Copyright by
Abulkafı Alıırıni
2004
ABSTRACT

The global adoption of information and communication technology (ICT) has been the landmark of the educational scene for the last two decades. A main feature of most technology initiatives worldwide is their focus on the technology itself and their inattentiveness to the human factor involved in the implementation process.

The overall purpose of this study was to investigate the attitudes of EFL teachers in Syrian high schools toward ICT in education and to explore the relationship of teachers’ attitudes with a selected set of variables. These variables included computer attributes, cultural perceptions, computer competence, computer access, and demographic variables (including computer training background). Teachers’ attitudes were examined from two related theoretical frameworks: Rogers’s (1995) Diffusion of Innovations and Ajzen and Fishbein’s (1980) Model of Reasoned Action.

Both quantitative and qualitative methods were employed to collect data on the population of EFL teachers in the city of Hims during the 2003-2004 school year (N=887). A questionnaire was developed and distributed to 326 sample teachers selected randomly from the population. The survey stage was followed by in-depth phone interviews with a purposeful sample of 15 teachers.
Results from both quantitative and qualitative data indicated that the participants had positive attitudes toward ICT in education. While the participants had somewhat positive perceptions of the attributes of computers, they were relatively neutral about the cultural relevance of ICT to Syrian society and schools. The teachers also reported low levels of computer competence, access, and training. Significant positive correlations existed between teachers’ attitudes toward ICT and five independent variables, including computer attributes, cultural perceptions, computer competence, computer access, and computer training. Multiple regression analysis indicated that only the first three of the above independent variables had a significant predictive value of computer attitudes toward ICT. The results indicated that 0.58% of the variance in computer attitude was explained by the independent variables included in this study.

Based on the findings, it was recommended that policy-makers sustain teachers’ positive attitudes toward ICT, offer them more training opportunities, and take steps to alleviate the concerns of some teachers about the culturally improper material on the web.
Dedicated to

The Creator and Sustainer of the Universes
ACKNOWLEDGEMENT

In the Name of Allah, the Most Gracious, the Most Merciful

All grand thanks and praise to Allah for his help, blessings and guidance. With Allah’s grace and help, I was able to finish this work.

This journey has been much more than just completing a program of study. My highest achievement has been the opportunity to interact with people from different cultural backgrounds. I would like to express my profound gratitude for those who have helped me throughout this journey and especially at the dissertation stage. Many thanks for my advisor Dr. Voithofer for his unfailing assistance, patience and dedication. I appreciate your support and advice throughout my graduate work. I am grateful to my co-advisor Dr. Damarin for her time, feedback, and support. Your input has been of much value. Special thanks to Dr. Alosh, who aided in making my experience at OSU rewarding. Your encouragement and help will never be forgotten.

My deep appreciation goes to my family for their thoughts and payers: my mother for her endless love and devotion; my brothers Abdulazeem, Abdulhaleem, Abdulhay, Ahmad, Muhammad and Abdulmawla for their encouragement and support; my sisters for their sincere wishes and care; and the spirit of my father for his inspiration.
I would like to express my indebtedness for the participants who gave me their time to complete the surveys. I especially owe the interview teachers my sincerest gratitude for the willingness to share their views. I am grateful for Mr. Nibhan Addakar, the Director of English in the Department of Education in Hims, for his kind contribution to the completion of this work.

Last but not least, I would like to offer my sincere appreciation for all friends and professors who offered their suggestions, advice, and support. Special thanks for Dr. Rahman for his instructive feedback. I wish you all the best in your lives.
VITA

August 10, 1970…………… Born— Kafraya, Hims, Syria

1990………………………. Teachers’ Certificate in English Education
Teacher Training Institute, Hims, Syria

1999……………………… B.A. in English Literature
Al-Baath University, Hims, Syria

1999-2000……………….. Teaching Associate
Language Institute, Al-Baath University Hims, Syria

2000-2001……………….. English Teacher & Coordinator of Planning and Curricula
Riyadh Najed Schools, Riyadh, Saudi Arabia

2002………………………. M.A. in Technologies of Instruction and Media
The Ohio State University, Columbus, Ohio, USA

2001-presnet……………… Graduate Teaching & Research Associate
Arabic & Educational Policy and Leadership
The Ohio State University, Columbus, Ohio, USA

FIELDS OF STUDY

Major Field: Education

Minor Field: Technologies of Instruction and Media

Minor Field: English as a Second Language

Minor Field: Research Methods
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td>iv</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>v</td>
</tr>
<tr>
<td>Vita</td>
<td>vii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>xi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>xiii</td>
</tr>
<tr>
<td><strong>Chapters</strong></td>
<td></td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Background of the Study</td>
<td>1</td>
</tr>
<tr>
<td>Problem Statement</td>
<td>5</td>
</tr>
<tr>
<td>Research Questions</td>
<td>7</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>8</td>
</tr>
<tr>
<td>Delimitations</td>
<td>10</td>
</tr>
<tr>
<td>Basic Assumptions</td>
<td>11</td>
</tr>
<tr>
<td>Definitions of Terms</td>
<td>11</td>
</tr>
<tr>
<td>2. Review of the Literature</td>
<td>14</td>
</tr>
<tr>
<td>The Rise of ICT in Education</td>
<td>14</td>
</tr>
<tr>
<td>ICT, Education, and Development</td>
<td>18</td>
</tr>
<tr>
<td>Educational Computing in Developing Countries</td>
<td>23</td>
</tr>
<tr>
<td>Diffusion of Innovations</td>
<td>28</td>
</tr>
<tr>
<td>Teachers’ Attitudes toward ICT</td>
<td>33</td>
</tr>
<tr>
<td>Factors Related to Teachers’ Attitudes toward ICT</td>
<td>37</td>
</tr>
<tr>
<td>Computer Attributes</td>
<td>37</td>
</tr>
</tbody>
</table>
Cultural Perceptions………………………………………………………… 40
Computer Competence……………………………………………………… 44
Computer Access…………………………………………………………… 47
Teachers’ Characteristics…………………………………………………… 48
  Gender………………………………………………………………. 49
  Age………………………………………………………………….. 49
  Income………………………………………………………………. 50
  Teaching Experience………………………………………………... 51
  Education……………………………………………………………. 52
  School Location…………………………………………………….. 52
  Computer Training………………………………………………….. 53
  Teaching Method…………………………………………………… 54

3. Research Methodology…………………………………………………….. 56

  Research Variables……………………………………………………………… 56
  Research Design………………………………………………………………… 57
  Population………………………………………………………………………. 58
  Sample Size and Sampling Procedure………………………………………….. 59
  Instrumentation…………………………………………………………………. 60
    Questionnaire Instrument…………………………………………………… 60
      Attitudes toward ICT Scale………………………………………………. 61
      Computer Attributes Scale……………………………………………….. 62
      Cultural Perceptions Scale…………………………………………………. 63
      Computer Competence Scale……………………………………………. 63
      Computer Access Scale…………………………………………………. 64
    Teachers’ Characteristics…………………………………………………… 64
    Validity……………………………………………………………… 66
    Reliability…………………………………………………………… 67
    Interview Instrument……………………………………………………... 69
  Data Collection…………………………………………………………………… 70
  Data Analysis Procedures………………………………………………………… 72

4. Data Analysis and Findings…………………………………………………….. 75

  Descriptive Summary of Teachers’ Characteristics…………………………….. 76
  Research Question One: Teachers’ Attitudes toward ICT in Education........ 78
  Research Question Two: Teachers’ Perceptions in Terms of Factors Related to
    Attitudes toward ICT……………………………………………………........... 81
    Computer Attributes…………………………………………………………. 81
    Cultural Perceptions………………………………………………………… 85
    Computer Competence…………………………………………………… 87
    Computer Access………………………………………………………….. 89
  Research Question Three: Relationship between Teachers’ Attitudes and
    Independent Variables………………………………………………………… 90
Research Question four: Proportion of Variance in Teachers’ Attitudes
Explained by the Independent Variables
Findings from Qualitative Data
Teachers’ Attitudes toward ICT in Education
Computer Attributes
Cultural Perceptions
Computer Competence
Computer Access
Computer Training

5. Discussion, Conclusions, and Recommendations

Attitudes of Syrian EFL Teachers toward ICT
Computer Attributes and Teachers’ Attitudes
Cultural Perceptions and Teachers’ Attitudes
Computer Competence and Teachers’ Attitudes
Computer Access and Teachers’ Attitudes
Computer Training and Teachers’ Attitudes
Teachers’ Attitudes in Relation to Demographic Characteristics
Conclusions
Recommendations
Methodology
Policy and Practice
Further Research

List of References
Appendices

Appendix A: Panel of Experts
Appendix B: Letter to the Syrian Ministry of Education
Appendix C: Approval of the Study by the Syrian Ministry of Education
Appendix D: Letter of Support by the Director of English in Hims
Appendix E: Cover Letter (Arabic Version)
Appendix F: Cover Letter (English Version)
Appendix G: Consent Form (Arabic version)
Appendix H: Consent Form (English version)
Appendix I: Questionnaire Instrument (Arabic Version)
Appendix J: Questionnaire Instrument (English Version)
Appendix K: Interview Instrument (Arabic Version)
Appendix L: Interview Instrument (English Version)
Appendix M: Interview Transcription Key

v
### LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Summary of Reliability Analysis</td>
</tr>
<tr>
<td>3.2</td>
<td>Response Rate and Percentages</td>
</tr>
<tr>
<td>3.3</td>
<td>Statistical Analysis Procedures Used to Answer Research Questions</td>
</tr>
<tr>
<td>4.1</td>
<td>Summary of Teachers’ Characteristics</td>
</tr>
<tr>
<td>4.2</td>
<td>Frequency Percentages on the Attitude Toward ICT Scale</td>
</tr>
<tr>
<td>4.3</td>
<td>Distribution of Mean Scores on the Attitude toward ICT Scale</td>
</tr>
<tr>
<td>4.4</td>
<td>Frequency Percentages on the Computer Attributes Scale</td>
</tr>
<tr>
<td>4.5</td>
<td>Distribution of Mean Scores on the Computer Attributes Scale</td>
</tr>
<tr>
<td>4.6</td>
<td>Frequency Percentages on the Cultural Perceptions Scale</td>
</tr>
<tr>
<td>4.7</td>
<td>Distribution of Mean Scores on the Cultural Perceptions Scale</td>
</tr>
<tr>
<td>4.8</td>
<td>Frequency Percentages on the Computer Competence Scale</td>
</tr>
<tr>
<td>4.9</td>
<td>Distribution of Mean Scores on the Computer Competence Scale</td>
</tr>
<tr>
<td>4.10</td>
<td>Distribution of Mean Scores on the Computer Access Scale</td>
</tr>
<tr>
<td>4.11</td>
<td>Summary of the Correlation Matrix of Independent Variables and Attitudes</td>
</tr>
<tr>
<td>4.12</td>
<td>Correlation of Individual Computer Attributes and Attitudes</td>
</tr>
<tr>
<td>4.13</td>
<td>Analysis of Variance</td>
</tr>
</tbody>
</table>
4.14 Multiple Regression on dependent variable (Computer Attitude)………... 94
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Stages of Innovation-Decision Process, Based on Rogers (1995)</td>
<td>32</td>
</tr>
<tr>
<td>4.1</td>
<td>Representation of Shared Variance among Competence, Access, and Training When Regressed on Attitude</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Background of the Study:

The last two decades have witnessed a worldwide proliferation of information and communication technologies (ICT, henceforth) into the field of education. The global adoption of ICT into education has been largely driven by economic demands for “national development” (Modum, 1998). ICT in education serves as a knowledge tool and a skill base for students’ employment preparation as well as for national economic development (Brandenburg & Dudt, 1998, p. 44). Harvey (1983) predicts that the effectiveness of the use of the computer in education may be an important factor in determining which countries will succeed in the future. Central to this vision is the powerful metaphor of the “information age”, where media, business and industry become increasingly computer-reliant.

The metaphor of the information age has generated a whole set of speculations about the necessity of educational reforms that will accommodate the new tools (Pelgrum, 2001). Governments in most developing countries have responded to the challenge by initiating national programs to introduce computers into education. Doing
so, these governments have added to their burden of debt “even though the costs are large and the payoffs modest” (Benzie, 1995, p.38). Benzie indicates that national programs have been of limited success not only because they were formulated in non-educational realms, but also because they were not based on research. In Rogers’ terms (1995), the “initiation stage”, which demands information gathering and planning, seems to be missing in this headlong process of technology implementation. Young (1991) remarked that in many cases computers were introduced into schools “not as a means, but as an end” (p. 144). Computers were provided with no supplementary measures to enable educators to develop positive attitudes toward the new tools and to use them. This has often resulted in ad hoc approaches to implementation. In this approach, technology availability is mistaken for technology adoption and use. However, As Baylor and Ritchie (2002) state, “regardless of the amount of technology and its sophistication, technology will not be used unless faculty members have the skills, knowledge and attitudes necessary to infuse it into the curriculum” (p. 398). That is, teachers should become effective agents to be able to make use of technology in the classroom.

As a recent educational innovation, the computerization of education is a complex process where many agents play a role. Forces at the micro-level of the educational system (teachers and students) may be influential in facilitating or impeding changes that are outside the control of the ministries of education (Pelgrum, 2001). Watson (1998) warns against the severance of the innovation from the classroom teacher and the idea that “the teacher is an empty vessel into which this externally defined innovation must be poured” (p. 191). Past history has shown many promising technological innovations fail to attain their promises due to the negligence of the end-users’ attitudes and needs
Unfortunately, however, the zealous entry of technology into the schools and the subsequent change demands has little considered teachers’ attitudes toward the innovation (Harper, 1987). The result has often been palpable in teachers’ passivity toward the new machines (Bush & Terry, 1997). This dilemma underlined the need for more research on teachers’ attitudes toward the new technologies (Bostrom and Olfman, 1990, cited in Morris, 2002).

Recent studies have shown that successful implementation of educational technologies depends largely on educators, who eventually determine how they are used in the classroom (Kagima, 1998a). The development of teachers' positive attitudes toward ICT is a key factor for enhancing computer integration and avoiding teachers’ resistance to computer use (Watson, 1998). Woodrow (1987) asserts that any successful transformation in educational practice requires the development of positive user attitude toward the new technology. Teachers’ attitudes toward computers have been found to bear a direct effect on their classroom use of computers (Abas, 1995; Isleem, 2003; Almusalam, 2001; Blankenship, 1998). In fact, some researchers have concluded that teachers’ attitudes toward technology may determine their implementation of any computer skills they acquire (Woodrow, 1992). Ultimately, as Pelgrum (2001) suggests, teachers are the most important agents of change on the educational work floor. Hence, any attempt to implement computers in education would need to address teachers' attitudes toward computers as a perquisite for its success.

Studying teachers’ attitudes is particularly important in developing countries where computer technology is not usually part of the school culture. Due to its novel presence in society at large and in schools in particular, technology may not be well
received by developing-country teachers. Marshal (cited in Benzie, 1995) indicates that many national programs have failed partly because they did not consider the prevailing school culture. Watson (1998) warns that the mismatch between the culture of technocentric mindedness and the teachers’ pedagogic culture results in the alienation of the teachers from the use of technology. Hence, developing countries have the responsibility not merely to provide computers for schools, but also to foster a culture of acceptance amongst the end-users of these tools. Unless teachers develop positive attitudes toward the new machines, they may simply ignore them. The delicacy of this situation calls for an investigation of teachers’ attitudes.

One developing country that is currently pursuing the technological track in education is the Syrian Arab Republic. Recognizing the challenge of the “information age”, The Syrian Ministry of Education has recently adopted a national plan to introduce computers and informatics into pre-college education. To this end, the Ministry inaugurated computer-equipped labs within secondary schools for general, vocational and technical education. It also connected many schools to the Internet. In addition, the Ministry created a new specialization in computer technologies in an effort to increase the number of computer experts in society. According to the National Report (2000), the introduction of technology into the educational system aims “to keep pace with the progress and to reach efficient levels of education.”

Unfortunately, the implementation of technology into the Syrian schools has not been guided by research. This has often been the case in most countries across the world. To date, no “published” study has been conducted to assess the current status of technology in the Syrian educational context. What is missing in particular are studies
about of teachers’ reaction to the new tools. Such inattention to the end-users’ attitudes
may engender unforeseen repercussions for ICT diffusion in Syrian schools. In his theory
to the innovation-decision process. Because of their critical role in the innovation-
implementation process, educators’ attitudes toward ICT should be the focus of studies at
the early stages of technology implementation (Woodrow, 1987). The current study was
based on this pressing need.

**Problem Statement:**

The global adoption of ICT into education has often been premised on the
potential of the new technological tools to revolutionize an outmoded educational system,
better prepare students for the information age, and/or accelerate national development
efforts. The problem with the current technology-implementation plans is not only their
focus on the potential of the technology per se, but also their failure to base their
implementation efforts on research and enough information gathering. A key element
seems to be left out in both the technology plans and their subsequent implementation
processes: the attitudes of the end-users and the real agents of change within the
classroom arena, namely, the teachers. It is widely accepted that unless teachers develop
positive attitudes toward ICT, they will not use them in their teaching practice (Watson,

While the study of teachers’ attitudes is in itself important, a more significant
challenge is to identify the factors that may have produced these attitudes. Research has
shown that attitudes are themselves a product of different factors. Rogers (1995) points to
the attributes of the technology itself as a primary influence. He suggests that some innovations may be considered harmful, inefficient, uneconomical, or complicated so that adopters may refrain from them. Similarly, Ostlund (1974, cited in Watson, 1998) highlighted the need for considering the effect of innovations’ characteristics on educators. He contended that computers had been introduced by outside agencies and may not be appropriate in the discipline of education. Also, Rogers (1995) and Thomas (1987) emphasized the effect of the cultural conditions of a given country on the adoption of technology among its people. Potential adopters may resist a technological tool because it may not fit within their micro- or macro-cultures. Other researchers have identified additional factors, such as computer competence (Francis-Pelton & Pelton, 1996; Harrison & Rainer, 1992), computer access (Marshall & Ruohonen, 1998; Na, 1993), and computer training (Gressard & Loyd, 1985; Knezek, Christensen & Rice, 1997).

Despite the relative increase in the number of studies dealing with teachers’ attitudes and factors related to them, the relationship between these variables and teachers’ attitudes has not always been clear and systematic. Even when some relationship was documented, the results were mostly context-specific due to population, sampling, and/or design limitations (e.g., Sooknanan, 2002; Al-Oteawi, 2002; Na, 1993). Hence, the findings may not necessarily be transferable to the Syrian context. Apart from the contextual variations, findings may not apply because of potential differences among participants. That is, Syrian teachers may have differing experiences with ICT due to the recent presence of ICT in their schools and their distinct cultural background. This calls for a study that focuses specifically on Syrian teachers.
The purpose of this study was therefore to explore the Syrian teachers’ attitudes toward ICT in education and then to examine the relationship between teachers’ attitudes and factors that are thought to be influencing them, including computer attributes, cultural perceptions, computer competence, computer access, and teachers’ personal characteristics. Both quantitative (survey) and qualitative (interview) procedures were used. The study focused mainly on EFL (English as a Foreign Language) teachers because they were first to experiment with computers in the Syrian context. This is partly because of their familiarity with English as “the main computer language” and also because much of the available software is for English language practice. Moreover, “The field of foreign language education has always been in the forefront of the use of technology to facilitate the language-acquisition process” (Lafford and Lafford, 1997, p.215).

Research Questions:

Trochim (2001) suggests that exploratory descriptive studies generally do not lend themselves to research hypotheses. The study is conducted to investigate the following questions:

1. What are the attitudes of high school EFL teachers in Syria toward ICT in education?

2. What are the teachers’ perceptions of:

   a. Computer attributes?

   b. Cultural relevance of computers to Syrian society and schools?

   c. Their level of computer competence?
d. Their level of access to computers?

3. What is the relationship between teachers’ attitudes toward ICT in education and their perceptions of each of the above variables (as well as teachers’ characteristics)?

4. What is the proportion of the variance in the attitudes of teachers toward ICT in education that can be explained by the selected independent variables and the relative significance of each independent variable in explaining the dependent variable?

Significance of the Study:

In the process of technology implementation in schools, the importance of teachers’ attitudes toward new innovations has been universally recognized (Gressard & Loyd, 1985; Watson, 1998; Woodrow, 1992). Undeniably, it is teachers who determine when, where and how to use these tools in the classroom environment. The energy and investment put forth in implementing ICT can be unproductive unless teachers develop positive attitudes toward the new technologies. Demetruadis et al. (2003) assert that “teachers’ attitudes regarding ICT use in schools not only pose difficulties in the use of technology per se but also cancel the learning benefits expected to spring from the instructional reform” (p. 20). As Fullan and Stiegelbauer (1991) note, an innovation is a multidimensional process that involves changes in beliefs and attitudes as well as practices. For change to occur, identifying teachers’ attitudes would be the first natural step. This explains the recurrent calls for conducting more studies on teachers’ attitudes (e.g., Bostrom & Olfman, 1990, cited in Morris, 2002; Benzie, 1995).
Benzie (1995) suggests that empirical research of “the pedagogical, psychological and cognitive barriers to the successful use of information technology is a vital precondition for improving the utilization of computers and other technological aids in the educational process” (p. 39). The detection of these barriers may be considerably constructive at initial/experimental stages, so as to avoid their ramifications on the use of the new tools. This is particularly true of developing countries, where technology has only lately entered the educational milieu. This need cannot be overemphasized within the Syrian context, since, to date, no published study has examined the status of technology implementation in Syrian schools and among Syrian teachers. The findings of the study will help those involved in the technology implementation process identify barriers as perceived by teachers. It is hoped that decision-makers can gain insight into the future direction of the implementation in the light of the teachers’ reactions to the current integration of computers.

Several attitude theorists have emphasized the strong connection between attitudes and behavior. For example, Fishbein and Ajzen (1980) propose that attitudes impact behavior indirectly by guiding the formation of behavioral intentions, which themselves prompt behavior. According to Fishbein and Ajzen’s Model of Reasoned Action, attitudes are main predictors of behavior. Some theorists have gone a step further by emphasizing the possibility of changing individuals’ behavior once their attitudes are pinpointed (Zimbardo, Ebbesen & Maslach, 1977). Such assertions explain to a large extent the wide interest in the study of attitudes toward technology. It is expected that once teachers’ attitudes have been identified, steps can be taken to change these attitudes if necessary. Change can be more effective if one can identify the factors that produced
these attitudes. These assumptions hold true for this study. The findings of the study may help decision-makers to know why teachers are responding to technology in a certain manner. Based on this knowledge, decision-makers can take the necessary steps either to change negative attitudes or to foster positive attitudes. For instance, decision-makers can take advantage of the study findings to design training programs that take into account teachers’ attitudes toward ICT.

Lastly, the study can contribute to the existing body of research on the integration of technology in developing countries. Obviously, developing countries have much in common in terms of the novelty of their technology initiatives as well as the obstacles they are facing to integrate ICT in their educational systems. The findings of the study may serve as a guide for future researchers who may examine teachers’ attitudes in similar educational contexts.

**Delimitations:**

The scope of this study is limited to the population of the 887 Syrian EFL teachers involved in this study. Teachers’ attitudes toward ICT in other sections of the Syrian educational systems, such as elementary schools and colleges, are not considered. Similarly, teachers from disciplines other than EFL are not included in this study. The results of the study may apply to the majority of Syrian EFL teachers working in public education because of the great similarities amongst these teachers. For example, EFL teachers share almost the same resources, curricula, tests, and standards that are provided by the Ministry of Education. Also, qualifying procedures are the same for all Syrian EFL teachers. However, the findings may not be generalizable to teachers in other countries.
where different school environments and different levels of technology implementation exist.

**Basic Assumptions:**

It is assumed that the participants are capable of describing their attitudes and perceptions as required in the study instruments. It is further assumed that the participants will be candid in their responses to the survey items and the interview questions. The researcher also presumes that the responses of participants involved in this random sample are representative of those of Syrian EFL teachers constituting the population of the current study.

