr>
<tr>
<td>Cohen’s d Test</td>
<td>Convert to r using its table*</td>
<td>useful if no source of data from a study is available other than another meta-analysis</td>
</tr>
<tr>
<td>Nonparametric Test</td>
<td>[ r = \frac{z}{\sqrt{N}} ]</td>
<td>alternatively convert to parametric test and substitute this value in formula</td>
</tr>
<tr>
<td>Pearson correlation coefficient and variants</td>
<td>No conversion necessary</td>
<td>r value itself is the value of the effect size</td>
</tr>
<tr>
<td>Most common test of significance and when only significance level and sample size are given</td>
<td>[ r = \frac{z}{\sqrt{N}} ]</td>
<td>convert the significance level to z then divide by the square root of the sample size involved</td>
</tr>
</tbody>
</table>

*It must be found from another table.

The combined effect can be estimated based on two models - Fixed effect size model and Random effect size model. In this study, it is estimated using Random effect model because this model assumes that the studies were drawn from population that differ from each other in ways that could impact on the treatment effect. As such, the effect sizes vary from study to study and all these effects are to be included to represent combined effect. Thus, the mean of effect size of all the studies considered for the research (irrespective of size of the sample) was calculated as the combined effect.

The details of the analyses and the results are presented in chapter IV.