**Definitions of Terms:**

- *Information and Communication technology (ICT):* refers to “technologies and tools that people use to share, distribute, gather information, and to communicate with one another…through the use of computers and interconnected computer networks” (APC, 2000).

- *Computer Attitudes:* An attitude is "the predisposition of an individual to evaluate some symbol or object or aspect of his world in a favourable or unfavourable manner" (Halloran, 1970, p. 20). In this study, *computer attitude* is operationally defined as the degree of favor or disfavor with which high school EFL teachers in Syria evaluate the presence and use of ICT in Syrian education.

- *Computer attributes:* Rogers (1995) identifies five attributes of an innovation that determine its rate of adoption: (1) relative advantage, (2) compatibility, (3)
complexity, (4) observability, and (5) trialibility. The five attributes refer respectively to (1) the degree to which an innovation is perceived as better than the idea it supersedes, (2) the extent to which an innovation is perceived as consistent with the existing values, past experience, and needs of potential adopters, (3) the degree to which an innovation is perceived as relatively difficult to understand and use, (4) the extent to which the results of an innovation are visible to others, and (5) the degree to which an innovation is experimented with on a limited basis (pp. 250-251). In this study, computer attributes is operationally defined as the level of relative advantage, compatibility, complexity, and observability of the computers as perceived by high school EFL teachers in Syria.

- *Cultural Perceptions*: “Cultural perceptions” is based on Rogers’s (1995) very general idea of “social system norms” and Thomas’ (1987) notion of the “cultural suitability” of computers. In this study, “cultural perceptions” is operationally delineated to mean the Syrian teachers’ perceptions of the value, relevance, and impact of ICT as it relates to the cultural norms in Syrian society and schools.

- *Computer competence*: refers to EFL teachers’ beliefs about their computer knowledge and computer skills as measured by the instrument developed for this study.

- *Computer knowledge*: is the level of understanding of the main computer hardware components and software applications identified as essential for educational computer use.

- *Computer skill*: is the ability to use the main computer hardware components and software applications identified as essential for educational computer use.
• *Computer access*: is the perceived availability of computers that Syrian EFL teachers can use at home, school, and other places.

• *Teacher characteristics*: is the demographic information about high school EFL teachers in Syria, including their computer training background.

• *Computer Training*: refers to any type of activity, including college computer courses, public or private computer in-service training, training seminars or workshops, peer staff development, etc. that helps teachers to learn about computers and computer usage.
CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this review is to provide an insight into the context and theoretical framework of this study. The review of related literature focuses on six major topics: (1) the rise of ICT in education, (2) the relationship between ICT, education and development (3) ICT in developing countries, (4) diffusion of innovations, (5) teachers’ attitudes toward ICT in education, and (6) variables related to computer attitudes. The first three sections provide the historical context for this study: the initial entry of ICT into American education and the rationale behind its spread to developing countries. The fourth and fifth sections provide the theoretical framework for the study. The last section sheds some light on variables whose relationships with teachers’ attitudes derive much empirical support from the literature.

The Rise of ICT in Education:

*I see IT [information technology] as another means of production and as such it has to be viewed in the context of the political, ideological and cultural assumptions of the society that has given rise to it* (Cooley, 1992).
Espoused by America’s military and promoted by its corporations, educational technology has been part of the American public interest in science and technology (Sofia, 1998). Historically, this interest has political and economic roots (Bromley, 1998). The event that helped ignite this interest occurred in 1957, when the Soviets launched Sputnik (Reiser, 1987). Shortly after this event, American education came under fire for its outdated mode of operation and for its inefficiency (Reyes, 1979). Because of the close relationship between education and other aspects of “progress”, American education was held responsible for its failure to produce “the scientific” type of students that its Soviet counterpart did. Henceforth, American teachers and schools became trapped in a “political quagmire” (Perelman, 1993, p.6). The initial experimentation with computer technologies in the late 1950s were conceived as an outlet of the post-Sputnik political crisis, an attempt to foster America’s competitive edge economically, and a new and promising vein of “progress” (Besser, 1993). Computers started finding their way into schools in the 1960s (Dettori, Greco & Lemut, 1998). The early project-based inroads of computer technology into education were part of the quest to resolve the “dilemma” of American education. However, the role of computers in education remained incremental and marginal because of the high cost of the then-prevalent mainframe computers and their limited accessibility to schools (Alessi & Trollip, 2001).

Computers did not occupy a relatively secure place in education until the late 1970s and early 1980s (Thomas, 1987). This period marks the mass production of microcomputers and their subsequent infiltration into American schools (Alessi & Trollip, 2001). These developments concurred with calls for educational reform (Besser, 1993). The common wisdom of the time was that education needed to resolve a
previously unknown deficiency called “computer literacy” (Besser, 1993). More importantly, computers were perceived to have the potential to revolutionize teaching and learning just as they revolutionized many other aspects of modern life (Maddux, Johnson, & Willis, 1997). The 1980’s in particular witnessed a frenzied competition between the major computer companies (such as Apple, IBM, Radio Shack, and Hewlett Packard) to disseminate computers into American schools. Noble (1984, cited in Besser, 1993) maintains that “one observer notes that securing shares of the education marketplace may be critical in determining which computer manufacturers will still be in business several years from now” (p. 37).

Unfortunately, the large-scale technology initiatives of the 1980s made little reference to the classroom teachers (Harper, 1987). Being at the lower-end of the decision-making chain, teachers were hardly involved in the process that touched the very foundations of their profession, and their opinions were never solicited (Harper, 1987; Marshall, 1993). The consequence was soon palpable in their apathy to the new tools (Harper, 1987; Bush & Terry, 1997). In her seminal study between 1978 and 1979, Olsen (1980) found that 527 out of 602 foreign language departments were not using computers in instruction nor were they even considering them for future use. A major related finding of the study was the predominantly negative attitudes of teachers toward these new tools. Notably, the study was carried out in a period when computers were virtually flooding schools (Besser, 1993). In a similar study, Perelman (1991, cited in Perelman, 1993) describes teachers’ reluctance to participate in “a multimillion-dollar program aimed at expanding computer-based instruction” (p.6). As Perelman reports, the typical teacher response was “Why should I do anything different next year from what I
did last year? Who cares?” (p.6). Such indifferent attitudes drove several educational theorists in the United States to ask “Should not educators, then, be actively involved so as to ensure that computers are used effectively?” (Harper, 1987, p. 44).

With the advent of the Internet and the World Wide Web around the mid 1990s, a new optimism in technology arose in educational circles. Such optimism was based on the great capacities of the networked computer and its related technologies to provide a wide array of learning opportunities ranging from access to huge amounts of information, to communication with others throughout the world, and to multinational collaborative research projects. The new capabilities added to computer technologies qualified them to play an important role in education. Technology advocates initiated a new discourse, contending that “we must prepare learners for their future, not for our past” (Thornburg, 1999). Therefore, the effective digital-age school should equip students with new and necessary skills to ensure their success beyond the school environment (North Central Regional Educational Laboratory, 2003). The metaphor of the digital/information age was enough reason for schools to adopt technology as both a framework and agent of change.

Without discounting the great learning potential opened up with the Internet, the call for its use in education was “pushed heavily by corporations, universities, and the computer industry” (Kearsley, 2002, p. 41). More pressure was placed on teachers and faculty to adopt the new tools (de Castell, Bryson & Jenson, 2002). Again teachers’ attitudes were relegated to a minor role. Even worse, in scenarios where technology was not well received or used, teachers were often to blame (Watson, 1998). Watson (1998) reports Willis (1992) asking “why do some teachers, when faced with an opportunity to
begin using technology in the classroom, treat it more like a disease to be avoided than a promising aid to effective instruction” (p. 190). As Watson notes, teachers have always been associated with the failure of technology implementation. Little attention has been given to the nature of the innovation itself and the other problems that teachers encounter. Evidently, there seems to be a difference in motives between those who fund technology and establish rules and regulations for its use, and those who actually work in the schools and classroom (Rockman, 2000).

By the year 2000, there was an estimated 10 million computers in American schools with annual school expenditures for technology of about 6 billion dollars (Fouts, 2000). There was one instructional computer for every 5.7 students and more than half of America’s classrooms were connected to the Internet (Fouts, 2000). By the time computer technology have permeated American education, technology manufacturers began looking for new markets in the international arena (see Holloway & Ohler, 1995; Thomas, 1987). For instance, in 1995 the integrated-circuit manufacturer Intel alone expected to ship 100 million every year starting in 2000 (Negroponte, 1995). Unsurprisingly, developing countries were a main target.

**ICT, Education, and Development:**

Computer manufacturers’ search for international markets concurred with the quest of many countries for “national development”—an aim already reverberating throughout the world since World War II. The intimate relationship between development, education, and technology explains to a large extent the global espousal of
technology as a means of educational change. Hence, it is important to shed some light on this symbiotic relationship among these three concepts.

One of the earliest theories of development in modern times to note the relevance of education to development is the modernization theory (Fagerlind and Saha, 1989). The modernization theory emerged in the 1950s after the economics-oriented European model of development has proven unproductive within the context of many developing countries. The failure of European model of development was attributed to its inattentiveness not only to the different socioeconomic structures found in developing countries, but also to the cultural and human-resource variations between the exporters and the importers (Fagerlind and Saha, 1989). Disparities in literacy levels, trained workforce, and the receptivity of secularization resembled some of these variations. Given that development is not restricted to economic factors, development plans had to accommodate simultaneous sociological and psychological dimensions (Sooknanan, 2002). Education was viewed as a means for attaining this goal.

Modernization theorists hypothesized that the diffusion of “modern” values and attitudes would lead to modernity, which in turn would lead to development (Inkeles & Smith, 1974). Alex Inkeles formulated a set of attitude questions known as “modernity scale” to determine the extent to which members of a given society hold modern values. Several studies using Inkeles’ modernization index found that modern values were related to education (Fagerlind & Saha, 1989). Following Inkeles, Lerner (1964, cited in Fagerlind & Saha, 1989) argued that modernity is a form of psychic empathy, which is “the infusion of rationalist and positivist spirit” (p.102). In a survey of Syrian respondents, Lerner found that psychic empathy was related to a number of factors,
including age, sex, socio-economic status, and education. With regard to education, 39% of the respondents who had at least a secondary education scored high on the empathy scale, compared to 5% of those who were illiterate. Conversely, 74% of the illiterate respondents were non-empathetic, whereas 19% of those who had at least a secondary education were. The researcher concluded that education was the strongest indicator of empathy. In other words, education was closely related to the “mentality” of development. While the modernization theory has been criticized on several grounds, a major criticism was its application of Western criteria to measure modernity, let alone the dubiousness of the notion of “modernity” itself (Fagerlind & Saha, 1989).

During the 1960s, economists hypothesized that, for any nation, the most efficient route to national development lies in the advancement of its population, that is, its human capital (Fagerlind & Saha, 1989). The advancement of the population can mainly be attained through education. This hypothesis came to be known as “human capital theory.” In essence, the theory postulates that education enhances the choices available to individual society members, and at the same time it produces the type of men necessary for industrial development and economic growth (Fagerlind and Saha, 1989, p. 18). The commonsensical logic of the theory was enough justification for the huge expenditure on education throughout the world. This was reflected in educational enrollments across all levels in developing countries and the subsequent decrease in illiteracy (UNESCO, 1983). Both the modernization and the human capital theories survived throughout the 1960s and the early 1970s.

The early 1970s witnessed the emergence of the dependency theory of development, which derived many of its principles from Marxist thought. Dependency
theory denounced the linear and progressive view of development and focused on the role of conflict in social change. Its proponents argued that the world can be divided into core and peripheral countries. Both types of countries are dominated by a capitalist economic network (Fagerlind & Saha, 1989, p. 23). Dependency resembles the process whereby the core countries exploit and dominate the poor countries through different means, including “plunder, colonial and neocolonial relationships, or the operations of multinational corporations” (Fagerlind & Saha, 1989, p. 23). Often times, the elite of the poor countries who hold the same values and attitudes of the core countries become instruments of the dependency relationship: “Using government cabinets and other instruments of the state, the bourgeoisie produces a policy of underdevelopment in the economic, social, and political life of the nation…” (Frank, 1972, p. 13). In this sense, underdevelopment is the result of exploitation of both colonial powers and their ideological followers within the elite class of the “underdeveloped nations” (Frank, 1972). More importantly, the influence of these elites can lead to the reproduction of the colonial educational trends in the so-called Third World schools. In this case, education reinforces the dependency conditions of less developed countries. This in turn perpetuates the state of “underdevelopment” for many poor counties (Frank, 1972). Hence the need for educational reform that stresses nationalism, self-reliance, and technologies appropriate for the development needs of the society (Fagerlind & Saha, 1989, p. 147). These procedures can lead to the production of individuals equipped with the technological skills needed for national development. The dependency theory provided a critical conceptualization of many sides of development among developing countries, including the importance of technology and technologically-skilled population. Nonetheless, the
theory was criticized for its “unrealistic vision” of nations’ ability of self-sufficiency and autonomy (Fagerlind & Saha, 1989).

Following dependency theorists, a new group of so-called liberation theorists postulated that developing societies are oppressed by domestic elite, who usurp the economic resources of their own societies. The solution for overcoming this oppression lies primarily in educating the oppressed to be aware of their conditions. A renowned proponent of the liberation philosophy is Paulo Freire. Freire (1972) saw in education a means for both liberation and development. Illiteracy can lead only to maintaining the status quo. That is why he aimed to simultaneously strike four keys in the struggle for social justice. These include literacy, education, production, and social change. Freire rejected the “paternalistic” pedagogical systems where learners assumed the role of “passive receivers” of knowledge. For one thing, the uncritical assimilation of this “banked” type of knowledge preserves the worldview of the elite. Instead, he called for students’ involvement in the learning process, their active participation, and reflection. The latter type of learning can ignite the critical faculties of students and direct them to social change and development needs. In principle, the type of education advocated by liberation theorists insinuated the need for educational reform in developing countries. Educational reform became a necessity for breaking away from the colonial educational trends as embodied in the elitist version of knowledge and the banking philosophy of education.

The rise of computer technologies in the 1980s and their promise to support economic growth, human resource development, and educational transformation opened a new venue of development that comprised premises from different development
theories. In many developing countries, national planners viewed computer technologies as a means to leapfrog over certain development constraints, bridge the economic gap with technologically advanced countries, spread “modern” thought amongst their population, prepare their citizens for the information age, and/or escape educational dependency (Modum, 1998, Fodje, 1999).

Educational Computing in Developing Countries

Computer technologies had attained wide recognition in technologically developed countries by the time they entered developing countries. The widespread use of ICT has caused fundamental changes in the character of technologically developed societies (Maddux, Johnson & Willis, 1997). The new changes were often characterized by speed, convenience, and efficiency. With these attributes, “computerization has risen to ideological prominence, an expression of grand hopes and ideals” (Winner, 2003, p. 595). On the international level, information technologies facilitated the world’s shift to a more open and global society, which created new challenges related to changing patterns of labor, business, and world communications (Berg & Vogelaar, 1998). With the change in the organization of society and the central role of technology in it, new competencies are required (van Weert, 1995). As Warschauer and Healey (1998) note, “the ability to read, write, and communicate effectively over computer networks will be essential for success in almost every sphere of life.” Because international business and economy is controlled by the same countries and forces that nurtured the computer culture, the
adoption of computer technology became not only an option, but a must dictated by “international standards” in business, communication, and global labor.

Given the global demand for technologically skilled labor force, together with the challenges of an increasingly competitive global market, developing countries have suddenly found themselves under economic, social, vocational, and pedagogic pressures to use technology in education (Kiangi, 1998). Information technologies are deemed necessary for economic survival, social change and international-business competition; international governments’ adoption of these tools reflects an awareness of that unavoidable fact (Ojo & Awuah, 1998). Technology implementation is also essential to prepare students for the new age (Thornburg, 1999). As Kazlauskas & Erwin (cited in Sooknanan, 2002) note, ICT has the potential to empower individuals as well as their nations. The general sentiment for computerization among decision makers in developing country is reflected in Allotey’s speech to top decision makers in Ghana: “we paid the price of not taking part of the industrial revolution of the late eighteenth century because we did not have the opportunity to see what was taking place in Europe. Now we see that information technology has become an indispensable tool. We can no longer sit down and watch passively” (cited in Sagahyroon, 1995, p. 164).

The need for implementing technology drove many ministries of education in developing countries to introduce technology into schools as ad hoc instruments (Gumbo, 1998). Many researchers have pointed out the lack of national policies to place some structure on the introduction of these alien tools to the indigenous educational systems (see Fodje, 1999; Sagahyroon, 1995; Fung, 1998). Harvey (1983) warns that, “computerization cannot be allowed to become a new form of cultural imposition —
neocolonialism is not acceptable even in an automated package” (p. 269). Similarly, De Castell et al. (2002) assert:

"It is irresponsible for educational administrators in ministries of education, school districts and schools to utilize resources provided for integrating technologies into the curriculum to support what is now a burgeoning corporate involvement in educational software design and development. Better by far to reallocate time and resources to teachers and learners for harnessing, themselves, new forms of intelligence and new functional capabilities to participate directly in the world of digital technologies as purposeful and capable producers of artifacts, and not merely as consumers of the products of others" (p. 14).

Developing countries need to find a formula to put these tools in service of their own needs, purposes and circumstances. Even if developing countries are not technically capable of producing local technologies, they should at least be culturally and educationally prepared to indigenize these tools. Fodje (1999) contends:

"What the world needs today is not talent in producing new technologies but talent in understanding the impact of technology on the society and individuals...Educational programs in the third world heretofore have been designed around the western ideals. These need to be reworked to reflect the indigenous cultures and promote human values while at the same time producing the talent for ‘controlled’ technological advancement. Only then would we be able to talk of development."

In particular, teachers need to be in the forefront of change; else “commercial and other organizations will take the lead in using technology for educational purposes” (Harper, 1987, p. 60).

The discrepancy in developing countries lies in that, while lacking in financial and human resources to invest in computer technologies, they still need to face the
greater demand of keeping pace with the technologically developed countries (Modum, 1998). According to Harvey (1983), “there is a rapid extension of information and data dissemination processes in the industrialized nations that threatens to push Third World countries even further behind their more developed sister states…” (p. 266). Predictably, the hasty and often improvised implementation process has been fraught with problems. Studies on the use of educational technology in developing courtiers have revealed common problems. Among the problems described by Sagahyron (1995) were the dearth of sufficiently qualified teachers, spread of computer illiteracy, deteriorating infrastructure base, lack of computer resources, inadequate funding, and the absence of accepted standards to guide educational planners.

In a multi-national study, Pelgrum (2001) examined what educational practitioners in 26 countries perceived as major impediments to technology implementations in their relative schools. Pelgrum (2001) found that the main obstacles were shortage of computers and lack of computer knowledge among teachers. In her study of technology implementation in Malaysian schools, Abas (1995) reported that the main hindrance to successful technology implementation was the scarcity of resources. The Malaysian ministry of education supplied software packages, but no funds to purchase additional resource material. A study in South Korea by Na (1993) revealed that computer resources available for teachers were very limited. Even when such resources existed, they were housed in computer rooms or business offices. Similarly, Modum (1998) reported the lack of hardware and software in Nigerian schools—a problem that is compounded by the meager external support. Research in developing countries has frequently underscored the lack of equipment and infrastructural to be a major obstacle to
educational computing initiatives. Factors such as the general population poverty, fragile economies, and high computational cost have often stood behind restricting the expenditure and subsequently the benefits of educational computerization efforts. It seems that balancing resource allocation among the competing areas of need in education is a critical issue (Ojo & Awuah, 1998).

Another major problem associated the integration of technology into the educational systems of developing countries has been the lack of trained teachers and trainers (Gumbo, 1998). Generally, the skills and technical background necessary for effectively utilizing the new technology are absent or in short supply (Soolnanan, 2002). As Ruohonen & Adelakun (1998) note, insufficient and inadequate human-resource development for IT implementations works against the effective IT adoption and integration in most developing countries. Abas (1995) pointed to the shortage of well-trained teachers as a main barrier to effective technology integration into Malaysian schools. She concluded that effective in-service training is a key for technological integration. She further suggested that teacher “training” is not enough; what is needed is “effective” teacher training. Based on his study in South Korea, Na (1993) recommended teachers’ participation in computer training programs to increase their skills and knowledge about computer use. He suggested that teachers should be trained, not simply to use the computer but also to use it in the classroom. Hogenbirk (1995) recommended creating teachers’ networks where teachers could meet and work together on regular basis to exchange experiences and activities. According to Hogenbirk, this strategy could be useful for creating “a critical mass of experts”, who gather on common interests and expectations (p.55).
Some researchers pointed to the process of change itself as a main barrier to technology implementation (Veen, 1995). Based on four case studies, Veen (1995) concluded that “educational change is a slow process and teachers need time to gain experience with computers” (p. 179). Change, whether related to humans or organizations, is a “fitful process” (Marshall and Ruohonen, 1998, p.1). Rather than being a process that starts from a zero point and accumulates with time, it is characterized by many obstacles, regressions and sometimes advances. For those who have been engaged in developing the role of technology in education, the task has been very hard (Benzie, 1995). It seems that change can only be achieved if those involved in it gain a better understanding of the procedures and concepts related to change (Robinson, 1995). Gaining a better understanding of the process of change makes potential technology-using teachers and teacher students aware of the nature of the tasks waiting ahead for them and helps them plan for professional development. Indispensable to such type of knowledge are theories and models describing changes driven by the diffusion of innovations.

**Diffusion of Innovations:**

One of the main theories that explain the process of change ushering the adoption of new technologies is Rogers’ “Diffusion of Innovations” (1995). Rogers’ theory was founded on a meta-analysis of 2,585 empirical studies published in 1981 in nine disciplines. Up to 1995, 3,890 research studies utilized the diffusion of innovation framework to examine the spread of new ideas, practices and objects (Roger, 1995). This wide applicability of diffusion theory explains why so much diffusion research continues
to be conducted (Sooknanan, 2002). Since Rogers uses the terms innovation and technology interchangeably (Rogers, 1995, p.12), the diffusion of innovation framework seems particularly suited for the study of the diffusion of ICT.

According to Rogers (1995), diffusion is “the process by which an innovation is communicated through certain channels over time among members of a social system” (p. 10). As the definition suggests, diffusion is governed by four main interacting elements: (1) the innovation itself, (2) communication channels, (3) time, and (4) social system. These four components explain the process of change as determined by individuals, decision-makers, or whole organizations. In the field of education, teachers are undeniably a key agent of change on the classroom floor (Pelgrum, 2001).

Rogers (1995) describes an Innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 11). Rogers focuses on technological innovations in particular. A technology is a means of uncertainty reduction insofar as it helps to solve the individual’s perceived problem (p.14). However, it may create uncertainty when little is known about its consequences. A Communication Channel is “the means by which messages get from one individual to another” (p. 18). The channel can be a mass medium or an interpersonal medium. Diffusion studies show that most individuals rely on the subjective accounts of other individuals who may have experienced or came in contact with the new media (Rogers, 1995). This means that diffusion is a social practice.

The Time element refers to the innovation decision process by which an individual passes from knowledge about the innovation to its adoption or rejection. Time also refers to the innovativeness of the individual in terms of how early or late he/she
adopts the innovation compared to other members of the social system. The rate of adoption of a new idea among a group of individuals forms an S-shaped curve when plotted on a cumulative frequency basis over time (p. 22-23). This premise indicates that an innovation undergoes a phase of slow, gradual growth before going through a phase of relatively rapid growth. Afterwards, the innovation’s rate of adoption will gradually stabilize before it eventually declines. Lastly, the Social System denotes the social context in which the innovation diffuses. It involves a group of interrelated units with a common goal. The structure of the social system affects diffusion in many ways. Social norms, the role of opinion leaders and change agents, types of innovation-decisions, and the consequences of innovation all influence the adoption of an innovation. Rogers (1995) calls attention to the dearth of studies dealing with the effects of the social systems on the diffusion of innovations. This may be related to the difficulty involved in capturing this construct.

Research using Rogers’ Diffusion of Innovations has often been guided by the assumption that the theory incorporates several sub-theories, each focusing on different elements of the diffusion process. Because of the comprehensiveness of Rogers’ theory, researchers often test or investigate some aspects of this unified theory of diffusion. In the field of education, researchers have often examined three major sub-theories related to the sphere of educational change: Innovation Attributes, Individual Innovativeness, and Innovation Decision Process.

The sub-theory of Innovation Attributes states that potential adopter’s evaluate an innovation based on their perceptions of five characteristics of the innovation. These include: Relative Advantage, Compatibility, Complexity, Observability, and Trialability.
The theory holds that an innovation will be increasingly diffused if potential adopters perceive that the innovation: (1) has an advantage over previous innovations, (2) is compatible with existing practices, (3) is not complex to understand and use, (4) shows observable results, and (5) can be experimented with on a limited basis before adoption.

The Individual Innovativeness sub-theory stipulates that individuals who are inclined to being innovative will adopt an innovation earlier than those with less innovative inclination. According to this hypothesis, individuals can be grouped into Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Innovativeness is highly determined by socioeconomic status. Thus, “it is assumed that individuals adopt innovations in direct proportion to their economic status; with each added unit of income, education, and other socioeconomic status variables, an individual is expected to become more innovative by an equivalent amount” (1995, p. 270). Many researchers have derived relevant teachers’ characteristics, such as income, education and so forth, from this sub-theory.

The last amongst these three sub-theories, namely the Innovation Decision Process, holds a special significance for many researchers in the field of education, and it has been by far the most frequently researched component of Rogers’ theory. Rogers’ Innovation Decision Process theory states that diffusion is a process that occurs over time through five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation (Figure 2.1). Accordingly, “the innovation-decision process is the process through which an individual (or other decision-making unit) passes (1) from first knowledge of an innovation, (2) to forming an attitude toward the innovation, (3) to a decision to adopt or reject, (4) to implementation of the new idea, and (5) to confirmation of this decision”
(Rogers, 1995, 161). Due to the novelty of computers and their related technologies, studies concerning technology diffusion in education have often focused on the first three phases of the innovation decision process. This is also because the status of computers in education is, to a great extent, still precarious. In cases where technology is very recently introduced into the educational system, as is the case of most developing countries, studies have mainly focused on the first two stages, that is, on knowledge of an innovation and attitudes about it. Rarely do we find studies dealing with the “adoption/rejection” phase.

Figure 2.1: Stages of Innovation-Decision Process, Based on Rogers (1995, p. 163)
Bringing together the main premises discussed above, this study employs the Diffusion of Innovation framework to understand the attitudes of teachers in Syria. Due to the ubiquity of computers in Syrian society, it is expected that teachers have already developed some attitudes toward these tools (which represent the second phase of the innovation decision process). The study will investigate the attitudes of teachers and their correlation to the innovation attributes (relative advantage, compatibility, complexity, and observability), teachers’ cultural perceptions, personal characteristics, computer competence, as well as level of computer access.

**Teachers’ Attitude toward ICT in Education:**

As noted above, people’s attitudes toward a new technology are a key element in its diffusion (Rogers, 1995). Rogers’ premise corroborates the general and widely accepted belief that attitudes affect behavior directly or indirectly (Zimbardo et al., 1977). Several attitude theories and models have confirmed the symbiotic relationship between attitude and behavior.

Among the salient theories of attitude adopting the above view is Ajzen and Fishbein’s Model of Reasoned Action (Ajzen and Fishbein, 1980). This theory is called the model of reasoned action because of its assumption that people’s actions are mostly rational and based on a systematic evaluation of the information available to them (Ajzen & Fishbein, 1980). That is, people evaluate the consequences of their actions and act based on a reasonable assessment of those consequences. Ajzen and Fishbein (1980) postulate that any action or behavior is determined by one’s intention to perform that behavior. However, intentions themselves are a result of an individual’s attitude toward
the behavior. However, intentions themselves are a result of an individual’s attitude toward the behavior, that is, his/her positive or negative judgment of performing the behavior, as well as the subjective norms, which are the social pressures put on him/her to perform or not to perform the behavior. According to Ajzen and Fishbein, attitudes are in turn determined by one’s “behavioral beliefs” about the favorableness or non-favorableness of the behavior outcome. Similarly, subjective norms are based on “normative beliefs” about whether specific individuals or groups approve or disapprove the behavior. Ajzen and Fishbein posit that behavioral and normative beliefs are based on information that individuals hold about themselves and the world in which they live. Moreover, both types of beliefs, and the corresponding attitudes and subjective norms, are influenced by “external variables”, such as demographic variables (p.9). In effect, the theory suggests that studying the attitudinal and normative components is a complex but an indispensable procedure for gaining a deeper understanding of behavior.

The Model’s basic assumption of the relationship between attitude and behavior has gained a great currency among psychologists and educators alike. For example, Zimbardo et al. (1977) emphasize the interrelationship between behavior and attitude in that each affects the other. Zimbardo and his associates suggest that “even though we cannot predict the behavior of single individuals, we should be able to predict that people (in general) will change their behavior if we can change their attitudes…” (p.52). They propose that attitudes are made up of three components: affect, cognition, and behavior. The affective component represents an individual’s emotional response or liking to a person or object. The cognitive component consists of a person’s factual knowledge about a person or object. Finally, the behavioral component involves a person’s overt
behavior directed toward a person or object (p. 20). According to Ajzen and Fishbein (1980), “a complete description of attitude requires that all three components be assessed by obtaining measures of all three response classes” (p. 20).

Unfortunately, much of the early research on computer uses in education has ignored teachers’ attitudes toward the new machines. Studies focused on the computer and its effect on students’ achievement, thus overlooking the psychological and contextual factors involved in the process of educational computerization (Clark, 1983; Thompson, Simonson & Hargrave, 1992). The importance of teachers’ attitudes has been noticed after the indifference with which teachers have received computers and the subsequent claims that “teachers teach the way they were taught.” In order not to replicate the mistake of the early computer studies, recent research has addressed psychological factors associated with the implementation of the new technologies (e.g., Gressard & Loyd, 1985; Heissen, Glass & Knight, 1987).

Educational theorists and researchers have realized that an important factor in the implementation of computers is users’ acceptance, which is in turn influenced by their attitudes towards these media (Koohang, 1989). Teachers’ attitudes have been found to be major predictors of the use of new technologies in instructional settings (Abas, 1995; Isleem, 2003; Almusalam, 2001; Blankenship, 1998). The successful use of technology in the classroom depends to a large extent on the teachers’ attitudes toward these tools (Lawton & Gerschner, 1982). Christensen (1998) states that teachers’ attitudes toward computers affect not only their own computer experiences, but also the experiences of the students they teach. In fact, it has been suggested that attitudes towards computers affect teachers’ use of computers in the classroom and the likelihood of their benefiting from
Positive attitudes often encourage less technologically capable teachers to learn the skills necessary for the implementation of technology-based activities in the classroom. Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals’ negative attitudes is essential for increasing their computer skills.

Knezek and Christensen’s (2002) analysis of several major cross-cultural studies completed during the 1990s and related to ICT in education suggests that teachers advance in technology integration through a set of well defined stages, which sometimes require changes in attitude more so than skills. Zimbardo et al. (1977) emphasized the possibility of changing individuals’ behavior by first knowing their attitudes and then moving to modify them. The latter assertion explains to a large extent the wide interest in the study of the attitudes toward technology.

Unfortunately, the task of pinning down teachers’ attitudes has not always been an easy one. Watson (1998) considers teachers’ attitudes as the most misread impeding force in the integration of computers in educational practices. As Zimbardo et al. (1977) note, the complexity of attitudes and their interrelationship with behavior and many other variables summons a considerations for “the maze of variables and processes that could affect attitudes, beliefs, and action” (p. 53). Following is a review of the variables that have been found to correlate with attitudes as they appear in the literature.
Factors Related to Teachers’ Attitudes toward ICT:

As noted above, studies have pointed to a wide range of factors affecting attitudes toward ICT. The variations in the factors identified by different researchers might be attributed to differences in context, participants, and type of research. This section presents a set of variables whose relationship with attitudes toward ICT has been theoretically and/or empirically well-supported.

Computer Attributes:

Rogers (1995) contends that “the perceived attributes of an innovation are one important explanation of the rate of adoption of an innovation” (p.206). Based on past research, Rogers (1995) identified five innovation attributes that may contribute to the adoption or acceptance of an innovation: relative advantage, compatibility, complexity, observability, and trialibility. According to Rogers (1995), relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. Compatibility is the extent to which an innovation is perceived as consistent with the existing values, past experience, and needs of potential adopters. Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Observability is the extent to which the results of an innovation are visible to others. Finally, trialibility refers to the degree to which an innovation is experimented with on a limited basis (pp. 250-251).

However, Rogers (1995) cautions that “one problem with measuring the five attributes of innovations is that they may not in all cases be the five most important perceived characteristics for a particular set of respondents” (p.209). More simply stated,
some computer attributes that are deemed important to one people might be irrelevant to peoples from other cultures. Based on Rogers’ warning, the study will utilize only four computer attributes that are thought to be relevant to the participants in this study. These include relative advantage, compatibility, complexity and observability. Trialibility was excluded because the majority of Syrian teachers may not have had the chance to experiment with computers before these were introduced into schools. That is, trialibility does not seem to be pertinent computer attribute to the participants in this study.

Research has established a relationship between perceived innovation characteristics and adoption (Rogers & Shoemaker, 1971; Sooknanan, 2002). Rogers and Shoemaker (1971) found that relative advantage, compatibility and observability were positively related to adoption, whereas complexity was negatively correlated. In his study in Trinidad and Togo, Sooknanan (2002) used the same four computer attributes utilized in this study. He found that relative advantage, compatibility, and observability were significantly related to the adoption/implementation variables. However, the results showed no relationship between complexity and the adoption/implementation variables. Based on the above conclusions, Sooknanan emphasized the importance of computer characteristics to the adoption/implementation of computers in developing countries.

Rogers (1995) proposes that “the relative advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption” (p. 250). Several studies have endorsed the positive relationship between teachers’ attitudes and the relative advantage of using computers (Sooknanan, 2002; Rogers and Shoemaker, 1971). Sooknanan (2002) found that “relative advantage” was the second most significant innovation characteristic in relation to teachers’ attitudes. The Technology Acceptance
Model proposed by Davis (1989) points to “usefulness” as the main innovation factor that determines individuals’ attitudes and subsequent acceptance of technology. Teachers’ and faculty’s perceptions of the value of technology has been systematically reported as a predictor of their use of computers in the classroom (e.g, Berner 2003; Hendricks, 1998; Huang, 2003).

According to Rogers (1995), “the perceived compatibility of an innovation is positively related to its rate of adoption” (p.250). Some studies have also established a positive relationship between attitudes and compatibility (Rogers and Shoemaker, 1971; Sooknanan, 2002). Generally, compatibility is viewed in terms of needs and beliefs (Rogers, 1995). Zaitman and Lin (1971, cited in Sooknanan, 2002) suggest that the less compatible an innovation and the more changes and adjustments it requires, the slower its acceptance. Sooknanan (2002) found that compatibility was the most significant innovation attributes in relation to computer attitudes. Teachers in his study had positive perceptions of the compatibility of computers to their curriculum goals. In addition, teachers perceive that “computers are reliable and accurate, and meet their information needs” (129). However, Ridgeway and Passey (1995) found that teachers were uneasy about the change that computers may bring into their teaching practices. Teacher felt threatened by computers, as they contest their values and roles.

Complexity, as discussed in the research, suggests that the greater the perceived complexity of an innovation, the less will be its rate of adoption (Rogers, 1995). In his Technology Acceptance Model, Davis (1989) suggests that “ease of use” is the second most important innovation factor determining individuals’ attitudes and subsequent acceptance of technology. Harper (1987) argues that, “To many teachers, a computer is
intimidating and difficult to master, so they avoid the computer for fear of committing embarrassing mistakes” (p.47). Some researchers pointed to the complexity of computer integration as a “brake” on teachers’ use of the new technology (Marsshall and Ruohonen, 1998; Ojo & Awuah, 1998).

In terms of observability, Rogers (1995) contends that “the perceived observability of an innovation is positively related to its rate of adoption” (251). Sooknanan (2002) found that observability was significantly related to the teachers’ attitudes toward computers in Trinidad and Togo education. Most of the teachers in his study had not heard about or seen computers at work, especially as an educational tool. Hebert and Benbasat (1994, cited in Sooknanan, 2002) found that observability contributed to attitudes and simultaneously predicted the intent to use information technology.

In general, the literature points to a positive relationship between teachers’ attitudes toward ICT and their perceptions of computer attributes. Teachers who perceive computers as advantageous, compatible with their current practices, easy to use, and observable usually have positive attitudes toward ICT in education.

**Cultural Perceptions:**

Rogers (1995) points to the *Social System* as an important parameter in the innovation diffusion process. The social system denotes the social context in which the innovation diffuses. The structure of the social system affects diffusion in many ways. Within the *social system*, social norms play a vital role in determining the rate of an innovation’s adoption. Norms are the established patterns of behavior that tell members
of the system what behavior is expected (Rogers, 1995, p.26). According to Rogers, social norms can be a main barrier to change. While Rogers defines social norms too loosely to be empirically studied, Thomas (1987) delineates the construct of social norms more concretely in his model of technology transfer from developed to developing countries. Thomas proposes that “How acceptable a new technology will be in a society depends on how well the proposed innovation fits the existing culture” (p.15). Thomas refers to his hypothesis as the cultural suitability factor. Both Rogers (1995) and Thomas (1987) note that few studies have considered the influence of cultural perceptions on the adoption of technological innovations.

Harper (1987) contends that cultural factors play an important role in creating negative attitudes toward computers: “One direct cultural cause is people’s apprehension that life is becoming too mechanized, so they resist contributing to a “computer culture”. Another cause is the concern that there are other social problems that need to be solved before computer-education is addressed...” (p. 47). Martinez (1999), among others, suggests that one of the major challenges facing developing countries is to make technology an essential part of the culture of the people. Similarly, Roblyer, Dozier-Henry and Burnette (1996) suggests that the reverence with which technology is held in a country like the US may be in contradiction to the perceptions of cultures that are relationship-oriented (p. 9). On the same grounds, Zhuang & Thomas (1987) argue:

An important reason for the frequent disappointing results in transferring a technology from one culture to another is that the decision-makers who engage in the transfer lack sufficient knowledge of either the importers’ cultural conditions or the nature of the technology or both (p.77).
Zhuang & Thomas warn that importing a technology into developing countries without enough understanding of the indigenous culture can result in an incompatibility between the home culture and the technology. Intellectuals from different developing nations have been aware of the mismatch between the computer culture and their home cultures. Interestingly, some have called for adapting the people’s culture to the culture of computers. For example, Modum (1998) contends:

*A computer culture involves getting Nigerians to imbibe the values of the computer as a tool that can be used by all for problem solving, no matter their profession. Cultivating a computer culture means getting the entire populace to appropriate for itself the potential that the computer offers for problem solving. It is a process of internalization rather than mere learning* (p.99).

In addition, the micro culture of a certain institution or organization may inhibit the diffusion of technologies and the changes they entail. For a new technology to be placed into an organization’s culture, there must be a match of organizational and technological values (Hodas, 1993). Within the school organization, if the technology is not received well by teachers, there must be a mismatch of values between the culture of schools and the technology.

The study of the cultural impact on technology’s reception has been claimed essential for accounting for any positive or negative attitude (Thomas, 1987; Harper, 1987). Unfortunately, however, very few studies have tried to study the impact of culture on the reception/rejection of the new tools. Li (2002) examined the effects of national culture on students' use of the Internet and the differences between Chinese and British students in terms of use of the Internet. The researcher found that there were differences in Internet experience, attitudes, usage, and competence between Chinese and British
students. Most of these differences were related to students’ national culture. Winschiers (1996, cited in Kiangi, 1998) attempted to analyze information technology knowledge acquisition at the University of the Polytechnic in Namibia. She noted that cultural backgrounds inhibit acquisition of computer knowledge and result in poor conceptions of computer science by students. Similarly, Al-Oteawi (2002) found that teachers refrain from using the Internet in the classroom for fear of the ethically inappropriate material on the Internet. He also found that his participants looked at much of the material on the Internet as inappropriate for the Saudi culture. He particularly pointed to the teachers’ reluctance to endorse the Internet for teaching and learning “because of concerns about the evil aspects of the Internet” (p. 258).

One area about which the literature remains virtually silent is the cultural non-neutrality of computers, the fact that the “…characteristics of technologies are determined by the socially and culturally-based assumptions of their designers” (Damarin, 1998, p. 12). As Bowers (1998) notes, “Right now, learning about the cultural non-neutrality of technology is a peripheral area of study, if it is studied at all” (p.50). In The Media Is the Message, McLuhan (2003) wrote, “The spiritual and cultural reservations that the oriental peoples may have toward our technology will avail them not at all. The effects of technology do not occur at the level of opinions or concepts, but alter sense ratios or patterns of perceptions steadily and without any resistance” (p.207). Undeniably, teachers’ awareness of the cultural non-neutrality of ICT may have substantial influence on their attitudes toward it as well as their approach of it.

From both theoretical and empirical perspectives, cultural perceptions seem to have a significant association with teachers’ attitudes toward ICT. It is expected that
teachers who have positive perceptions about the cultural relevance of computer
technology will have positive attitudes toward ICT in education. Conversely, teachers’
negative attitudes toward ICT may be related to their negative cultural perceptions.

**Computer Competence:**

While the infusion of technology into schools required new competencies on the
part of the teachers, teachers’ preparation does not always afford these competencies
(Francis-Pelton & Pelton, 1996). Research suggests that teachers often struggle with the
integration of technology in the school curriculum on daily basis (Spiegel, 2001).
Heeding this problem, Bulkeley (1993) states: “The problem isn’t getting computers and
software, though; it’s also knowing how to use them” (p.9). In fact, computer competence
includes not only the knowledge of computers but also the skills and experience
necessary for putting them into use.

Previous research suggests that the success of educational innovations depends
largely on providing teachers with the competencies required to make them function
(Pelgrum, 2001). In a multinational study that involved teachers from 26 countries,
Pelgrum (2001) found that teachers’ lack of knowledge and skills was the second most
inhibiting obstacle to the use of computers in schools. In their analysis of several major
cross-cultural studies completed during the 1990s and related to information technology
and education, Knezek and Christensen (2002) found that teachers’ competence with
computer technology is the principal determinant of effective classroom use by students.
Isleem (2003) found that computers expertise (competence) was the strongest predictor of
computer use by Ohioan technology education teachers.
A number of studies showed that teachers' computer competence team up with attitudes in determining both the initial acceptance of computer technology as well as future behavior regarding computer usage (Francis-Pelton & Pelton, 1996; Harrison & Rainer, 1992). In their study of the correlation between teacher attitude and the acceptance of technology, Francis-Pelton & Pelton (1996) maintained, "Although many teachers believe computers are an important component of a student's education, their lack of knowledge and experience lead to a lack of confidence to attempt to introduce them into their instruction. This lack of confidence then leads to anxiety and reluctance to use technology" (p. 1). Berner (2003) studied the relationship between computer use in the classroom and seven independent variables: perceived relevance; desire to learn; emotional reaction to technology; beliefs about computer competence; beliefs about technology; administrative support; and peer support. Berner found the faculty’s belief in their computer competence was the greatest predictor of their use of computers in the classroom. Similarly, Na (1993) found a significant relationship between computer knowledge and attitudes, and a moderate relationship between attitude and skills. The researcher concluded that “Teachers must be prepared to use computers…Future teachers should also know about computers and how to use them to provide students with better instruction” (pp. 143-144).

In cases where teachers showed negative attitudes toward computers, researchers ascribed these attitudes to the teachers’ lack of knowledge, skill, and/or experience of computers. Summers (1990) stated that a major reason for teachers’ negative attitudes toward computers is their lack of knowledge and experience in using these tools. Similarly, Al-Oteawi (2002) found that most teachers who showed negative or neutral
attitudes toward the use of ICT in education lacked knowledge and skill about computers that would enable them to make “informed decision” (p. 253). He therefore recommends that teachers should have adequate training programs to develop their knowledge and skill. Hogenbirk (1995) recommends forming groups of teachers who work collaboratively and exchange experiences and expertise as “a powerful strategy for changing attitudes toward new types of educational behavior especially toward IT [information technology]” (p. 55).

Jaeglin (1998, cited in Christensen, 1998) compared students and teachers views toward computer-assisted class discussion and found that, while students were positive about the use of computers as an effective learning tool, teachers were uncomfortable using computers in class activities. One of the main reasons that teachers gave for their relative discomfort about the use of computers is their technical discomfort with using these tools. Most of them were unfamiliar with the functionality of the software they were using and about the optimal way to integrate it in class activities.

However, computer competence do not always account for positive attitudes toward computers. Sometimes, teachers report positive attitudes toward computers but indicate that they lack the competence necessary for using them effectively in the classroom (Grasty, 1986, cited in Na, 1993). That is partly why some studies did not find any significant relationship between teachers’ attitude and competence (e.g., Hendricks, 1998). Overall, however, the bulk of literature indicates that teachers’ attitudes toward IT are directly related to their level of computer competence.
Computer Access:

Access to computer resources has often been one of the most important barriers for the integration of technology in both developed and developing countries (Marshall and Ruohonen, 1998). The US President’s Committee of Advisor’s on Science and Technology (1997) reported that “access to modern hardware remains a significant impediment (though by no means the only impediment) to the widespread application of technology within grades k-12” (Report to the President on the Use of Technology, 1997). The same report stated that most of the schools’ computer equipment was obsolete.

Research in developing countries has shown that, while computers were supplied for students’ use, almost none were available specifically for teachers’ use (Abas, 1995). Reporting on her study in Malaysian schools, Abas (1995) suggests that access to computers in different location may help create what she calls “a computer using culture” among teachers (p. 161). Pelgrum (2001) found that computer inavailability/insufficiency was the main obstacle to computer use by teachers from 26 different countries.

Most studies examining computer attitudes have reported a significant correlation between computer access and attitudes toward computers (Marshall and Ruohonen, 1998; Pelgrum, 2001; Na, 1993). In his study of Korean teachers, Na (1993) found a positive correlation between teachers’ attitudes toward computers and computer ownership, accessibility to school computers, the level of accessibility to school computers, and number of computer locations in the school. Na concluded that there was a significant relationship between the proximity of computers and the number of access resources (home and school) on the one hand, and, on the other, teachers’ attitudes
toward computers. Knezek and Christensen (2002) found that teachers’ access to technology tools has a major impact on the quality of computer use on the part of the teachers. Knezek and Christensen’s conclusion has been widely supported by studies on the use of computers in education (e.g., Isleem, 2003; Blankenship, 1998).

In a fewer number of studies, however, access to computers did not correlate with teachers’ attitudes toward ICT. For examples, Watson (1998) reported of teachers resisting the very existence of computers in the educational milieu. Rockman (2000) argued:

*If schools have access to the Internet and there are computers in reasonable numbers, we also need to know that the teachers are prepared, that the technology is maintained and in working order, and that the appropriate software is available. Further, we must also have a culture that encourages and supports the use of technology for teaching and learning (p.3).*

That is why some researchers indicated that the results of technology implementation are “independent of any computer platform or software environment” (van Weert, 1998, p. 275). This suggests that access is important only when other conditions are met in the process of technology implementation in schools.

**Teachers’ Characteristics:**

Rogers (1995) notes that “individual innovativeness [adoption of an innovation] is affected both by individuals’ characteristics and by the nature of the social system in which the individuals are members” (p. 26). However, Katz (1992) indicated that only certain personality traits are significantly associated with positive computer attitudes.
Several studies have examined the relationship between different combinations of teacher characteristics and teacher attitudes toward computers.

**Gender:**

Gender differences concerning computer attitudes have been a topic of much investigation. Despite the persistent debate about the under-representation of women in computing technology (see Shashaani & Khalili, 2001), studies have reported conflicting ideas about the role of gender in formulating attitudes toward ICT. Several researchers found no significant relationship between gender and teachers’ attitudes (e.g., Roza, 1994; Kim, 1986; Na, 1993). Roza (1994) found no difference in attitude toward computers between male and female teachers, even when male teachers had greater computer literacy scores and experience with computers than female teachers. Similarly, Kim (1986) found that the gender of secondary school teachers had no significant effect on their attitudes toward computers or their computer literacy level. A few researchers have found a significant relationship between gender and attitudes toward computers (e.g., Jones, 1998; Francis, 1994). For instance, Francis (1994) found that males are more enthusiastic and more confident using computers than females.

**Age:**

Different experiences of different age groups may entail disparity in attitudes toward computers. Young teachers may have been exposed to computers as part of their high school or college studies. In fact, many teachers are now expected to take obligatory computer courses during their high school and/or college study. On the other hand, older
teachers may have had limited exposure to computers. Therefore, learning to use a computer in the classroom is a new skill and may result in different attitudes toward ICT. Several studies reported a relationship between teachers’ ages and their attitudes toward computers. Blankenship (1998) found that age was the most important demographic variable affecting computer use and attitudes. Na (1993) found a significant, negative relationship between age and teachers’ attitudes toward computers in education; young teachers had more positive attitudes toward computers than their older colleagues. The same finding was reported by Davis (1998), Varner (2003), and others. However, many studies reported no relationship between teachers’ age and their attitudes toward computers. For example, Lin (2002) found that the older teachers had lower technological knowledge. Yet, teachers’ motivation, their attitude toward ICT, and their technological knowledge were not significantly related to age. He concluded that “no matter how old a teacher is or at which level she/he has technological knowledge, she/he still has high motivation and maintains a positive attitude toward IT” (p. 113). Similar conclusions have been reported by several other researchers (e.g., Jones, 1998; Roza, 1994; Kim, 1986; Spiegel, 2001).

Income:

Rogers (1995) suggests that income is one of the main demographic variables that affect the process of innovation adoption. Income may be especially important in developing countries where low wages can be an inhibiting factor to technology purchase and use. Al-Tamimi (1998) investigated the role of demographic factors in the individuals' adoption of direct broadcasting system service in the United Arab Emirates.
Adopters' demographic factors included age, sex, income, education, and cultural factors (language and travel). In addition, the study investigated participants' attitudes, motivations and behavior toward the adoption of the technology. Findings showed weak relationships between independent variables (age, sex, income, education, language, and travel) and dependent variables (attitudes, motivations, and behavior). Amongst these variables, age, parents’ monthly income, language and travel played the biggest role in individuals' adoption of the technology. On the other hand, Lee (1970, cited in Sooknanan, 2002) found a negative correlation between attitude and variables such as income, occupation and educational level. While the impact of income on computer attitudes has been theoretically recognized, the conflicting results of empirical studies leave the relationship between computer attitudes and income quite unpredictable.

**Teaching Experience:**

Several researchers have reported a significant relationship between teaching experience and attitudes toward computers. For example, Davis (1998) investigated the attitudinal differences among early childhood teachers toward the instructional use of computers in their classroom. He also examined the relationship between teachers’ attitudes and teachers’ demographics variables, such as age, sex, educational level, grade level taught, years of teaching experience, and prior computer use. Davis found a significant correlation between teachers’ attitudes and age, years of teaching experience, amount of computer training, and amount of computer experience. Huang (2003) found that senior teachers have less positive attitudes toward computers and were less willing to use them in their classes than did less fresh teachers. However, several researchers found
no significant relationship between teaching experience and teachers’ attitudes (e.g., Kim, 1986; Na, 1993).

**Education:**

Rogers (1995) suggests that an individual’s educational level affects his/her adoption of an innovation. It seems reasonable that the higher the educational level, the more familiarity an individual may have with the new technologies. This may entail more positive attitudes toward ICT. This hypothesis has been supported in different educational contexts. Several studies have reported a significant relationship between educational level and attitudes toward computers (e.g., Na, 1993, Francis, 1988). However, such relationship did not exist in different educational contexts. For example, Al-Tamimi (1998) found no relationship between education and teachers attitudes toward technology in the United Arab Emirates.

**School Location:**

Generally, school location often tells about the general welfare of the area in which it is located, and may also show the amount of support that schools receive from local people. Mitchell (1985, cited in Na, 1993) found that teachers in a large, urban school district have a higher level of knowledge about microcomputers than do teachers in rural schools. However, they showed no statistically different attitude toward computers. Similarly, Na (1993) found no relationship between Korean teachers’ resident location and their attitudes toward computers. However, Isleem (2003) found that
teachers in urban schools in Ohio have less positive attitudes and less level of computer use than those in suburban schools.

**Computer Training:**

Large scale innovations require large-scale teacher training (Pelgrum, 2001). In the case of ICT in education, computer training has been hardly available because of the expenses that it entails. The US Office of Technology Assessments (1995) reported lack of training and lack of knowledge as main barriers to the integration of technology in classroom practices. Armstrong and Casement (2000) suggest that “The first attempt to computerize classrooms in the 1970s is considered to have been largely a failure for several reasons, one of the chief being that so little attention was paid to teacher training. The same error is in danger of being repeated” (p. 35). In his study of Saudi teachers and administrators, Al-Oteawi (2002) found that 98.3% of the participants asserted the need for training and development in order to improve their knowledge and skills. A large number of studies showed that computer training significantly increased computer confidence and computer liking (Gressard & Loyd, 1985; Woodrow, 1992; Knezek et al., 1997). Gressard and Loyd (1985) surveyed 15 teachers before and after a training program that was designed to enhance their experience with microcomputers. Teachers reported lower anxiety and more computer confidence after the training program. The relationship between teachers’ attitudes toward ICT and their computer training is well documented in the literature (e.g., Davis, 1998; Na, 1993)
Teaching Method:

Research suggests that teachers who use more innovative instructional approaches (e.g., use of inquiry, project-oriented work, hands-on activities, etc.) are more likely to use new technologies than those who stick to traditional teaching methods. For example, Warschauer (1999, cited in Warschauer, 2000) carried out a qualitative study about Internet-enhanced learning in three colleges and universities. The study showed that the way instructors presented computers depended to a large extent on their teaching and learning beliefs. Instructors who believed in student-centered, collaborative learning found that the Internet was a viable tool for their de-centered class activities. Whereas teachers who believed in controlled learning could not make much use of the Internet and were eventually obliged to re-consider their teaching beliefs. However, the relationship between teachers’ computer attitudes and their teaching method has not been consistently reported in the literature. For example, Savitt (1996) investigated the effect of using a cooperative learning teaching strategy to train pre-service teachers. A total of 153 subjects in six sections of a course designed to the use of computers in education were randomly assigned to either a cooperative or individual group. An attitude survey administered upon completion of this study showed small differences in attitude towards instruction and the Internet. Both groups reported a favorable experience either working individually or cooperatively. However, a slight preference for working alone existed among all subjects. The findings of this study indicated that cooperative learning does not affect an individual’s attitude toward computers either negatively or positively.

In general, the literature has produced mixed results about the role of demographic characteristics in determining teachers’ attitudes toward ICT. A still vaguer
picture exists as to which demographic variables are related to computer attitudes and which are not. Hence, the relationship between teachers’ attitudes toward ICT and demographic variables seems quite unpredictable. Nonetheless, demographic characteristics were included in the study for two reasons. The first, and the most important, concerns the need to control extraneous variables (Gay & Airasian, 2000) by building them into the design of the study. The second rationale for including demographic variables in this study regards the theoretical support of the role of some demographic variables in the diffusion literature (Rogers, 1995).

To conclude, the literature points to the importance of adopters’ attitudes in the innovation decision process. An examination of the history of technology in education shows that the technology initiatives adopted by educational policy-makers worldwide have often focused on the potential of technology per se. In developing countries in particular, policy-makers have adopted ICT in education to accelerate their nations’ development efforts. In such hasty adoption, teachers’ attitudes toward ICT have often been ignored. The literature emphasizes the need for more studies on not only teachers’ attitudes toward ICT but also the factors that have produced them. Previous research shows that computer attributes, cultural perceptions, computer competence, and computer access have often been related to attitudes. Teachers’ attitudes and their relationship with the above variables are the main focus of this study. These variables will be examined in the context of Syrian education and on Syrian EFL teachers. The next chapter explicates the methodology employed to conduct the study.
CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research methodology that was used to study the attitudes of Syrian high school EFL teachers toward ICT and the factors that influence those attitudes. The methodology of this study is presented in the following sections: (a) research variables, (b) research design, (c) population, (d) sample size and sampling procedures, (e) instrumentation, (f) data collection, and (g) data analysis procedures.

Research Variables:

The purpose of this study was two-fold: first, to examine the attitudes of high school EFL teachers in Hims (Syria) toward ICT in Syrian education; and second, to explore the relationship between teachers’ attitudes toward ICT and factors identified as potentially influencing teachers’ attitudes. These factors include: perceived computer attributes, cultural perceptions, computer competence, computer access, and teacher characteristics. The dependent variable in this study was the attitudes of Syrian EFL teachers toward IT in the Syrian educational system. The independent variables were: (1) perceived computer attributes, (2) cultural perceptions, (3) computer competence, (4)
computer access, and (4) teachers’ characteristics (including gender, age, income, teaching experience, school location, education, and teaching method as well as computer training background).

**Research Design:**

This is a descriptive study of an exploratory nature, even though it includes a correlational element. Creswell (2003) suggests that exploratory studies are most advantageous when “not much has been written about the topic or the population being studied” (p. 30). Best and Kahn (1993) indicate that “descriptive research seeks to find answers to questions through the analysis of variable relationship” (p. 120). Descriptive research, also referred to as survey research (Gay & Airasian, 2000), is mainly concerned with “attitudes, opinions, preferences, demographics, practices, and procedures” (p. 275). Descriptive research is appropriate when a problem does not lend itself to controlled inquiry and experimentation (Best and Kahn, 1993).

According to Gay & Airasian (2000), “descriptive data are usually collected by questionnaire, interview, telephone, or observation” (p.275). Both quantitative and qualitative methods were used in this study in order to collect the data on the population of EFL teachers in Hims, a large Muhafaza (province) in Syria. First, the study utilized cross-sectional survey methods to gather data on the population. A cross-sectional survey involves the collection of data from participants in a single period of time (Gay & Airasian, 2000, p. 276). Fetterman (1989) suggests that surveys are “an efficient means of large-scale data collection” (p. 65). In this study, the survey was a means of collecting self-reported data at a specific point in time with the purpose of (1) describing the
dependent variable of interest, that is, teachers’ attitudes, and (2) examining the relationship between the dependent variable and selected independent variables.

The results of the quantitative analysis were supplemented by in-depth phone interviews. This qualitative element was employed not only to gather more in-depth information but also to ensure the trustworthiness of the results. As Gelsne (1998) notes, “The multiple data-collection methods contributes to the trustworthiness of the data” (p. 31). The use of qualitative measure was in response to current calls by many researchers to include qualitative measures for probing the process of diffusion of innovations (see Rogers, 1995). Interviews became of major importance to explain the unanswered issues that the survey data analysis generated and also to gain a deeper understanding of teachers’ Cultural Perceptions—a construct that called for a greater consideration than quantitative methods could actually afford.

**Population:**

Best and Khan (1993) define a population as “any group of individuals that have one or more characteristics in common that are of interest to the researcher” (p. 13). Gay and Airasian (2000) define a target population as “The population that the researcher would ideally like to generalize to” (p.122). The target population in this study was Syrian high school EFL teachers in the Muhafaza of Hims during the 2003-2004 school year. The list of teachers was based on the EFL teachers’ Directory. The Directory was maintained and updated on a quarterly basis by Hims Department of Education. The total number of high school EFL teachers in the Directory of the Department of Education in Hims was 887 (214 males, 24%; 673 females, 76%) as of the thirtieth of March, 2004.
Sample Size and Sampling Procedures:

Wiersma (2000) defines sample as “A subset of the population to which the researcher intends to generalize the results” (p.269). Gay and Airasian (2000) suggest that for a population number of 900, a sample of 269 subjects is appropriate. Gay and Airasian suggest that simple random sample is “the best single way to obtain a representative sample” (p. 140). For the purpose of this study, a simple random sample of 326 subjects was selected to participate in the survey stage of the study. The specific procedure used for sample selection was a “table of random numbers” (Gay & Airasian, 2000, p. 124). This procedure involved assigning each subject in the population to a number, and then selecting 326 arbitrary numbers from the population. Since each number corresponded to a subject in the population, the selected numbers formed the sample of subjects for the survey part of the study.

As for the interview participants, purposeful sampling procedures were employed. Following quantitative data collection and analysis, the researcher selected 15 “information-rich” subjects (nine females and six males). The criterion for choosing the interviewees was their “intense” (Patton, 1990) responses on three main independent variables: computer competence, computer access, and computer training. According to Patton (1990), “An intensity sample consists of information-rich cases that manifest the phenomenon of interest intensely (but not extremely)” (p. 171). Therefore, 15 teachers who had very low levels of computer competence, computer access, and computer training while maintaining positive attitudes toward ICT in education were interviewed in order to gain a better understanding of the participants’ positive attitudes given their low computer competence, access and training. The interviews were categorized into three
groups of five each based on the above variables: a competence group, an access group, and a training group. The three groups were asked the same set of questions. Only questions 9 and 10 were changed according to each group (see appendices K & L).

**Instrumentation:**

Due to differences between the participants, research objectives, research variables, and cultural context of this study and those in previous studies, the quantitative instrument (questionnaire) and the qualitative instrument (interviews) in this study were developed by the researcher to obtain the information needed for the study rather than using existing instruments.

**Questionnaire Instrument:**

The researcher developed the questionnaire based on the following criteria: literature review of studies related to the adoption of computers and computer-related technologies in education (Isleem, 2003; Al-Oteawi, 2002), existing psychometric scales (Gressard & Loyd, 1986; Christensen & Knezek, 1996; Bannon, Marshall, & Fluegal, 1985; Gardner, Discenza & Dukes, 1993; Bear, Richards & Lancaster, 1987; Harrison & Rainer, 1992; Swadener & Hannifin, 1987; Meier, 1988; Jones & Clarke, 1994; Robertson, Calder, Fung, Jones, & O’Shea, 1995), literature on new technologies in developing countries (Na, 1993; Sooknanan, 2002; Al-Oteawi, 2002; Rogers, 1995), the diffusion of innovation theory (Rogers, 1995), and the experience of the researcher. As mentioned above, the quantitative instrument was a means of collecting self-reported data.
from the participants. The questionnaire consisted of six scales that correspond to the main variables of the study (see Appendices I & J):

- Section I: Attitudes toward ICT
- Section II: Perceived Computer Attributes
- Section III: Cultural Perceptions
- Section IV: Perceived Computer Competence
- Section V: Perceived Computer Access
- Section VI: Teacher Characteristics

All statements were either constructed by the researcher or selected from previous research based on their relevance to the current study and on their cultural and contextual appropriateness. Positive and negative items were balanced across the six scales.

Following is a detailed description of the constructs/variables in the study:

- **Attitudes toward ICT Scale:**

  Twenty attitude-related statements comprised the Attitude toward ICT (ATICT) Scale. The ATICT consisted of three subscales: (a) Affective (items 1-6), (b) Cognitive (items 7-15), and (c) Behavioral (items 16-20). In this study, these three components referred respectively to (a) a teacher’s emotional response or liking to ICT in education, (b) his/her factual knowledge about ICT, and (c) his/her overt behavior directed toward it (Zimbardo et al., 1977). The attitude toward technology, as the dependent variable, was quantified by the score of the 20 items using a 5-point, Likert-type scale, ranging from
strongly disagree (1), through disagree (2), neutral (3), and disagree (4), to strongly agree (5). The responses were reduced to a mean score that demonstrated how positive/negative each respondent’s attitude toward IT was. Since respondents rated their attitudes on each item from “strongly disagree” (1) to “strongly agree” (5), the range of possible mean scores was between 1 and 5, with higher scores indicating more positive attitudes.

- **Computer Attributes Scale:**

  Of the five innovation attributes identified by Rogers (1995), only four computer attributes, namely, relative advantage, compatibility, complexity, and observability were examined in the questionnaire. Trialibility, as the fifth computer attribute, was not examined because the majority of teachers in the study might have had no chance to experiment with computers before they were introduced into schools. The Computer Attributes Scale consisted of eighteen, Likert-type statements. The items were grouped into four subscales corresponding to the four innovation attributes. Thus, items 21-25 measured computers’ relative advantage, items 26-30 measured computer compatibility, items 30-34 measured computer complexity, and items 35-38 measured computer observability. To ensure systematicity in the negative/positive direction of all subscales, the negative items of the complexity subscale were reversed, and thus it was the simplicity (non-complexity) of computers that was measured. In other words, higher scores on the complexity subscale indicated positive perceptions about the simplicity of computers (or negative perceptions of the complexity of computers) and not the opposite. The scaling and the rating of the overall Computer Attributes scale was the same as that
of the ATICT Scale, with higher scores indicating more positive perceptions of computer attributes.

- **Cultural Perceptions Scale:**

  The Cultural Perceptions Scale consisted of sixteen, Likert-type statements. The statements took into account the teachers’ perceptions of the cultural value, relevance, and impact of ICT as it relates to both Syrian scholastic and national cultures. The scaling and rating of this scale were the same as that of the ATICT and the Computer Attributes Scales, with higher scores indicating more positive cultural perceptions.

- **Computer Competence Scale:**

  The Computer Competence Scale consisted of fifteen items. The items focused on the common computer uses in education: software installation (item 1), basic hardware (2-3), productivity software (e.g., word processing) (4-7), telecommunication resources (8-9), basic troubleshooting (10), graphic application (11), grade keeping (12), educational software evaluation (13), organization tools (e.g., use of folders) (14), and virus handling (15). Computer Competence was quantified by the score of the 15 items on a four-point scale, ranging from *no competence (1)*, through *little competence (2)*, and *moderate competence (3)*, to *much competence (4)*. The responses were reduced to a mean score that demonstrated how high/low each respondent’s perceived computer competence was.
• **Computer Access Scale:**

The Computer Access Scale consisted of three statements. The three statements about computer access took into account possible locations where computers might be available for use by EFL teachers: at home, in school, and other places (the last choice was given to accommodate locations not mentioned in the first two guided responses). Computer access, as an independent variable, was quantified by the score of the 3 access-related items on a 5-point scale, ranging from *never* (1), through *once a month* (2), *once a week* (3), and *2 or 3 times a week* (4), to *daily* (5). The responses were reduced to a mean score demonstrating the perceived level of computer access that each respondent had, with higher scores indicating greater computer access.

• **Teacher Characteristics:**

The items used to characterize high school EFL teachers in Hims were gender, age, income, teaching experience, school location, education, and teaching methods as well as computer training background. As mentioned previously, demographic variables were correlated with attitudes to ensure maximum control of extraneous variables by building them into the design of the study. Gay and Airasian (2000) state that “two types of extraneous variables in need of control are participant variables and environmental variables. Participant variables are the characteristics of the participants (such as gender) that cannot be altered but that can be controlled” (p. 383). Although demographic variables in general do not seem to have a consistent relationship with attitudes, a set of these variables were selected mainly based on their theoretical relevance to attitudes (Rogers, 1995). The selected variables were quantified by individual scores on eight
items. The responses to all eight items were treated separately as descriptive information that was correlated with the attitudes toward ICT.

- Gender: was measured by asking respondents “what is your gender?” with a dichotomized choice of male or female as guided responses.

- Age: was measured by asking respondents, “what is your age?” with a choice of ten-year interval as guided responses.

- Income: was measured by asking respondents, “What is your monthly average household income in Syrian Liras?” with a choice of 5-thousand lira interval as guided responses.

- Teaching Experience: was measured by asking respondents, “Including the current year, how many years have you been teaching?” with a choice of 5-year interval as guided responses.

- School location: was measured by asking respondents, “In what type of school do you teach?” with a choice of urban, suburban, and rural as guided responses.

- Education: was measured by asking respondents, “What is your highest completed academic degree? “ with a choice of Teacher Certificate, Bachelor’s and Master’s as guided responses.

- Training experience: was measured by asking respondents, “Have you ever attended any training course, workshop, or seminar on using computers?” with a choice of “yes” and “no”. For respondents answering with “yes” a further question asked them to specify the number of hours and/or days with no guided responses.
Teaching method: was measured by asking respondents, “What is the teaching method you use most often?” with a choice of Active discussion, Collaborative activities, Demonstration, Hands-on learning, Lecturing, Role playing, Computer-assisted instruction, and Other as guided responses.

Validity:

Face validity refers to “the degree to which a test appears to measure what it claims to measure” (Gay & Airasian, 2000, p. 164). Face validity of the instrument was established by a panel of experts. Content validity is “the degree to which a test measures an intended content area” (Gay & Airasian, 2000, p. 163). Content validity for the instrument was also established by the panel. The panel consisted of three content experts, two bilingual experts, one measurement expert, and four population experts (Syrian teachers) (see Appendix A). The instrument was evaluated during and after development. Feedback from the panel of experts was used to make modifications and clarifications prior to and after conducting the pilot study.

To ensure that Syrian EFL teachers had a complete comprehension of the instrument used in the study, the questionnaire was translated from English to Arabic and then back from Arabic into English by the researcher and another PhD student with expertise in Arabic-English translation. Both versions were reviewed by two bilingual experts: one is a professor of Arabic and Applied Linguistics and another a bilingual teacher in the Arabic program at the Ohio State University. One of the evaluators suggested few minor changes. In addition, face and content validity of the Arabic version
of the instrument was re-tested by a representative group (n=8) from the population for comprehensibility and clarity. The Arabic version of the questionnaire was used in the main study.

**Reliability:**

“Reliability is the degree to which a test consistently measures whatever it is measuring” (Gay and Airasian, 2000, p. 169). A reliability coefficient indicates the consistency of the score produced (Gay and Airasian, 2000). Reliability in this study was established using the pilot study data. The pilot study was carried out immediately after the approval of the Behavioral and Social Sciences Institutional Review Board at the Ohio State University had been obtained on the 30th of March, 2004. Thirty (30) subjects were included in the pilot study. The subjects in the pilot study were volunteers from the target population (some of whom were in the sample and some not).

Cronbach’s Alpha was used as a measure of internal-consistency. Cronbach’s Alpha estimates internal-consistency reliability by finding out how items of an instrument relate to each other and to the total instrument (Gay and Airasian, 2000). Cronbach’s alpha was calculated via SPSS.12 statistical package. The polarity of the negative questions in the Likert-type scales was reversed. This reversed polarity was used for subsequent analyses. Obtained Cronbach’s alphas from the pilot study and the actual study are reported in Table 3.1. Nunnally (1967, cited in Na, 1993) indicated that .50 to .60 would be high enough in the early stages of research. Based on the pilot study, some changes were made to the first three scales in order to increase their reliability in the main study. The changes included adding two items to the Attitude Scale, omitting two from
the Computer Attribute Scale, and modifying/adding seven on the Cultural Perceptions Scale.

In the actual study, the alpha coefficients for the four main scales were: computer attitude = .90, computer attributes = .86, cultural perceptions = .76, and computer competence = .94. The alpha coefficients of the computer attitude subscales were: affective = .71, cognitive = .81, and behavioral = .79. The reliability coefficients of the computer attribute subscales were: relative advantage = .80, compatibility = .61, complexity = .66, and observability = .60.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Subscale</th>
<th>No. of Main Study Items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pilot (n = 30)</td>
</tr>
<tr>
<td>Attitude toward ICT</td>
<td></td>
<td></td>
<td>.87</td>
</tr>
<tr>
<td></td>
<td>Affective</td>
<td>6</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>Cognitive</td>
<td>9</td>
<td>.78</td>
</tr>
<tr>
<td></td>
<td>Behavioral</td>
<td>5</td>
<td>.77</td>
</tr>
<tr>
<td>Computer Attributes</td>
<td></td>
<td>18</td>
<td>.84</td>
</tr>
<tr>
<td></td>
<td>Advantage</td>
<td>5</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>Compatibility</td>
<td>5</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>Complexity</td>
<td>4</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>Observability</td>
<td>4</td>
<td>.60</td>
</tr>
<tr>
<td>Cultural Perceptions</td>
<td></td>
<td>16</td>
<td>.54</td>
</tr>
<tr>
<td>Computer Competence</td>
<td></td>
<td>15</td>
<td>.94</td>
</tr>
</tbody>
</table>

Table 3.1: Summary of Reliability Analysis
**Interview Instrument:**

A semi-structured interview form (Gay & Airasian, 2000) was developed by the researcher in order to obtain more details related to the survey data collected in the first stage (see Appendices K & L). The interviews were intended to further probe some issues that were unanswered by the questionnaire data. In particular, the interviews were anticipated to provide some explanations for the positive attitudes of the participants, their cultural perceptions, and their lack of computer competence, access, and training. Each interview involved twelve structured questions and allowed for open-ended comments. Questions 1, 7, and 8 probed the interviewees’ views about the entry of ICT into Syrian society and school. Questions 2, 3, 4, 5, and 6 sought to examine the interviewees’ perceptions about the attributes of computers as well as their general cultural perceptions. Questions 9 (altering according to three different groups) sought to explain the interviewees’ low computer competence/access/training when they had positive attitudes toward ICT. Question 10 (also altering according to three different groups) sought to investigate the interviewees’ future plans in terms of increasing their computer competence/access/training as well as their suggestions about the training opportunities that they would like. Lastly, questions 11 and 12 allowed interviewees to add open comments at the end of the interviews. The interview instrument was piloted on one participant on May 29th, 2004 to ensure that the questions were comprehensible to the respondents. Due to the smooth flow of the pilot interview and the positive feedback of the interviewee, no change was made after the pilot.
Data Collection:

The data were collected in two stages. In stage one, the questionnaire described above was administered to the 326 participants included in the sample starting on the 27th of April, 2004. Following Dillman’s (1978) recommendations, a letter of recruitment, a letter of informed consent (which also included consent to participate in a follow-up interview), and a return envelope accompanied the questionnaire. Letters of support by the Syrian Ministry of Education (Appendix C) and the Director of English in the Department of Education in Hims (Appendix D) were used for accessing the schools and teachers. A total of 326 questionnaires were distributed over a period of three days from the 27th to the 29th of April. The questionnaires were delivered in person to school principals of each participant or group of participants (when two or more sample teachers were from the same school). Principals in turn distributed them to the teachers. This procedure was necessary to avoid low response rate given that Syrian schools were about to close for the final exams and then for the summer break. The teachers were given two weeks to complete the questionnaire. Three days before the deadline, school principals were asked via phone to remind teachers to complete the questionnaire. The questionnaires and the accompanying forms were collected in person from school principals from May 12th to May 14th. The principals of six schools where some teachers did not complete questionnaires were asked for a three-day extension for collecting the rest of the questionnaires from teachers. By May 17th, a total of 320 questionnaires were collected from the participants. Thus, the collection of the survey data encompassed three weeks, starting April 27 and ending on May 17. The response rate was 98.16%. The rate was high enough to avoid further survey distribution. Six out of 320 were not usable for
data analysis because they were not completed. Only 314 were analyzed, representing a valid response rate of 96.32% (Table 3.2).

<table>
<thead>
<tr>
<th>Number of Questionnaires</th>
<th>Distributed</th>
<th>Returned</th>
<th>Valid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>326</td>
<td>320</td>
<td>314</td>
</tr>
<tr>
<td>Percentage</td>
<td>100.00</td>
<td>98.16</td>
<td>96.32</td>
</tr>
</tbody>
</table>

Table 3.2: Response Rate and Percentages

In stage two, a purposeful sample of 15 teachers out of 97 who provided their consent to participate in follow-up interviews were interviewed via phone. As mentioned earlier, the criterion for choosing the interviewees was their “intense” responses on three independent variables: computer competence, computer access, and computer training. The selected subjects were contacted by phone twice. During the first contact (on 1st and 2nd of May, 2004), the researcher presented a cover story (Glesne & Peshkin, 1992) to reintroduce himself and his research topic, explain the purpose of the interview, request participation in the interview, and set up appointments for the interviews. One of the selected participants was not ready to be interviewed (because of travel issues) and was therefore replaced by another one with similar responses. The second contact (on June 4th, 5th, and 12th) was dedicated to the interviews themselves. All interviews lasted between 20-30 minutes, and all were audiotaped and then immediately coded.
Data Analysis Procedures:

Both descriptive and inferential statistics were employed for analyzing the quantitative data of this study. Descriptive statistics was used to describe and summarize the properties of the mass of data collected from the respondents (Gay & Airasian, 2000, p. 437). Inferential statistics was used to infer the properties of the population from the properties of the sample (Best & Khan, 1993, p. 276). All analyses were carried out with SPSS.12 statistical package. By convention, an alpha level of .05 was established a priori for determining statistical significance. Prior to conducting the analysis, the scoring of all negatively stated items was reversed. Table 3.3 illustrates the research questions in relation to statistical methods that were used to answer them.

<table>
<thead>
<tr>
<th>N.</th>
<th>Research Question</th>
<th>Analysis Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What are the attitudes of high school EFL teachers in Syria toward ICT in education?</td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td>2.</td>
<td>What are the teachers’ perceptions of:</td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td></td>
<td>• Computer attributes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cultural relevance of ICT to Syrian society and school?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Their level of computer competence?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Their level of access to computers?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>What is the relationship between teachers’ attitudes toward ICT and their perceptions of each of the independent variables (including teachers’ characteristics)?</td>
<td>Pearson &amp; Spearman Correlations</td>
</tr>
<tr>
<td>4.</td>
<td>What is the proportion of the variance in the attitudes of teachers toward ICT in education that can be explained by the selected independent variables and the relative significance of each independent variable in explaining the dependent variable?</td>
<td>Analysis of Multiple Regression</td>
</tr>
</tbody>
</table>

Table 3.3: Statistical analysis procedures used to answer research questions
Descriptive statistics was used to answer questions 1 and 2. Statistics used to describe interval data were means, standard deviations, mode, and range. Ordinal and nominal data were described using the mode and frequency distribution. Inferential statistics was used to answer questions 3 and 4. Following Gay and Airasian’s (2000) recommendations, simple correlations (using Pearson and Spearman analyses) were first performed to identify independent variables that individually correlate with the dependent variable (attitudes toward ICT). These variables were used in the multiple regression equation to make a more accurate prediction of the dependent variable and to show the proportion of variance in the dependent variable explained by the selected independent variables.

The qualitative data were analyzed using an interpretive qualitative approach (Glesne, 1998). Within this paradigm, “it is possible to understand the subjective meaning of action (grasping the actor’s beliefs, desires and so on) yet do so in an objective manner” (Schwandt, 2000, p.193). Interviews were transcribed verbatim and then coded. The coding followed the procedure recommended by Glesne (1998) for data cataloging using analytic codes, categorization, and theme-searching. In developing codes, the first step was to systematically read and group the participants’ transcribed responses according to the research questions. After this basic grouping of data, recurring words, phrases, and ways of thinking within each group were identified and then labeled into coding categories. Related codes were synthesized into broader codes. For verification purposes, a combination of manual and computer-assisted methods was employed to code the data. The particular computer program used for coding the data was NUDIST (N6). Relevant quotations were grouped with their related codes and then
translated into English. To ensure the anonymity of the respondents, pseudonyms were used to identify individual respondents. Lastly, the relationships amongst codes were sought and then assembled into themes and sub-themes before final reporting. The results of the qualitative data are reported separately in chapter four.
CHAPTER 4

DATA ANALYSIS AND RESULTS

Reporting the findings of the data analysis, this chapter starts with a brief summary of the teachers’ characteristics before addressing the results around each the research questions. The second section presents descriptive statistics of the teachers’ attitudes toward ICT. The third section presents descriptive statistics of teachers’ perceptions of (a) computer attributes, (b) cultural relevance of computers, (c) their own computer competence, and (d) their computer access. The fourth section employs Pearson and Spearman correlations to present the relationship between computer attitudes and each of the independent variables. The fifth section uses multiple regression analysis to present the proportion of variance in the dependent variable that is explained by the selected independent variables and the relative significance of each independent variable in explaining the dependent variable. The last section summarizes the themes, patterns, and relationships that emerged from the qualitative data (interviews).
Descriptive Summary of Teachers’ Characteristics

Teachers’ characteristics are presented in terms of (1) demographic information, including sex, age, income, teaching experience, school location, education, and preferred teaching method as well as (2) information regarding background in computer training (Table 4.1).

Twenty percent (20%; n=63) of the respondents were males while 80% (n=251) were females. More than half of the respondents (52.9%; n=166) were within the 30-39 age range, 30.2% (n=95) were within the 40-49 age range, 8.9% (n=28) were between 20 and 29, and 8% were between 50 and 59. None were 60 or older. Forty point eight percent (40.8%; n=128) of the respondents earned 10,000 to 14,000 Syrian Liras a month, 25.8% (n=81) earned between 5,000 and 9,000, 20.3% (n=65) earned within the 15,000-19,000 income range, 8.6 % (n=27) earned between 20,000 and 24,000, and only 4.1% (n=13) earned 25,000 or more. Participants’ responses on their teaching experience showed that 29.9% (n=94) of them had 16 to 20 years of experience, 21.7% (n=68) were in their first five years of teaching, 21.3% (n=67) had 11 to 15 years, 14.3% (n=45) had 21 or more years, and only 12.7% (n=40) had 6 to 10 years. The majority of the respondents (61.5%; n=193) taught in urban schools, while 24.2% (n=76) taught in rural schools, and 14.3% (n=45) in suburban schools. More than half of the respondents (51%; n=160) held bachelor’s degrees, and a little less (48%; n=151) had teacher certificates. Only 1% (n=3) had Masters’ degrees.

Most of the respondents (64.7%; n=203) reported that they had had no computer training. Fourteen percent (14%; n=44) of the teachers had between 1 to 20 hours of
<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>63</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>251</td>
<td>80.0</td>
</tr>
<tr>
<td>Age</td>
<td>20-29</td>
<td>28</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>166</td>
<td>52.9</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>95</td>
<td>30.2</td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>24</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>&gt;=60</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Income</td>
<td>5,000- 9,000</td>
<td>81</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>10,000- 14,000</td>
<td>128</td>
<td>40.8</td>
</tr>
<tr>
<td></td>
<td>15,000- 19,000</td>
<td>65</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>20,000- 24,000</td>
<td>27</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>&gt;=25,000</td>
<td>13</td>
<td>4.1</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>1- 5 years</td>
<td>68</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>40</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>11-15 years</td>
<td>67</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>16-20 years</td>
<td>94</td>
<td>29.9</td>
</tr>
<tr>
<td></td>
<td>&gt;= 21 years</td>
<td>45</td>
<td>14.3</td>
</tr>
<tr>
<td>School Location</td>
<td>Urban</td>
<td>193</td>
<td>61.5</td>
</tr>
<tr>
<td></td>
<td>Suburban</td>
<td>45</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>76</td>
<td>24.2</td>
</tr>
<tr>
<td>Education</td>
<td>Teacher certificate</td>
<td>151</td>
<td>48.0</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s</td>
<td>160</td>
<td>51.0</td>
</tr>
<tr>
<td></td>
<td>Master’s</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>Training</td>
<td>No</td>
<td>203</td>
<td>64.7</td>
</tr>
<tr>
<td></td>
<td>Yes 1-20 days</td>
<td>44</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>21-40 days</td>
<td>48</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>41-60 days</td>
<td>17</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>&gt;=61 days</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Teaching Method</td>
<td>Active discussion</td>
<td>122</td>
<td>38.9</td>
</tr>
<tr>
<td></td>
<td>Collaborative act.</td>
<td>71</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>Demonstration</td>
<td>48</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>Hands-on</td>
<td>26</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>Lecturing</td>
<td>11</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Role playing</td>
<td>36</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Computer-assisted</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.1: Summary of teachers’ characteristics
training, 15.3% (n=48) had between 21 and 40 hours, and 5.4% (n=17) had between 41 and 60 hours. Only 0.6% of them (n=2) had a training of more than 60 hours. The teaching method most commonly used by the respondents was Active Discussion (38.9%; n=122) and the least used is Computer Assisted Learning (0%; n=0). Collaborative Activities were the second most used teaching method (22.6%; n=71), and Demonstrations were the third (15.3%; n=48). Only 11.5% (n=36) used Role Playing, 8.3% (n=26) used Hands-on Learning, and 3.5% (n=11) relied on Lecturing. No other teaching methods were reported by respondents in the “Other” option.

**Research Question One: Teachers’ Attitudes toward ICT in Education**

Participants were asked to respond to 20, Likert-type statements dealing with their attitudes toward ICT in education. Table 4.2 illustrates the frequency of participants’ responses to the 20-item Attitude Scale. The first six items were designed to measure the affective domain of computer attitude. The next nine items were designed to measure the cognitive domain. The last five items were designed to measure the behavioral domain. Computer attitudes of EFL teachers were represented by a mean score on a 5-point scale, where 5 (Strongly Agree) represents the maximum score of the scale and 1 (Strongly Disagree) represents the minimum score. Higher scores indicate more positive attitudes and lower scores indicate less positive attitudes.
<table>
<thead>
<tr>
<th>N.</th>
<th>Computer Attitude Scale</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SD D N A</td>
</tr>
<tr>
<td>1</td>
<td>Computers do not scare me at all</td>
<td>2.9 4.5 8.9 54.1 29.6</td>
</tr>
<tr>
<td>2</td>
<td>*Computers make me feel uncomfortable</td>
<td>1.6 6.7 8.3 52.2 31.2</td>
</tr>
<tr>
<td>3</td>
<td>I am glad there are more computers these days</td>
<td>1.3 2.6 4.1 55.1 36.9</td>
</tr>
<tr>
<td>4</td>
<td>*I do not like talking with others about computers</td>
<td>2.6 14.3 7.3 58.3 17.5</td>
</tr>
<tr>
<td>5</td>
<td>Using computers is enjoyable</td>
<td>0.6 1.3 8.9 47.1 42.0</td>
</tr>
<tr>
<td>6</td>
<td>*I dislike using computers in teaching</td>
<td>6.1 12.1 13.4 49.0 19.4</td>
</tr>
<tr>
<td>7</td>
<td>Computers save time and effort</td>
<td>0.6 2.6 6.1 37.6 53.2</td>
</tr>
<tr>
<td>8</td>
<td>*Schools would be a better place without computers</td>
<td>1.6 3.2 10.8 43.3 41.1</td>
</tr>
<tr>
<td>9</td>
<td>Students must use computers in all subject matters</td>
<td>4.8 17.5 21.3 42.7 13.7</td>
</tr>
<tr>
<td>10</td>
<td>*Learning about computers is a waste of time</td>
<td>0.6 1.6 4.8 36.9 56.1</td>
</tr>
<tr>
<td>11</td>
<td>Computers would motivate students to do more study</td>
<td>1.9 11.5 25.2 47.1 14.3</td>
</tr>
<tr>
<td>12</td>
<td>Computers are fast and efficient means of getting information</td>
<td>1.0 1.6 3.2 34.7 59.6</td>
</tr>
<tr>
<td>13</td>
<td>*I would never need a computer in my classroom</td>
<td>3.2 10.5 26.1 47.8 12.4</td>
</tr>
<tr>
<td>14</td>
<td>Computers can enhance students’ learning</td>
<td>0.6 2.6 9.9 61.8 25.2</td>
</tr>
<tr>
<td>15</td>
<td>*Computers do more harm than good</td>
<td>1.0 3.2 8.6 47.8 39.5</td>
</tr>
<tr>
<td>16</td>
<td>*I would rather do things by hand than with a computer</td>
<td>4.1 16.9 10.2 55.4 13.4</td>
</tr>
<tr>
<td>17</td>
<td>If I had the money, I would buy a computer</td>
<td>1.9 4.1 4.1 40.5 49.4</td>
</tr>
<tr>
<td>18</td>
<td>*I would avoid computers as much as possible</td>
<td>1.3 5.1 5.4 48.1 40.1</td>
</tr>
<tr>
<td>19</td>
<td>I would like to learn more about computers</td>
<td>0.3 2.2 1.9 42.4 53.2</td>
</tr>
<tr>
<td>20</td>
<td>*I have no intention to use computers in the near future.</td>
<td>1.3 5.4 11.5 43.6 38.2</td>
</tr>
</tbody>
</table>

Scale: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

Note: * polarity reversed on these items

Table 4.2: Frequency Percentages on the Attitudes Scale

Insofar as the affective domain is concerned, the mean score of participants’ responses was 4.00 (S.D. = 0.5), indicating positive affect toward ICT (Table 4.3). The majority of the respondents agreed or strongly agreed that they had no apprehension of computers (83.7%), were glad about the increase of computers (92%), and felt using computers enjoyable (89.1%). Also, most of the teachers disagreed or strongly disagreed with the three negatively stated items 2, 4, and 6. This means that they felt comfortable
about computers (83.4%), liked to talk with others about them (75.5%), and liked using them in teaching (68.4%).

Regarding the cognitive domain, the mean score was 4.05 (S.D. = 0.4), indicating positive cognition of ICT (Table 4.3). The majority of the respondents agreed or strongly agreed that computers save time and effort (90.8%), must be used in all subject matters (56.4%), motivate students to do more study (61.4%), are fast and efficient means of getting information (94.3%), and enhance students’ leaning (87%). Also, most of the respondents disagreed or strongly disagreed with the four negatively stated items 8, 10, 13, and 15. That is, they thought that computers would make schools a better place (84.4%), are worth the time spent on learning them (93%), are needed in the classroom (60.2%), and do more good than harm (87.3%).

In the behavioral domain, the mean score was 4.13 (S.D. = 0.5), indicating positive behavioral intentions toward ICT (Table 4.3). The majority of the respondents intended to buy computers (89.9%) and to learn about them (95.6%). Also, most of the teachers disagreed or strongly disagreed with the three negatively stated items 16, 18, and 20. In other words, they preferred doing things by computers to doing them by hand (68.8%), were willing to use computers (88.2%), and had the intention to use them in the near future (81.8%).
### Table 4.3: Distribution of Mean Scores on the Attitude toward ICT Scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>Percent (%)</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly Negative</td>
<td>Negative</td>
<td>Neutral</td>
</tr>
<tr>
<td>Affect</td>
<td>0.3</td>
<td>0.6</td>
<td>13.7</td>
</tr>
<tr>
<td>Cognition</td>
<td>0.0</td>
<td>1.0</td>
<td>12.4</td>
</tr>
<tr>
<td>Behavior</td>
<td>0.3</td>
<td>2.9</td>
<td>8.3</td>
</tr>
<tr>
<td>Overall Attitude</td>
<td>0.0</td>
<td>0.6</td>
<td>11.8</td>
</tr>
</tbody>
</table>

In general, teachers’ attitudes toward ICT were positive with an overall mean score of 4.05 and a standard deviation of 0.38 (Table 4.3). After reversing the negatively stated items, the mode score for the Attitude Scale was “Agree” (4). The range of respondents’ mean scores was between 4.50 and 3.43. Participants responded most favorably to item 12 (mean=4.50), and least favorably to item 9 (mean=3.43).

### Research Question Two: Teachers’ Perceptions in Terms of Factors Related to Attitudes toward ICT

This section presents a description of teachers on four main independent variables: (a) perceived computer attributes, (b) cultural perceptions, (c) perceived computer competence, and (d) perceived level of computer access.

- **Computer Attributes:**

  Participants were asked to respond to 18, Likert-type statements dealing with their perceptions about computer attributes. Table 4.4 illustrates the frequency of participants’
responses to the 18-item Computer Attributes Scale. The items were designed to measure teachers’ perceptions of the relative advantage of computers (items 1-5), their compatibility with teachers’ current practices (items 6-10), their complexity (items 11-14), and their observability (items 15-18).

<table>
<thead>
<tr>
<th>N.</th>
<th>Computer Attributes Scale</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SD</td>
</tr>
<tr>
<td>1</td>
<td>Computers will improve education</td>
<td>0.6</td>
</tr>
<tr>
<td>2</td>
<td>Teaching with computers offers real advantages over traditional methods of instruction</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>*Computer technology cannot improve the quality of students’ learning</td>
<td>3.2</td>
</tr>
<tr>
<td>4</td>
<td>Using computer technology in the classroom would make the subject matter more interesting</td>
<td>0.3</td>
</tr>
<tr>
<td>5</td>
<td>*Computers are not useful for language learning</td>
<td>1.3</td>
</tr>
<tr>
<td>6</td>
<td>*Computers have no place in schools</td>
<td>1.3</td>
</tr>
<tr>
<td>7</td>
<td>Computer use fits well into my curriculum goals</td>
<td>2.2</td>
</tr>
<tr>
<td>8</td>
<td>*Class time is too limited for computer use</td>
<td>18.2</td>
</tr>
<tr>
<td>9</td>
<td>Computer use suits my students’ learning preferences and their level of computer knowledge</td>
<td>1.6</td>
</tr>
<tr>
<td>10</td>
<td>Computer use is appropriate for many language learning activities</td>
<td>0.6</td>
</tr>
<tr>
<td>11</td>
<td>*It would be hard for me to learn to use the computer in teaching</td>
<td>2.2</td>
</tr>
<tr>
<td>12</td>
<td>I have no difficulty in understanding the basic functions of computers</td>
<td>3.2</td>
</tr>
<tr>
<td>13</td>
<td>*Computers complicate my task in the classroom</td>
<td>3.2</td>
</tr>
<tr>
<td>14</td>
<td>Everyone can easily learn to operate a computer</td>
<td>2.9</td>
</tr>
<tr>
<td>15</td>
<td>*I have never seen computers at work</td>
<td>1.6</td>
</tr>
<tr>
<td>16</td>
<td>Computers have proved to be effective learning tools worldwide</td>
<td>1.3</td>
</tr>
<tr>
<td>17</td>
<td>*I have never seen computers being used as an educational tool</td>
<td>7.3</td>
</tr>
<tr>
<td>18</td>
<td>I have seen some Syrian teachers use computers for educational purposes</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Scale: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

Note: * polarity reversed on these items

Table 4.4: Frequency Percentages on the Computer Attributes Scale
Respondents had positive perceptions of the relative advantage of computers, with a mean score of 4.04 (S.D. = 0.59) (Table 4.5). The majority of the respondents agreed or strongly agreed that computers will improve education (82.1%), offer real advantage over traditional methods of instruction (73.5%), and make the subject matter more interesting (91.1%). Also, most of the teachers disagreed or strongly disagreed with the two negatively stated items 3 and 5. Therefore, they considered that computers can improve the quality of students’ learning (67.5%) and are also useful for language learning (90.1%).

Teachers’ perceptions of the compatibility of computers with their current practices were midway between neutral and positive with a mean score of 3.54 (S.D. = 0.54) (Table 4.5). A high percentage of the respondents agreed or strongly agreed that computer use suits their students’ learning preferences and level of computer knowledge (58.2%) and is also appropriate for many language learning activities (89.8%). The majority (83.5%) disagreed or strongly disagreed that computers have no place in schools. Forty-one point one percent (41.1%) of the respondents were neutral about whether or not computer use fits well in their curriculum goals. The same percentage of respondents (41.08%) agreed or strongly agreed that class time is too limited for computer use.

Teachers’ perceptions of the simplicity of computers (i.e., “complexity” before the negative items were reversed) were also midway between neutral and positive with a mean score of 3.48 (S.D. = 0.67) (Table 4.5). Around half of the respondents (47.5%) agreed or strongly agreed that they had no difficulty in understanding the basic functions
of computers. A high percentage of them (65%) reported that everyone can easily learn to operate a computer. Also, most of them disagreed or strongly disagreed with the two negatively stated items 11 and 13, suggesting that it is easy to use computers in teaching (61.2%) and that computers do not complicate the teachers’ task in the classroom (58%).

The mean score of teachers’ responses to four-item observability subscale was 3.70 (S.D. = 0.68), indicating somewhat positive perceptions (Table 4.5). A high percentage of the respondents agreed or strongly agreed that computers have proven to be effective educational tools worldwide (81.9%) and that they had seen other Syrian teachers use computers for educational purposes (47.2%). Also, most of the respondents disagreed or strongly disagreed with two negatively stated items 15 and 17, indicating that they had seen computers at work (87.9%) and as an educational tool (54.8%).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Percent (%)</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly</td>
<td>Negative</td>
<td>Neutral</td>
</tr>
<tr>
<td>Advantage</td>
<td>0.3</td>
<td>1.0</td>
<td>12.7</td>
</tr>
<tr>
<td>Compatibility</td>
<td>0.3</td>
<td>2.6</td>
<td>43.0</td>
</tr>
<tr>
<td>Complexity</td>
<td>0.0</td>
<td>4.8</td>
<td>36.9</td>
</tr>
<tr>
<td>Observability</td>
<td>0.0</td>
<td>3.8</td>
<td>28.3</td>
</tr>
<tr>
<td>Overall Attributes</td>
<td>0.0</td>
<td>1.3</td>
<td>29.0</td>
</tr>
</tbody>
</table>

Table 4.5: Distribution of Mean Scores on the Computer Attributes Scale

In general, teachers’ perceptions of computers’ attributes were somewhat positive with an overall mean score of 3.7 and a standard deviation of 0.38 (Table 4.5).
reversing the negatively stated items, the mode score for the overall Computer Attribute scale was “Agree” (4). The range of respondents’ mean scores was between 4.28 and 2.45. Respondents responded most favorably to item 5 (mean=4.28) and least favorably to item 8 (mean=2.45).

**Cultural Perceptions:**

Participants were asked to respond to 16, Likert-type statements dealing with their perceptions about computers’ cultural relevance to and impact on Syrian society and schools. Table 4.6 shows the frequency of participants’ responses to the 16-item Cultural Perceptions scale.

Teachers’ perceptions of the cultural relevance of computers were somehow midway between neutral and positive. The overall mean score on the Cultural Perceptions Scale was 3.38 with a standard deviation of 0.44 (Table 4.7). The majority of the respondents agreed or strongly agreed that students need to know how to use computers for their future jobs (87.2%), that knowing about computers earns one the respect of others (70.1%), that computers contribute to improving their standard of living (69.4%), that using computers would not hinder Arab generations from learning their traditions (62.1%), that people who are skilled in computers have privileges not available to others (84.7%), that the increased proliferation of computers will make their lives easier (80.9%), that working with computers does not diminish people’s relationships with one other (51.9%), and that computers should be a priority in education (80.3%). Also, a high percentage of the respondents disagreed or strongly disagreed with the four negatively stated items 1, 10, 13, and 15, indicating that computers will make a difference in their
classrooms, schools, and lives (78.1%), that computers will not increase their dependence on foreign countries (38.2%), that computers do not dehumanize society (70%), and that computers do not encourage unethical practices (46.9%).

<table>
<thead>
<tr>
<th>N.</th>
<th>Cultural Perceptions Scale</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>*Computers will not make any difference in our classrooms, schools, or lives</td>
<td>0.6  6.1  15.3  54.8  23.3</td>
</tr>
<tr>
<td>2</td>
<td>Students need to know how to use computers for their future jobs</td>
<td>0.0  3.2  9.6  60.8  26.4</td>
</tr>
<tr>
<td>3</td>
<td>*Students prefer learning from teachers to learning from computers</td>
<td>6.1  23.6  38.9  27.4  4.1</td>
</tr>
<tr>
<td>4</td>
<td>Knowing about computers earns one the respect of others</td>
<td>1.9  13.4  20.4  49.7  20.4</td>
</tr>
<tr>
<td>5</td>
<td>*We need computers that suit better the Arabic culture and identity</td>
<td>31.2  52.2  8.6  5.4  2.6</td>
</tr>
<tr>
<td>6</td>
<td>Computers will improve our standard of living</td>
<td>1.0  4.8  24.8  43.0  26.4</td>
</tr>
<tr>
<td>7</td>
<td>Using computers would not hinder Arab generations from learning their traditions</td>
<td>4.1  9.9  23.9  48.7  13.4</td>
</tr>
<tr>
<td>8</td>
<td>*Computers are proliferating too fast</td>
<td>27.7  60.8  6.7  4.5  0.3</td>
</tr>
<tr>
<td>9</td>
<td>People who are skilled in computers have privileges not available to others</td>
<td>0.0  3.8  11.5  51.6  33.1</td>
</tr>
<tr>
<td>10</td>
<td>*Computers will increase our dependence on foreign countries</td>
<td>6.4  26.1  29.3  31.2  7.0</td>
</tr>
<tr>
<td>11</td>
<td>*There are other social issues that need to be addressed before implementing computers in education</td>
<td>12.1  41.1  16.6  23.9  6.4</td>
</tr>
<tr>
<td>12</td>
<td>The increased proliferation of computers will make our lives easier</td>
<td>1.6  5.4  12.1  65.0  15.9</td>
</tr>
<tr>
<td>13</td>
<td>*Computers dehumanize society.</td>
<td>3.5  10.5  15.9  48.7  21.3</td>
</tr>
<tr>
<td>14</td>
<td>Working with computers does not diminish people’s relationships with one other</td>
<td>5.7  26.4  15.9  43.3  8.6</td>
</tr>
<tr>
<td>15</td>
<td>*Computers encourage unethical practices</td>
<td>7.6  19.4  26.1  32.2  14.7</td>
</tr>
<tr>
<td>16</td>
<td>Computers should be a priority in education</td>
<td>1.9  5.4  12.4  51.0  29.3</td>
</tr>
</tbody>
</table>

Scale: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

Note: * polarity reversed on these items

Table 4.6: Frequency Percentages on the Cultural Perceptions Scale
However, the majority of the respondents (83.44%) agreed or strongly agreed that they need computers that better suit the Arabic culture and identity. Almost all of the respondents (91.4%) stated that computers are proliferating too fast. Also, more than half of the respondents (53.18%) saw that there are other social issues that need to be addressed before implementing computers in education. In addition, a high percentage of them (38.9%) were neutral about whether or not students prefer learning from teachers to learning from computers. After reversing the negatively stated items, the mode score for the Cultural Perceptions Scale was “Agree”. The range of respondents’ mean scores was between 4.14 and 1.89. Participants responded most favorably to item 9 (mean=4.14), and least favorably to item 8 (mean=1.89).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Percent (%)</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highly</td>
<td>Negative</td>
<td>Neutral</td>
</tr>
<tr>
<td>Cultural Perceptions</td>
<td>0.3</td>
<td>1.0</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Table 4.7: Distribution of Mean Scores on the Cultural Perceptions Scale

- **Computer Competence:**

Participants were asked to respond to 15 statements dealing with their perceptions about their level of computer competence. Table 4.8 shows the frequency of teachers’ responses to the 15-item Computer Competence scale. Computer competence of EFL teachers was represented by a mean score on a 4-point scale ranging from 1 (No Competence) to 4 (Much Competence).
<table>
<thead>
<tr>
<th>No.</th>
<th>Computer Competence Items</th>
<th>Percent (%)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install new software on a computer.</td>
<td>59.9</td>
<td>21.7</td>
<td>13.4</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Use a printer</td>
<td>41.1</td>
<td>20.7</td>
<td>24.2</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Use a computer keyboard</td>
<td>15.9</td>
<td>16.2</td>
<td>42.0</td>
<td>25.8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Operate a word processing program</td>
<td>35.7</td>
<td>22.0</td>
<td>29.9</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Operate a presentation program</td>
<td>61.1</td>
<td>23.9</td>
<td>13.1</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Operate a spreadsheet program</td>
<td>64.3</td>
<td>22.0</td>
<td>10.8</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Operate a database program</td>
<td>75.2</td>
<td>16.9</td>
<td>6.7</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Use the Internet for communication</td>
<td>64.0</td>
<td>15.6</td>
<td>16.6</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Use the World Wide Web to access different types of information.</td>
<td>65.9</td>
<td>12.7</td>
<td>16.2</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Solve simple problems in operating computers.</td>
<td>52.5</td>
<td>26.8</td>
<td>18.2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Operate a graphics program.</td>
<td>49.4</td>
<td>24.8</td>
<td>20.4</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Use computers for grade keeping.</td>
<td>43.3</td>
<td>21.7</td>
<td>24.2</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Select and evaluate educational software.</td>
<td>60.2</td>
<td>18.8</td>
<td>17.2</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Create and organize computer files and folders.</td>
<td>52.2</td>
<td>21.3</td>
<td>19.4</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Remove computer viruses</td>
<td>81.5</td>
<td>10.2</td>
<td>7.6</td>
<td>0.6</td>
<td></td>
</tr>
</tbody>
</table>

Scale: No competence=1, Little competence=2, Moderate competence=3, Much competence=4

Table 4.8: Frequency Percentages on the Computer Competence Scale

On average, the respondents reported that they had “Little Competence” in using computers. The overall mean score of teachers’ responses on the Computer Competence Scale was 1.78 with a standard deviation of 0.67 (Table 4.9). The majority of the respondents (82.80%) had little or no competencies in handling most of the computer functions, including software installation, printer usage, productivity software, telecommunication resources, basic troubleshooting, graphic application, grade keeping, educational software evaluation, organization tools, and virus removal. The only computer function at which respondents seemed to be moderately competent was “keyboard usage” (mean=2.78). The range of respondents’ mean scores on the Computer
Competence Scale was between 2.78 and 1.27. Respondents were most competent at the use of keyboard (item 3, mean = 2.78) and least competent at handling computer viruses (item 15, mean= 1.27).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Percent (%)</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No competence</td>
<td>Little competence</td>
<td>Moderate competence</td>
</tr>
<tr>
<td>Computer competence</td>
<td>43.3</td>
<td>39.5</td>
<td>16.7</td>
</tr>
</tbody>
</table>

Table 4.9: Distribution of Mean Scores on the Computer Competence Scale

- **Computer Access:**

Participants were asked to rate their level of access to potential computer places: at home, school and other places (Table 4.10). Computer access of EFL teachers was represented by a mean score on a 5-point scale ranging from 1 (Never) to 5 (Daily).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Percent (%)</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>Once a month</td>
<td>Once a week</td>
</tr>
<tr>
<td>Home</td>
<td>43.0</td>
<td>9.2</td>
<td>7.6</td>
</tr>
<tr>
<td>School</td>
<td>66.6</td>
<td>16.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Other (cafés, friends, relatives, university, work)</td>
<td>74.5</td>
<td>11.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Overall Access Level</td>
<td>40.8</td>
<td>34.7</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Table 4.10: Distribution of Mean Scores on the Computer Access Scale
As Table 4.10 illustrates, “Home” was the respondents’ most frequent place of computer access with fifty-seven (57%; n=179) of them having access to it either daily (30.6%; n=96), biweekly or three times a week (9.6%; n=30), weekly (7.6%; n=24), or monthly (9.2%; n=29). Schools came second with thirty-three point four (33.4%; n=105) of the respondents having access to it either daily (5.1%; n=16), biweekly or three times a week (4.5%; n=14), weekly (7.3%; n=23), or monthly (16.6%; n=52). Only twenty-five point five (25.5%; n=80) of the respondents had access to computers in places other than home and school. These places included Internet cafes (12.1%; n=38), friends (6.1%; n=19), relatives (3.8%; n=12), university (1.3%; n=4), and private work (2.2%; n=7). The level of access to these places ranged from daily (2.5%; n=8), biweekly or three times a week (4.1%; n=13), weekly (7.0%; n=22), to monthly (11.8%; n=37). The mean score on the Computer Access Scale was 1.96 (S.D. = 0.86), which indicates that a typical teacher had access to computers almost once a month.

**Research Question Three: Relationship between Teachers’ Attitudes and Independent Variables**

This section addresses the third research question concerning the relationship between teachers’ attitudes toward ICT in education and the main independent variables of this study: computer attributes, cultural perceptions, computer competence, computer access, and demographic characteristics. The conventions used to determine the strength of correlations came from Davis (1971), who suggests that a coefficient of 1.00 signifies a perfect relationship. A coefficient of .70+ indicates a very strong relationship. A coefficient between .50 and .69 shows a substantial relationship, between .30 and .49 a
moderate relationship, between .10 and .29 a low relationship, and between .01 and .09 a negligible relationship.

Pearson Product Moment correlations were used to represent the relationships between the variables measured on an interval level (i.e., Computer attributes, cultural perceptions, computer competence, computer access, and computer training). Spearman Rank Order correlations were used to determine the relationship between the interval dependent variable and the nominal and ordinal independent variables (i.e., demographic variables with the exception of computer training). The correlation matrix shows a number of significant relationships between attitudes and the independent variables (Table 4.11). The title row of the matrix contains the dependent variable (attitudes) and five independent variables that were found to be significantly related to computer attitudes. The rest of the matrix shows the power and direction of the relationships amongst these variables and with the rest of the independent variables (mainly demographic variables).
As Table 4.11 illustrates, there was a very strong positive relationship \((r = .74, p < .05)\) between teachers’ attitudes toward ICT in education and computer attributes. Further analysis showed positive associations between teachers’ attitudes and each of the four computer attributes (Table 4.12). Thus, a very strong positive relationship \((r = .71, p < .05)\) was found between teachers’ attitudes and their perceptions of the relative advantage of computers. Also, moderate positive relationships were found between teachers’ attitudes and the three remaining computer attributes: compatibility \((r = .58, p < .05)\), complexity \((r = .59, p < .05)\), and observability \((r = .43, p < .05)\). There was a substantial positive relationship \((r = .62, p < .05)\) between teachers’ attitudes toward ICT and their cultural perceptions. A moderate positive relationship \((r = .30, p < .05)\) existed between teachers’ attitudes and their level of computer competence. Also, there was a low positive association \((r = .17, p < .05)\) between teachers’ attitudes and their level of computer

<table>
<thead>
<tr>
<th>Variable</th>
<th>Attitude</th>
<th>Attributes</th>
<th>Culture</th>
<th>Competence</th>
<th>Access</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer attributes</td>
<td>.74**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural perceptions</td>
<td>.62**</td>
<td>.66**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. competence</td>
<td>.30**</td>
<td>.34**</td>
<td>.15**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. access</td>
<td>.17**</td>
<td>.25**</td>
<td>.20**</td>
<td>.41**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>.15**</td>
<td>212**</td>
<td>.10</td>
<td>.37**</td>
<td>.07</td>
<td>1.00</td>
</tr>
<tr>
<td>Gender</td>
<td>-.08</td>
<td>-.14*</td>
<td>-.09</td>
<td>-.14*</td>
<td>-.15**</td>
<td>-.11</td>
</tr>
<tr>
<td>Age</td>
<td>-.08</td>
<td>-.07</td>
<td>-.04</td>
<td>-.03</td>
<td>.07</td>
<td>-.06</td>
</tr>
<tr>
<td>Income</td>
<td>-.01</td>
<td>-.01</td>
<td>-.01</td>
<td>.01</td>
<td>.12*</td>
<td>.01</td>
</tr>
<tr>
<td>Teaching experience</td>
<td>-.10</td>
<td>-.04</td>
<td>.06</td>
<td>-.10</td>
<td>.08</td>
<td>-.15**</td>
</tr>
<tr>
<td>School location</td>
<td>-.04</td>
<td>-.01</td>
<td>-.14*</td>
<td>.04</td>
<td>-.07</td>
<td>.13*</td>
</tr>
<tr>
<td>Education</td>
<td>.01</td>
<td>.02</td>
<td>.03</td>
<td>.07</td>
<td>.07</td>
<td>.18**</td>
</tr>
<tr>
<td>Teaching Method</td>
<td>.01</td>
<td>.03</td>
<td>.08</td>
<td>-.05</td>
<td>-.01</td>
<td>.10</td>
</tr>
</tbody>
</table>

**: \(p < .01\);  *: \(p < .05\)

Table 4.11: Summary of the Correlation Matrix of Independent Variables and Attitudes
access. Lastly, a low positive relationship (r = .15, p< .05) existed between teachers’ attitudes and the length of computer training they received. All the above associations were significant at the .05 level of significance (and also at the .01 level of significance).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Attitudes</th>
<th>Advantage</th>
<th>Compatibility</th>
<th>Complexity</th>
<th>Observability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>relative advantage</td>
<td>.71**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>.58**</td>
<td>.61**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td>.59**</td>
<td>.51**</td>
<td>.46**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Observability</td>
<td>.43**</td>
<td>.51**</td>
<td>.41**</td>
<td>.36**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**: p<.01

Table 4.12: Correlation of Individual Computer Attributes and Attitudes

Research Question Four: Proportion of Variance in Teachers’ Attitudes Explained by the Independent Variables

To determine the independent variables that explained the greatest amount of variance in the computer attitudes of the sampled Syrian EFL teachers, a multiple regression analysis was performed. Following Gay and Airasian’s (2000) recommendations, only independent variables that individually correlated with the dependent variable were entered into the multiple regression equation. These included: computer attributes, cultural perceptions, computer competence, computer access, and computer training. The summary of the multiple regression results are presented in Table 4.13 and Table 4.14. The results indicated that 0.58% of the variance in computer attitude
was explained by the independent variables included in this study (Table 4.13). The test statistic was significant at the 0.05 level of significance ($F_{(5, 313)} = 87.94; p<.001$).

<table>
<thead>
<tr>
<th>Sources</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F Value</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>47.10</td>
<td>5</td>
<td>9.41</td>
<td>87.94</td>
<td>.59</td>
<td>.58</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>33.00</td>
<td>308</td>
<td>.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80.03</td>
<td>313</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.13: Analysis of Variance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unstandardized b</th>
<th>Standardized b</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Attributes</td>
<td>.60</td>
<td>.57</td>
<td>11.03</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Cultural Perceptions</td>
<td>.29</td>
<td>.25</td>
<td>5.02</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Computer Competence</td>
<td>.07</td>
<td>.10</td>
<td>2.18</td>
<td>.030</td>
</tr>
<tr>
<td>Computer Access</td>
<td>.04</td>
<td>.06</td>
<td>1.50</td>
<td>.14</td>
</tr>
<tr>
<td>Training</td>
<td>.02</td>
<td>.03</td>
<td>.71</td>
<td>.481</td>
</tr>
</tbody>
</table>

Table 4.14: Multiple Regression on dependent variable (Computer Attitude)

As Table 4.14 illustrates, the results of multiple regression indicate that three variables affect the teachers’ attitudes toward ICT at the 0.05 level of significance. The following are the absolute values of the standardized estimate (b) of these factors from largest to smallest: computer attributes (b= .57, t=11.03, p <.05), cultural perceptions (b= .25, t= 5.02, p <.05), and computer competence (b= .10, t= 2.18, p <.05). The analysis suggests that the independent variables explaining the greatest amount of variance in computer attitudes are in order of predicative value: computer attributes, cultural perceptions, and
computer competence. Computer access and training were not significant predictors of attitudes toward ICT as they were sharing a significant degree of variance with computer competence (Figure 4.1).

As Figure 4.1 illustrates, computer competence is related to both computer access and computer training. The relationship between computer competence and access was significant at the 0.05 level of significance (r = .41, p< 0.05) (see Table 4.11). Similarly, computer competence and computer training were significantly correlated (r = .37, p<0.05). Computer access and computer training were also related but not significantly (r = 0.7) at the 0.05 level of significance.
Findings from Qualitative data

The qualitative data were vital not only to consolidate the findings from the survey stage of the study but also to illuminate some issues that were unanswered by the quantitative data, including the explanation for the teachers’ positive attitudes toward ICT, cultural perceptions, and low levels of computer competence, access, and training. As Lincoln and Guba (2000) suggest, the symbiosis of careful quantitative and qualitative measures ensure the trustworthiness of a study’s conclusions. Key findings from the qualitative data analysis are presented with the following themes: (a) teachers’ attitudes toward ICT in education, (b) computer attributes, (c) cultural perceptions, (d) computer competence, (e) computer access, (f) and computer training. These heading themes—each based on sub-themes that emerged from the data analysis—are organized in relation to the research questions. Specifically, the findings are related to research questions 1 and 2 (descriptive data), and they also help explain research question 3 (relationships between attitudes and the other variables)
Teachers’ Attitudes toward ICT in Education:

The qualitative data (Interviews) provided key cues for understanding the positive attitudes of teachers toward ICT in general and in education in particular that were reported in the quantitative data. The most often cited reason for the participants’ positive attitudes was that ICT is a means of national progress and a way for awakening “a nation that has been sleeping for a while.” Statements such as "a necessity for marching with the procession of progress” and “inevitable means of progress" were typical comments made by the 15 participants during the interviews. One interviewee (Saleem) noted, “I feel glad that we joined the march of progress through the right path even though we are still in the initial stages.” Saleem explained, “The use of computer can help create a generation of educated people who can contribute to the development of our country.” This patriotic sentiment of enthusiasm pervaded the 15 interviews and seemed to submerge the individualistic tones.

On a personal level, most of the participants underscored the importance of ICT for self-development; ICT is a means for increasing one’s knowledge and a window for getting in touch with the world. Ali gave a clear picture of how ICT played a major role in his access to different types of information: “I depend on the Internet to get most of the daily information I need: news stories, historical figures, books, and so on. This information would have been difficult to get without it… added to the fact that it takes time and effort to get such information.” Not only did ICT offer access to information, but also to different people around the world—a factor that some teachers saw as justification for their positive attitudes toward it. Omar indicated that “the ability to talk to people who are far from here is really wonderful. It is like touring with no expenses.”
From an educational perspective, most of the participants seemed content that computers can be used by parents to educate their children, by students to self-educate themselves, or by teachers to add “some flavor” to the traditional ways of teaching. At the same time, the majority of the participants were expecting a more widespread presence of computers and more use of these tools by teachers. Due to their inadequate presence and limited use in schools, computers are still in the initial stages and their capabilities have not been felt yet. Hence, participants found it difficult to judge the role of computers in schools at this point. Samer stated that “the effects of computers on the Syrian society is clearly felt…However, they have thus far had little effect on schools because they are used on a limited scale and also because most of the teachers are not skilled enough to use them.” The fact that the process of ICT implementation was in its early stages seemed to convince participants of the unavoidability of problems and limitations. When asked what source is responsible for the current limitations, only a few participants laid blame on the Ministry of Education. The majority of them felt that more achievements were desirable but unrealistic within a 10-year time frame. Kareem explained, “The Ministry is doing its best to make computers available in schools…and we have to be realistic about what can be done and what cannot within 10 years.”

Beside their national and personal rationales, three participants highlighted the efficiency of computers in achieving many tasks; computers increase the productivity of individuals and institutions. Hala said, “With computers, everything can be accomplished easily and quickly…it takes one no more than a few seconds to do many tasks that used to take a long time to complete …. ” In all the above cases, participants have found some
aspects of ICT to be appealing to them and thereupon they justified their positive attitudes.

**Computer Attributes:**

Participants’ positive perceptions of the attributes of computers were clearly reflected in their responses to an interview question asking them about how they would design a computer if they were given the chance to do that. With the exception of four, all of the 15 participants stated that they would not make any major changes to the current computers. The only changes imagined by some of the teachers were in terms of interface, such as culturally specific icons, symbols, and keyboard configuration. These features, as Laila suggested, “should reflect the symbolism of the Arab culture and civilization.” Only four participants stated that they would have changed some of the functionality of the current computers. For example, Huda suggested that “the computer should have a program or a function that blocks all immoral content.” Similarly, Ali commented, “I would have a computer that is clever enough to disable all corrupt material.” In these two examples, participants distinguished between computer hardware and the Internet content. The later distinction seemed to have helped maintain their positive perceptions of computer attributes.

Teachers’ responses about computer attributes were mainly focused on the relative advantage of these tools. That is, almost all interviewees ascribed their positive assessment of computers to the advantages that they might bring into the field of education. Other computer attributes, such as compatibility, complexity and observability, were hardly mentioned by the interviewees. Participants indicated that
computers can benefit education in the following ways: (a) save time and effort in getting information needed for some classes, (b) help in abandoning some “primitive” ways of delivering information, (c) make better the quality and quantity of the delivered information, (d) add an element of interest and joy to the teaching/learning process, (e) provide easy storage and retrieval for lesson plans and other class-related material, (f) resemble an alternative way of presenting information, (g) offer a means of self-education, and (h) endow students with additional opportunity for drill and practice. Also, the majority of the participants considered that computers can serve as (i) a visual aid for demonstrations, (j) a huge library for getting varied types of information, (k) a tool for research-based learning, and (l) a means of grade keeping. Participants also pointed to the particular advantage of computers for language learning. Most of them stated that computers are useful for developing students’ reading, pronunciation, and particularly listening skills. In addition, two interviewees saw online dictionaries as helpful tools for language learning. Omar summed up teachers’ conceptions of computer attributes: “I do not see any reason why I should not like computers…I really see them as an all-advantage tool….”

When asked whether they came to know these advantages through direct experience, most of the participants indicated that they just saw or heard about these advantages through other channels. For example, Ruba explained, “I know that computers are used in the Arab Lab [a language institute]…students …and my cousin one of them…are excited about that. They are learning much more than in their regular classes.” Similarly, Zahra reported, “My brother studies Computer Science and he knows how powerful these machines are. I wish I had half of his experience to apply that
knowledge in teaching.” As the comments illustrate, teachers’ lack of direct experience in using computers did not prevent them from approaching them from a positive angle.

**Cultural Perceptions:**

The majority of the respondents were aware that ICT was bringing about perceptible changes in the character of the Syrian society. These changes were eyed with a mixture of hope and discomfort on the part of the participants. On one hand, participants considered ICT as a new window opened to the world. What interviewees particularly valued about this feature was not only getting acquainted with the events of the world but also with different cultures and different people. To some interviewees, this helps enhance “cultural education” with the added advantage of having a way for communicating directly with people around the world. In one of the participants’ terms, cultural education indicates that “…you know what people from the rest of the world think, how they behave…these are things you cannot find in the school books.”

On the other hand, some of these changes were not seen as favorably by a number of participants. For example, three interviewees were concerned about the reduction of social exchanges that the new means of communication (chatting and email) were bringing into the lives of Syrian people. Samer hoped that computers “will not isolate us by locking us within their domain away from family kinships.” Two other participants were disappointed that Arabic has limited presence on the Internet compared to the other main languages. Kareem complained, “I cannot believe that Arabic …with all the large number of people speaking it… has such shy presence on the Internet…to me this means less advantage of this tool for Arab people in general and Arab students in particular.”
More importantly, most of the participants expressed apprehension about the moralities and values that the Internet is bringing into the Syrian culture. This apprehension concerned only a limited audience. As Omar stated, “I do not think though that immoral websites affect rationale people. Only corrupt people will be affected by such things.” A reiterated assertion was that “if one is confident of himself, nothing like that will affect him…I myself won’t care about these websites even if they were to multiply hundred times…” Most of the participants were particularly worried that the increased proliferation of immoral websites may affect younger generations. Hence, they urged that children should never use the Internet on their own. For example, Zahra remarked, “My deepest fear is about my children. I cannot overcome the fear that one of my children would reach one of these awful websites. This is my only complaint about the use of the Internet. One has always to be on the alert when children are using it.” Two participants were concerned that allowing these culturally inappropriate websites to appear for the common Syrian people is just another way of facilitating a cultural invasion. As Ali indicated, “it seems there are people who are dedicated to spreading immorality…I really do not understand what the point of this is (…)…what we can do is to forbid these websites…else we would be aiding this form of cultural invasion.”

When asked whether an Arab-made computer would make any difference, most of the participants indicated that an Arab-made computer would be safer insofar as morality issues and children are concerned. In addition, Huda suggested, “an Arab-made computer would serve better Arabic customs and values.” Nonetheless, participants were not sure as to how an Arab-made computer would look like. For example, Ali mentioned, “We have to create something that reflects our ethics and rules of conduct… I myself do
not know how this would be achieved, but there should be some people who can deal with this issue.” More essential to many participants was the creation of Arab-made software that reflects the needs and character of the Arab people. Added to this are “awareness programs about what is useful to our people and what is not…” Interestingly, Kareem commented, “Intruders and saboteurs always try to ruin and destroy good things. If an Arab invented a different computer, another Arab may find a way to corrupt it.”

To investigate teachers’ views about the cultural non-neutrality of computers, the researcher asked participants about their reactions to the statement, “Computers are said to reflect the values and ways of thinking of those who make them.” The statement provoked a variety of reactions amongst participants. Three of the participants simply disagreed with this statement and tried to avoid (or failed to provide) any further explanation for their response. Two of them contested this statement on historical grounds. For example, Kareem argued:

*We cannot simply say that computers are developed by a certain people or for a certain people since the computer industry has evolved through the contribution of people from different ethnic backgrounds...just like we cannot say that the writing system reflects the mentality of Arabs who invented it, or that mathematics reflects the values of Indians who were the first people to use it. What counts is the user and how he uses these things according to his own purposes.*

The remaining ten participants agreed hesitantly to the statement, but indicated that it is not the computer itself that is value-laden but the software and applications that the user chooses. In other words, it is the user who decides how to use the computer and to infuse it with his/her own values. For example, Hala stated “the computer as a tool is like any other machine. It can be employed in whichever manner the user wants and in
accordance with his own ethics and values.” Typical of Hala’s assertion, most of the teachers’ responses seemed to subscribe to the discourse that it is humans who manipulate computers and dictate their values and ethics depending on how they put them to use. However, this explanation is arguable given that teachers were explicit about the need for Arab-made computers, culturally appropriate software, and awareness programs. It seemed that participants had vague perceptions of this concept itself; they had no full awareness of the meaning or implications of the non-neutrality of technology.

Insofar as the school culture is concerned, most of the interviewees suggested that if computers were to be used in teaching, the Department of Education should prepare programs that educate students “morally and culturally” about the improper material on the Internet. Ali remarked, “We cannot expect students to take responsibility for their own behavior. Most of them may be introduced to computers at a stage where they cannot make informed judgments about the value or dangers of what they see.” Ali further explained, “I would like to have computers used on a wider scale in education provided that this step would be well calculated and planned, especially when matters of supervision and guidance for students is concerned.” Other participants indicated that teachers using the computer in the classroom or even teaching about it should know how to use it effectively and wisely in accordance with Arab students. As Hala stated, “…the teacher is still important to guide students as to where to go, warning them of harmful or misleading websites… Unless the teacher herself is able to evaluate the Internet material, she cannot guide her students during their access to the Internet…she cannot make effective use of it, either.” Clear as it is, Hala’s account externalizes and echoes the apprehension that most of the teachers felt about the culturally improper aspects of ICT.
It seemed that the cross-cultural benefits of ICT were moderated in the participants’ eyes by the more serious apprehension about the morally damaging effects of certain Internet-related material.

**Computer Competence:**

Five participants were asked in the interviews to explain the reasons behind their low level of computer competence. The three main reasons that were given for this phenomenon were the lack of financial resources, time, and training opportunities. For example, Laila acknowledged that although she valued computers and would like to develop her computer skills, her modest competence was due to “an absolute material reason.” Huda explained that she could not develop her computer competence because of her household and teaching workload as well as her financial conditions: “it is life demands and teaching responsibilities…I don’t know if I have the time for such a thing right now…or even the money…There are a lot of things that need to be done before I work on this issue. But I really like to learn more about computers.” A similar justification was given by Samer, who said that he was not so keen to develop his computer competence at present. He related this indifference to the fact that he might not have the chance to make use of this competence in teaching simply because of the insufficient number of computers. Hence, he preferred to work on other priorities before developing his computer competence.

All of the participants in the Competence Group expressed their willingness to attend training sessions to increase their computer competence. Interestingly, two of the participants stated that they would rather improve their competencies in using computers
for teaching and learning than increase their overall computer literacy. However, two interviewees thought that this was not a present priority for them since computers were hardly available for teaching. Yet, they expressed their readiness to increase their expertise once computers are more available in schools.

**Computer Access:**

Like their colleagues in the Computer Competence group, the five participants in the Access Group ascribed their low level of computer access to their limited financial resources and lack of time. A third reason that stood behind the participants’ minimal access to computers was the insufficient number of computers in schools. Two of the participants had had adequate access to computers before moving into the field of education. Both worked for small private businesses where they had to use the computer for much of their administrative work. However, they had fewer chances to access computers after they became teachers.

Participants affirmed that access to computers is necessary for 21st-century teachers and students and therefore they would try to increase their access at their own expense (by buying personal computers). Most of the participants in the Access Group suggested that the best way to increase access is to buy a personal computer. In fact, all of them expressed their intention to purchase personal computers in the near future. In addition, four participants suggested that the Department of Education should help the teachers gain better access to computers in schools. According to them, this can be achieved by providing a computer room for teachers, where they can use computers during their free time, or by increasing the number of computer labs in every school.
Computer Training:

Interviews were very useful in shedding some light on the reasons that stood behind participants’ lack of computer training. Three interviewees ascribed this phenomenon to the paucity of opportunities offered by the Department of Education in Hims for training teachers. Jameela and Sara were surprised that the Department would offer free and even funded training for “science” teachers only. Jameela stated that “…all teachers need to be trained on how to use computers… this will sooner or later become part of their teaching competence. I mean the ability to use computers nowadays is part of the teachers’ overall teaching ability.” However, Sara gave different reasons for having little amount of training: “…lack of time and lack of financial resources. Also I do not have a computer at home and I see that training will not be effective unless one has access to computers… preferably personal computer…to practice what she has been training on.” Hala attributed her little training to “the difficulties of life and its demands.”

All of the teachers in the Training Group suggested that the Department of Education should provide teachers with adequate training. Omar indicated that “it is the responsibility of the Department… not all of us have training opportunities because of many financial constraints.” Jameela and Sara suggested that the Department should help teachers obtain computers through comfortable installments. Jameela suggested that ideally the Department should not merely provide training on how to use computers but also on how to use them in teaching and learning. Sara proposed training sessions that are special for language teachers. She discerned that this step needs expert teachers who can model computers’ pedagogic usage in some language activities.
Overall, the qualitative data corroborated the findings from the survey data. The interview participants were optimistic about the role of ICT in education. In addition, they stressed the relative advantage of computers vis-à-vis other computer attributes. However, while teachers welcomed the cross-cultural venues of communication ushered in by ICT, they were simultaneously apprehensive about the culturally inappropriate material on the web. The qualitative stage pointed to the relatedness of computer competence to access and training: most of the teachers ascribed their modest computer competence to their lack of time and financial resources (to access computers) and to the shortage of training opportunities. Lack of financial resources and time also stood behind the participants’ low computer access and training. In summary, the qualitative data added a new dimension to the quantitative data by providing an explanation for teachers’ positive attitudes toward ICT, their cultural perceptions, and their lack of computer competence, access, and training.
CHAPTER 5

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

The global changes triggered by the rapid diffusion and adoption of ICT have created both promises and challenges for most developing countries. On one hand, ICT is a promising mechanism for national development, and, on the other, it necessitates new capacity building and development in human resources. Addressing these promises and challenges calls for an active role from the educational systems in these countries. In response, educational planners have initiated national programs to integrate new technologies in education. Unfortunately, the “initiation stage” (Rogers, 1995), which demands information gathering and planning, has often been overlooked in the urgency to implement ICT in schools. A key element that has been left out is understanding the attitudes of the end-users toward these new tools.

One developing country that exemplifies the above situation is the Syrian Arab Republic. For the last decade, the Syrian Ministry of Education has adopted a national plan to introduce computers into schools in an attempt to allow an increased use of these tools by students and teachers. While little is known about the attitudes of Syrian teachers toward the Ministry’s technology initiative, still less information is available about the
current status of viewpoints about ICT among the teachers. Starting to understand these information gaps about teachers’ attitudes toward ICT was the primary impetus for this study. The specific purpose of this study was to determine the attitudes of high school EFL teachers in a large Muhaifa (province) in Syria toward ICT in education and to explore the relationship between teachers’ attitudes and variables that might have shaped them. These variables, mainly identified from the literature on technology implementation in developing countries, were: computer attributes, cultural perceptions, computer competence, computer access, and demographic variables (including training background).

Both quantitative and qualitative methods were employed in this study to collect data from the population of EFL teachers in Hims (Syria). Using a survey instrument, quantitative data were collected from a random sample of 326 EFL teachers in the Department of Education in Hims. The survey stage was followed by a more in-depth investigation using interviews. A purposeful sample of 15 teachers was selected for the interviews. The following discussion is based on the results from both types of data and the implications that they have on research in this field.

**Attitudes of Syrian EFL Teachers toward ICT in Education**

Teachers’ attitudes toward ICT have been universally recognized as an important factor for the success of technology integration in education (Gressard & Loyd, 1985; Woodrow, 1992; Watson, 1998). Findings from both the survey data and the interviews suggest that participants had positive attitudes toward ICT in education. The survey respondents’ positive attitudes were evident within the affective, cognitive and behavioral
domains. The majority of respondents (85.3%) reported liking, enjoying, and feeling comfortable about ICT in general and in education in particular. In the interviews, participants ascribed their positive attitudes to the national progress, self-development, and efficiency capabilities that ICT can offer. Such optimism cannot simply be attributed to the novelty of computers in education (Salaberry, 2001). The participants seemed to have totally accepted the rationale for introducing ICT into schools and were able to base their judgments on understandable reasons. Thus, most of the respondents (86.6%) considered computers as a viable educational tool, worth the time and effort spent on it, a fast and efficient means of getting information, and generally more useful than harmful.

Teachers’ positive attitudes exhibit their initiation into the innovation-decision process (Rogers, 1995). It seems that teachers have already gone through the Knowledge and Persuasion stages (Rogers, 1995) and are probably proceeding to the Decision phase. As many theorists have indicated, attitudes can often foretell future decision-making behavior (Ajzen & Fishbein, 1980). Having formed positive attitudes toward ICT in education, participants are expected to be using ICT in their classrooms once computers become more available to them. In fact, the behavioral subscale of the Computer Attitude Scale showed that the majority of teachers (88.6%) had the intention to buy computers, to learn about them, and to use them in the near future. This symbiotic relationship between attitudes toward ICT and its use in the classroom has been widely reported in the literature (e.g., Blankenship, 1998; Almusalam, 2001).

Teachers’ positive attitudes in the current study have a special significance given the limitations characterizing the current status of ICT in Syrian schools: insufficient computer resources and lack of training opportunities. Interviews showed that
participants were aware that ICT implementation was still in initial stages and that problems were inevitable at this stage—a factor that made them condone the recent limitations in the implementation process. Although the majority of interview participants thought that computers were not as widely utilized as they should be, they still expected a more active role for ICT in Syrian schools. Teachers’ high expectancy toward ICT might have maintained their positive attitudes toward its role in education.

**Computer Attributes and Teachers’ Attitudes:**

Teachers’ perceptions of computer attributes were examined from Rogers’ (1995) diffusion of innovation theoretical framework. According to Rogers, people’s acceptance or rejection of any new technology depends largely on the attributes of the technology itself. Rogers identified five main attributes of technology that affect the innovation-decision process: relative advantage, compatibility, complexity, observability, and trialibility. Only the first four attributes were investigated in this study.

Respondents’ positive perceptions varied across the four computer attributes examined in this study. Respondents were most positive about the relative advantage of computers. The participants’ mean score was 4.04 on a 5-point scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5). In the interviews, participants were also keen to highlight the advantages of computers at the expense of other computer attributes. Teachers seemed to endorse the idea that ICT improves education, offers real advantage over traditional methods of teaching, enhances the quality of students’ learning, makes the subject matter more interesting, and is useful for language learning.
Teachers’ appreciation of the advantages of ICT becomes more explicable when viewed in combination with their somewhat positive responses on the observability subscale (mean = 3.70). The fact that the majority of survey respondents have observed ICT being used successfully in teaching/learning is a reasonable justification for their positive perceptions of the advantage of ICT for education. However, the interviews showed that teachers did not come to know all of these advantages through direct experience; most of participants saw or heard about other teachers using computers. As Rogers (1995) suggests, most individuals rely on subjective accounts of other individuals who may have experienced or came in contact with the new media. Since these teachers did not actually “experience” the advantages of ICT, they may have taken for granted the assumption that the new technologies—revolutionary as they are from a technical point of view—are revolutionary from an educational standpoint (Salaberry, 2001). Such an assumption has been initially disseminated for industrial and corporate profits. Industrial and corporate forces were themselves responsible for associating computers with the imagery of “the new, positive change and renewal, and of economic survival” (Watson, 1998; p. 188). These images seem to be nowadays in place in Syria just as they are in most developing countries (see Watson, 1998; Fodje, 1999).

Teachers’ perceptions of the compatibility of ICT with their current teaching practices ranged between neutral and positive (mean=3.54). The majority of respondents thought that computer use suits their students’ learning preferences and level of computer knowledge, is appropriate for many language learning activities, and should be accommodated by schools. However, a high percentage of them were neutral about whether or not computers fit well in their curricular goals. The disparity between
computer demands and the existing curricula has been a major hindrance for technology integration (Ojo and Awuah, 1998). As the responses of the participants indicate, the Syrian educational landscape seems to be no exception. Most of the participants also thought the class time is too limited for computer use. This problem has also been emphasized in the literature (Becker, 1998; Smith, 1987). Teachers’ concern about the incompatibility of computers with the existing curricula as well as the insufficiency of the class time indicate that educational change cannot simply be attained by placing computers in schools (Hodas, 1993; Warschauer, 2000). For a change to occur, many renovations need to be made at the structural level as well as the pedagogic level. Otherwise, a consistent mismatch will occur between the industrial models of schooling and the information-age teaching devices. Salamon (2002) refers to this mismatch as a “Technological Paradox” resulting from “the consistent tendency of the education system to preserve itself and its practices by the assimilation of new technologies into existing instructional practices” (pp. 71-72). Hence, the introduction of ICT innovations into education requires equal innovativeness in pedagogical and curricular approaches.

As was the case with computer compatibility, teachers’ perceptions of computer simplicity (i.e., “complexity” before the negative items were reversed) ranged between neutral and positive (mean=3.48). Teachers’ responses were split between positive and neutral about whether it is easy to understand the basic functions of computers, operate them, and use computers in teaching. This is understandable given the fact that most of the participants have minimal computer access, little training, and modest competence. In fact, this has often been the norm for teachers around the world (Harper, 1987; Al-
Oteawi, 2002; Na, 1993). This implies that teachers’ familiarity with computers may boost their perceptions of this important computer attribute.

In general, teachers’ perceptions of the overall attributes of computers were somewhat positive (mean = 3.7). The findings of the study indicated a very strong positive correlation between teachers’ attitudes toward ICT in education and their perceptions of computer attributes (r=.74, p< .05). In addition, significant positive relationships existed between teachers’ attitudes and each of the computer attributes: relative advantage (r=.71, p< .05), compatibility (r=.58, p< .05), simplicity/non-complexity (r=.59, p< .05), and observability (r=.43, p< .05). The findings are consistent with Rogers’ Innovation Attributes sub-theory. Rogers and Shoemaker (1971) found that relative advantage, compatibility, and observability were positively correlated with adoption, while complexity was negatively correlated. The multiple regression analysis showed computer attributes to be the strongest predictor of teachers’ attitudes toward ICT (b=.563, p <.05). Therefore, the results of this study contribute to the continued applicability of Rogers’ theory. Simultaneously, the findings demonstrate their potential transferability to similar research settings.

**Cultural Perceptions and Teachers’ Attitudes:**

One of the main challenges that the study undertook was to examine teachers’ perceptions of the cultural relevance of ICT to the Syrian society and schools. Thomas (1987) indicates that the transfer of technology from industrialized societies to developing countries should take into account the cultural conditions of the importers. Similarly, Rogers (1995) asserts that social norms play a vital role in determining the rate
of an innovation’s adoption. Both Thomas (1987) and Rogers (1995) note that, despite their indisputable importance, cultural conditions and/or social norms have not been sufficiently studied in the innovation-diffusion research. The dearth of studies examining “cultural conditions” might be attributed to the difficulty involved in capturing this construct. To be researchable, cultural perceptions was delineated in this study to mean Syrian teachers’ perceptions of the value, relevance, and impact of ICT as it relates to the cultural norms in Syrian society and schools. Even with this focused definition, the use of both quantitative and qualitative measures was still necessary for pinpointing this construct.

Participants’ responses to the 16 items on Cultural Perceptions scale ranged between neutral and positive (mean=3.38). From a school-culture perspective, the majority of respondents acknowledged that students need to know how to use computers for their future jobs and that computer usage will transform their classrooms, schools, and lives. Hence, they perceived that computers should be a priority in education. However, a high percentage of them were neutral about whether or not students prefer learning from teachers to learning from computers. Also, most of the respondents thought that possessing knowledge of computers earns one the respect of others and ensures privileges not available to others. For the majority of respondents, the increased proliferation of computers would make their lives easier and contribute to improving their standard of living. Similarly, most of the respondents thought that using computers does not diminish people’s relationships amongst one another or hinder Arab generations from learning their traditions. Likewise, more than half of the respondents saw that the use of computers does not encourage unethical practices. Also, the majority of respondents
disagreed that computers increase national dependence on foreign countries or dehumanize society. To many of the respondents, however, there are more important social issues to be addressed before implementing computers in education. Therefore, it was not a surprise that almost all of the respondents (91.4%) agreed that computers are proliferating too fast. Moreover, the majority of the respondents felt the need for computers that better suit the Arabic culture and identity.

The interviews were most informative insofar as teachers’ cultural perceptions are concerned. The qualitative data showed that while participants were slightly positive about the cross-cultural and cultural effects of technology, they were apprehensive about the morally and culturally inappropriate aspects of ICT and particularly the Internet. This conclusion showed an ostensible contradiction with the survey data, which showed that most of the respondents disagreed that computers encourage unethical practices. This discrepancy was clarified in the interviews: participants were concerned only about websites that spread immorality among children and “some corrupt people.” Hence, some of them saw that children and students in particular should never use the Internet unattended. This last concern has been voiced in different parts of the world (e.g., Armstrong & Casement, 2000; Al-Oteawi, 2002; Alliance for Childhood, 2000). According to a statement made by the Alliance for Childhood (2000), “Too often, what computers actually connect children to are trivial games, inappropriate adult material, and aggressive advertising” (p. 1). It was for the above reason that most of the respondents were hoping for the creation of “cultural and ethical” awareness programs. These types of programs might make less the effect of immoral and culturally inappropriate material on the Internet. The alarmist outlook through which a few respondents saw the effects of
such websites was expressed in a fear of cultural invasion. Freire (1972) warns of the consequences of cultural invasion: “Cultural conquest leads to the cultural inauthenticity of those who are invaded; they begin to respond to the values, the standards, and the goals of the invaders” (p. 121-122). It seems that the cross-cultural benefits of ICT were moderated in the participants’ eyes by the more serious apprehension about its morally damaging effects on young Arab generations. This may explain the somewhat neutral cultural perceptions of participants during the survey stage of the study. This concern has been reported by researchers from other parts of the Arab World (e.g., Al-Oteawi, 2002).

A less frequently voiced concern was about the under-representation of the Arabic language on the Web, which lowered the value that the Arab people can obtain from this tool. In view of the above dilemmas, “the major questions for educators with respect to technology would be whether the technologies are so thoroughly saturated with cultural biases that they must be changed or resisted more energetically and fully than other aspects of education” (Damarin, 1998, p.12).

In both the surveys and the interviews, most of the teachers responded that they would prefer Arab-made computers that reflect the Arab customs and values. It has often been noted that people who have not been quite influential in the design and development of ICT would prefer a localized version of these technologies (Damarin, 1998). In fact, participants in this study were less concerned about the computer itself and more about its related programs and software. They were particularly emphatic about the need for Arab-made software that integrates the values, ethics and way of thinking of Arab people. This demand seems to resonate with Fodje’s (1999) argument in the International Conference for Technology in Education:
What the world needs today is not talent in producing new technologies but talent in understanding the impact of technology on the society and individuals…Educational programs in the third world heretofore have been designed around the Western ideals. These need to be reworked to reflect the indigenous cultures and promote human values while at the same time producing the talent for ‘controlled’ technological advancement.

What should not go unnoticed is that the majority of the interviewees expressed little concern about the cultural non-neutrality of computers; they thought that it is the user who ultimately determines how these tools are used. Although it seems attractive to suggest that teachers endorse the instrumentalist argument (that it is humans who decide how to put technology to use, for good or ill), the interviews showed that teachers were not aware of the non-neutral aspect of technology. This affirms Bowers’ (1998) apprehension over the global unawareness about the cultural non-neutrality of ICT. As Bowers puts it, “…neither the computer industry nor educational policy makers understand the cultural mediating characteristics of computers” (p. 49). Unfortunately, people from different countries have often accepted technological innovations as neutral tools (De Castell et al., 2002). De Castell et al. cite Penley and Ross (1991) arguing:

*We fully recognize that cultural technologies are far from neutral and that they are the result of social processes and power relations. Like all technologies, they are ultimately developed in the interests of industrial and corporate profits, and seldom in the name of greater community participation or creative autonomy* (p. 10)

The sensitivity of this issue suggests that teachers need to be informed about the value-laden aspect of ICT and how to adjust its functionality in accordance with the Arabic character.
As expected, the findings showed a substantial relationship between teachers’ attitudes and their cultural perceptions ($r = 0.62, p< .05$). This result supports those of Li (2002) and Winschiers (1996, cited in Kiangi, 1998). Moreover, the multiple regression analysis showed that cultural perceptions were the second most important predictor of computer attitudes. This conclusion points to the need for considering cultural factors in studies conducted in developing countries.

**Computer Competence Teachers’ Attitudes:**

Previous research has pointed to teachers’ lack of computer competence as a main barrier to their acceptance and adoption of ICT in developing countries (Pelgrum, 2001; Al-Oteawi, 2002; Na, 1993). The results of the current study support and extend the findings from previous research. Survey respondents’ mean score was 1.78 on a 4-point scale ranging from *No competence* (1) to *Much competence* (4). The majority of respondents reported having little or no competence in handling most of the computer functions needed by educators, including software installation, basic hardware, productivity software, telecommunication resources, basic troubleshooting, graphic application, grade keeping, educational software evaluation, organization tools, and virus handling. The only computer function at which the respondents seemed to be moderately competent was the use of the keyboard.

In the interviews, the majority of participants ascribed their modest computer competence to their lack of computer resources (due to financial constraints), time, and training opportunities. Besides, two participants indicated that the development of their computer competence was not a present priority for them because of the futility of
developing their computer competence with insufficient computers available for use in schools. These constraints, especially teachers’ priorities among competing responsibilities, have been underscored by several educators and researchers (Becker, 1998; Al-Oteawi, 2002; Na, 1993). Moreover, the teachers’ accounts of their computer competence underline the role of computer training and access in equipping teachers with the competencies needed for utilizing ICT.

Despite their other responsibilities, all interviewees expressed their willingness to enhance their computer competence. Notably, some participants considered computer competence part of their overall professional competence. This enthusiasm for developing computer skills seems to be common among teachers in different parts of the world nowadays (e.g., Demetroadis et al. 2003; Pelgrum, 2001; Al-Oteawi, 2002). Such feelings are anticipated since teachers believe that ICT enhances the quality of teaching. However, a few teachers were not particularly concerned about their present lack of competence since computers were not available for teachers’ use in schools.

The correlation analysis pointed to the existence of a moderate, positive correlation between teachers’ attitudes toward ICT and their computer competence level (\(r = .30, p< .05\)). This result is in compliance with the findings of Na (1993), Summers (1990), and Al-Oteawi (2002). In this study, computer competence was the third most significant predictor of teachers’ attitudes toward ICT in education—a finding that supports the theoretical and empirical arguments made for the importance of computer competence in determining teachers’ attitudes toward ICT (Harrison & Rainer, 1992; Bulkeley, 1993; Berner, 2003). The findings, however, did not support the assumption that teachers with low level of computer competence usually have negative attitudes.
toward computers (Summers, 1990). The relationship between computer attitudes and competence suggests that higher computer competence may foster the already positive attitudes of teachers and eventually result in their use of computers in the classroom.

**Computer Access and Teachers’ Attitudes:**

Computer access has often been one of the most notorious impediments to technology adoption and integration in both developing and developed countries (Marshall & Ruohonen, 1998; Abas, 1995; Pelgrum, 2001). Findings from the current study substantiate this globally felt barrier. Survey respondents reported low levels of access to computers. The respondents’ mean score was 1.96 on a 5-point scale ranging from *Never* (1) to *Daily* (5). Thus, a typical teacher had access to a computer almost once a month. While more than half of the respondents (57%) had computers at home, only 33.4% of them had access to computers in the school. Moreover, of those who had access to school computers, only 5.1% could access computers daily, 4.5% could access them biweekly or three times a week, and 7.3% weekly. The last set of percentages gives a clear indication of the insufficiency of computers in schools, particularly for teacher use. As noted above, the paucity of computer resources available for teachers has been widely reported in the literature as a major obstacle to technology integration in education (e.g., Abas, 1995; Na, 1993).

The qualitative data showed that the inadequate financial resources of the participants, lack of time, and insufficient number of computers in schools were the main reasons behind the participants’ inability to access computers. Participants affirmed that access to computers is necessary for 21st-century teachers and students and therefore they
would try to increase their access at their own expense (by buying personal computers).
Most of the participants suggested that the Department of Education should assist them in
obtaining better access to computers in the school. According to them, the latter step can
be achieved by either assigning a computer room for teachers’ use or increasing the
number of computer labs in schools.

The Pearson analysis showed the existence of a low, positive relationship between
teachers’ attitudes toward ICT and their computer access level ($r = .17, p< .05$). This
result supports the findings of Na (1993), Marshall & Ruohonen (1998), and Pelgrum
(2001). However, computer access was not a significant predictor of teachers’ attitudes
toward ICT after adjusting for the other independent variables in the multiple regression
equation. Although the shortage of computers did not seem to have a notable influence on
the teachers’ attitudes toward ICT in this study, it may theoretically have its effects on
their future uses of ICT in the classroom.

**Computer Training and Teachers’ Attitudes:**

Scholars from different developing countries have repeatedly complained about
teachers’ lack of training and about the consequences of this obstacle on teachers’
acceptance of ICT (Abas, 1995; Sooknanan, 2002; Na, 1993; Al-Oteawi, 2002). Findings
from this study echo this widespread concern. Most of the survey respondents (64.7%)
reported that they had had no computer training at all. Fourteen percent (14%) of the
teachers had between 1 to 20 hours of training, 15.3% had between 21 and 40 hours, and
5.4% had between 41 and 60 hours. Less than one percent (0.6%) of the respondents
received more than 60 hours of computer training.
Interview participants attributed their lack of training to the limited opportunities offered by the Department of Education in Hims for training teachers. Some of them complained about the fact that the Department of Education would offer free and even funded training for “science” teachers only. The latter group of teachers indicated that computer training is needed for promoting their overall teaching abilities. This demand has been noticed in various educational settings (e.g., Al-Oteawi, 2002; Na, 1993). Other participants suggested different reasons for their inadequate training, such as the lack of time, insufficient financial resources, and the futility of training when little access was available for practice. All participants suggested that the Department of Education should provide teachers with adequate training. Some of them remarked that the Department should not merely provide training on how to use computers but also on how to use them in teaching and learning. Such suggestions complement the current calls by many researchers to provide teachers with specialized training that would allow them to integrate ICT into their everyday teaching practices (e.g., Abas, 1995; Al-Oteawi, 2002).

In addition, two interviewees proposed language-specific training sessions. As the interviewees suggested, this step needs expert teachers who can model computers’ pedagogic usage in some language activities.

The correlation analysis showed that a low positive relationship (r = .15, p< .05) existed between teachers’ computer attitudes and the length of computer training they received. This result is in line with findings from previous research on computer training (Gressard & Loyd, 1985; Woodrow, 1992; Knezek et al., 1997). However, computer training was not a significant predictive factor of teachers’ attitudes toward ICT after adjusting for the other independent variables in the multiple regression analysis. As
mentioned earlier, teachers’ seem to have based their positive attitudes toward ICT more on the “advertised” and “observed” potential of ICT and less on their direct experience, use, and experimentation with computers.

**Teachers’ Attitudes in Relation to Demographic Characteristics:**

Previous research has produced conflicting results about the impact of teachers’ characteristics on their attitudes toward ICT. Despite the lack of sufficient empirical evidence about their relationship with teachers’ attitudes toward ICT, a selected set of demographic variables (Gender, Age, Income, Teaching Experience, School Location, Education, and Teaching Method) were examined mainly for the purpose of controlling extraneous variables (Gay & Airasian, 2000). As expected, none of the demographic variables was significantly correlated with teachers’ attitudes toward ICT. This result downplays the importance of personal characteristics in adopting new technologies. When compared to the findings concerning cultural perceptions, such conclusion shows that the formation of computer attitudes is influenced more by the collective culture than by personal characteristics. This result does not agree with Rogers’ supposition that the adoption of technology is influenced by both the individual’s characteristics and the social system in which he or she lives. However, this finding may be specific to the Arab culture, which is highly relationship-based. In the Arab culture, an individual’s attitudes, decisions, and actions are greatly influenced by the opinions of his/her family or community members. Similarly, it seems that computer “privileges” (access, training, and competence) are more significant in determining teachers’ attitudes toward ICT than personal differences. This point provokes concerns about the prospect of a digital divide.
in the Syrian society. As is the case in many countries, technology may therefore induce (or enhance) a multi-fold gap between the haves and the have-nots in the Syrian society.

**Conclusions:**

Findings from this study indicate that Syrian EFL teachers hold positive attitudes toward ICT in education. The more in-depth interview procedure used in this study provided the opportunity to look behind this optimism that has become popular among teachers from different parts of the world. With little exception, teachers ascribed their positive attitudes to ICT potential for national development and self-enhancement (on educational, personal, and professional levels). A smaller group of participants attributed their positive attitudes to the efficiency of ICT in achieving different tasks. All three rationales seem to resonate with the common rhetoric behind the entry of ICT into developing countries.

As expected, teachers had positive perceptions of the attributes of computers. More specifically, participants underscored the relative advantage of computers as an educational tool at the expense of the other computer attributes: compatibility, complexity, and observability. Teachers’ positive perceptions about the computer attributes had a very strong correlation with their attitudes toward ICT in education. This corroborates the proposition that the attributes of the technology itself play a major role in determining its receptivity (Rogers, 1995).

Teachers’ cultural perceptions of the relevance of ICT as it relates to the cultural norms in Syria ranged between neutral and positive. The qualitative data showed that while teachers were optimistic about the cultural and cross-cultural aspects of ICT, they
were markedly concerned about the proliferation of morally and culturally inappropriate websites and the dangers they pose for Syrian children and students. The latter concern was enough to counteract their enthusiasm for the cultural and cross-cultural promises that ICT offers. Teachers’ cultural perceptions were significantly related to their attitudes toward ICT. Those teachers who had positive perceptions about the cultural relevance of ICT for Syrian society and schools also had highly positive attitudes compared to those with less positive cultural perceptions.

Teachers’ perceived computer competence was notably low in almost all major computer applications and functions. The modest computer competence of Syrian EFL teachers in Hims epitomizes a globally voiced obstacle to technology implementation (Pelgrum, 2001). This obstacle has often been more prevalent in countries where technology has only recently appeared on the educational scene (Na, 1993; Sooknanan, 2002). The teachers’ limited computer competence is a natural outcome of their lack of access, training, computer resources, and time as well as their priorities among competing responsibilities. Interestingly, teachers who had high computer competence had simultaneously more positive attitudes than those who did not.

As expected, participants had very low levels of access to computers. A typical teacher could access computers once a month. This impediment is quite understandable given the novelty of technology in Syrian schools and the limited computer resources available for teacher use at present. Added to these limitations were teachers’ inadequate financial resources and their lack of time. Interestingly, those who had a higher degree of computer access had more positive attitudes toward ICT than those with less access.
However, after adjusting for other variables in the regression equation, computer access was not a significant predictor of teachers’ attitudes toward ICT.

The study indicated that the majority of Syrian EFL teachers had little or no computer training. As was the case with computer access, those who had greater chances for computer training held more positive attitudes toward ICT than those who did not. However, the regression analysis provided insufficient evidence to support any significant predictive value for training in determining teachers’ attitudes.

As far as the demographic variables are concerned, none of them had a significant relationship with teachers’ attitudes toward ICT. This last conclusion was expected given the little empirical support of the role of demographic variables in determining attitudes toward ICT.

Recommendations:

Based on the results of this study, the following methodology, policy and practice, and future research recommendations address the respective groups for whom the findings may be relevant.

Methodology:

The questionnaire used in this study was based on extensive review of literature and scales developed by researchers from different educational backgrounds (Al-Oteawi, 2002; Gressard & Loyd, 1986; Christensen & Knezek, 1996; Bannon, Marshall, & Fluegal, 1985; Gardner, Discenza & Dukes, 1993; Bear, Richards & Lancaster, 1987; Harrison & Rainer, 1992; Swadener & Hannifin, 1987; Meier, 1988; Jones & Clarke,
1994; Robertson, Calder, Fung, Jones, & O'Shea, 1995; Isleem, 2003; Na, 1993; Sooknanan, 2002; Rogers, 1995). However, most of the questionnaire items were adapted to suit the context of the current study. Following the pilot study, inappropriate items were also omitted and replaced by items relevant to the Syrian participants and educational setting. Specifically, the scale dealing with attitudes toward ICT contained items originally developed and tested in technologically advanced countries. The modified computer attitude scale and its subscales were highly reliable and served well the purposes of the current study. This scale will be useful for future researchers who may study teachers’ attitudes in other developing countries.

Equally important are the two scales used for measuring computer attributes and cultural perceptions. The development of these two scales extended over a period of ten months. The scale-development process began along with the initial review of the literature (June 19th, 2003) and ended with the final adjustments made based on the pilot study (April 7th, 2004). The creation of these two scales was important not only due to their extensive revisions and high reliability, but also because of the paucity of scales dealing with these constructs. Future researchers who may examine the two constructs in similar educational contexts can utilize these scales.

The simple, random-sampling procedure followed in this study makes it highly probable that the findings of the study are generalizable to the target population. The study managed to reach a total of 314 teachers from different schools and with different demographic and computational backgrounds. In general, the teachers involved in this study may have similar characteristics to EFL teachers in the whole public-education system in Syria. Therefore, the findings might have implications for the entire system— a
factor that makes them invaluable to policy-makers in Syrian education. Nonetheless, for
more confident generalizations, teachers’ attitudes in other disciplines (i.e., other than
English as a Foreign Language) need to be investigated.

The adoption of both quantitative and qualitative methods to collect the data was
valuable for this study. The quantitative procedure was necessary to guarantee a wider
generalization of the results, and the qualitative part was necessary to provide plausible
explanations for the quantitative data. Many researchers have endorsed and encouraged
this mixed-method trend (Sooknanan, 2002; Isleem, 2003; Kagima, 1998a). In this study,
the data collected from questionnaire and interviews served as a mutually validating
procedure. As Lincoln and Guba (2000) note, such strategy also increases the
trustworthiness of the conclusions. Future researchers may need to consider this option
based on their needs and other feasibility issues. Additional procedures, such as direct
observation, are likely to increase the trustworthiness/validity of the conclusions.

**Policy and Practice:**

Several specific implications for policy and practice can be derived from the
findings. Most of these implications relate directly to strategies that can be implemented
by policy-makers to ensure the success of their technology initiative and by teachers to
get the most out of their ICT experience.

Results from this study indicated that teachers generally had positive attitudes
toward ICT despite the different limitations regarding its implementation in Syrian
schools. It is essential for policy-makers to sustain and promote teachers’ attitudes as a
prerequisite for deriving the benefits of costly technology initiatives. Since positive
attitudes toward ICT usually foretell future computer use, policy-makers can make use of teachers’ positive attitudes toward ICT to better prepare them for incorporating ICT in their teaching practices.

A high percentage of the teachers felt that ICT does not match the existing curricula nor fit within the class-time frame. It follows that placing computers in schools is not enough for attaining educational change. The introduction of ICT into education requires equal innovativeness in pedagogical and curricular approaches. Both policy-makers and teachers share this responsibility. Policy-makers should provide additional planning time for teachers to experiment with new ICT-based approaches. This may be attained by reducing the teaching load for the teachers.

Teachers’ deep apprehension about the morally and culturally inappropriate materials on the web and their unwelcome effects on Syrian children and students should receive its due attention on the part of the Ministry of Education. The Ministry may need to employ Internet content blocking systems, apply strict rules about Internet use, and/or implement awareness programs in schools. Such steps would alleviate the teachers’ concern and simultaneously motivate them to use ICT in their classrooms with the least amount of anxiety. It is also incumbent upon teachers themselves to increase their awareness of this issue in order to be able to guide students during their access to the Internet.

While teachers were hoping for the creation of Arab-made computers, they were particularly emphatic about the need for software and programs that are congruent with the Arabic character, values, and customs. Policy-makers should spare no effort to
address this issue. Adequate funds should be allocated for the creation of software that is pertinent to Arab students and acceptable to Arab teachers.

In view of the teachers’ low level of access to school computers and the significant relationship between access and attitudes toward ICT, policy-makers need to allocate funds to increase the numbers of computers for schools and for teacher use in particular. The last step may aid teachers in experimenting with ICT before being able to use it in their classrooms.

Finally, the need for more training opportunities was one of the teachers’ major demands in this study. Some teachers were concerned that “science” teachers will be treated differentially insofar as computer training is concerned. Hence, the Ministry of Education should ensure that all teachers receive adequate training. This measure would be part of the human resource development, which is essential for technology implementation. Training should not merely focus on computer literacy skills but also present ways to integrate ICT in teaching and learning. In addition, training should include a cultural awareness element. With such training, teachers can act as agents of educational change and cultural safeguard within their school culture.

**Further Research:**

Future studies can build on the results of this study to enrich the existing knowledge in the area being investigated. Based on the analysis of the data and the ensuing findings, the following recommendations are presented for consideration:
1. Since the current study is the first of its kind in the Syrian educational system, similar studies are needed to produce more knowledge in this area. Such studies may consider changing the setting, population, sampling procedures, or data collection methods utilized in the current study. For example, future researchers may examine the attitudes of teachers from different disciplines (say, mathematics), in other Syrian cities, or with higher access to computers.

2. Within the computer attitude scale, the behavioral subscale showed that teachers are willing to adopt technology and to use it in their classrooms. First, further research is needed to determine whether attitudes are the best predictor of teachers’ use of ICT in the Syrian school system. To verify this relationship, attitudes may be examined along with such variables as computer access, relevant software availability, administrative support, technical support, and computer expertise. If such a relationship is established, following studies may focus on needs assessment in terms of the infrastructure required for putting this prospect into effect.

3. Given the high contribution of computer attributes to teachers’ attitudes toward ICT in education, future studies need to consider the role of single computer attributes (e.g., relative advantage, complexity, etc.) in predicting attitudes. Studies also need to examine computer attributes other than those included in this study (e.g., trialibility, adaptability, etc.).

4. Given the substantial weight of cultural perceptions in determining attitudes, future studies should examine the effect of this factor in different educational settings. This factor is particularly important in developing countries, where technology is often seen as an alien tool that may or may not fit within the existing school or domestic culture. First
and above all, future researchers need to pinpoint this construct within their respective research settings. In-depth qualitative procedures or a combination of both qualitative and quantitative methods will be necessary to attain this goal.

5. The regression analysis showed that the independent variables included in this study explained 58% of the variance in attitudes. Future research should include additional variables (e.g., administrative support, technical support, teachers’ techno-anxiety, their openness to change, their self-efficacy, etc.) to account for the unexplained variance.

6. The study did not examine the relationships amongst the independent variables. The relationships amongst variables that were found to correlate with attitudes in particular need to be studied further. These variables include computer attributes, cultural perceptions, computer competence, computer access, and computer training.

7. While the current study employed cross-sectional methods to gather data on the population of Syrian EFL teachers at a single point of time, future research need to consider attitude change toward ICT in education over a long period of time. This step will necessitate longitudinal studies with some proposed model about attitudinal change.

8. Findings point to the initiation of Syrian teachers through the process of ICT adoption. It seems that teachers have already gone through the Knowledge and Persuasion stages of adoption. Further research should be done to identify the future adoption stages specific to the Syrian teachers.


Creation, Development and Cross-Cultural Transfer (pp.35-64). Oxford: Pergamon Press.


APPENDICES
# APPENDIX A

## PANEL OF EXPERTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Rick Voithofer</td>
<td>Mr. Ali Al-Asmeri</td>
</tr>
<tr>
<td>Dr. Suzanne Damarin</td>
<td>Mr. Mustafa Hameesh</td>
</tr>
<tr>
<td>Dr. Mahdi Alosh</td>
<td>Mr. Muhammad Albirini</td>
</tr>
<tr>
<td>Dr. Alan Hirvela</td>
<td>Ms. Maleema Albirini</td>
</tr>
<tr>
<td>Dr. Muhammad Atiq Rahman</td>
<td>Mrs. Linda Bakkar</td>
</tr>
</tbody>
</table>
APPENDIX B

LETTER TO THE SYRIAN MINISTER OF EDUCATION

The Ohio State University
College of Education
School of Educational Policy and Leadership

125 Ramsdell Hall
294 West Woodruff Avenue
Columbus, OH 43210-1177 USA
FAX 614-292-7900


Dear Minister of Education,

I am writing to express our concerns regarding recent developments in education and related technological advancements in Syria. We are committed to supporting the educational sector through the utilization of technology and innovation.

The Ohio State University
Graduate Teaching Associate
Educational Policy and Leadership
Technologies of Instruction and Media
Jennings Hall # 203
1735 Neil Ave.
Columbus, OH 43210
USA.

Phone: (614) 292-0555
Fax: (614) 292-1262
Email: Albrime11@osu.edu

Yours sincerely,

[Signature]

[Name]
Graduate Teaching Associate
Educational Policy and Leadership
APPENDIX C

APPROVAL OF THE STUDY BY THE SYRIAN MINISTRY OF EDUCATION

الموضوع: تسهيل مهمة

لإشراف الموجب المقيم في معهد اللغة الإنجليزية

الجهورية العربية السورية
وزارة التربية
الرقم: 643/4

ديناميك المهام

السدس، حمص - 2004

المحاسبة: 

معاون وزيرة التربية

الدكتور سامان الطهويل

مساعد الوزير

- مكتب الوزير

- مكتب الأبحاث

- دائرة التعليم

- دائرة اللغة

- دائرة العلاقات الدولية

- دائرة العلاقات الخارجية

- دائرة الابتكار وتطوير التعليم

دمشق في / 2004
المواقيف للـ / 2004
التحرير للم : 442942

المحاسبة: 

معاون وزيرة التربية

الدكتور سامان الطهويل

مساعد الوزير

- مكتب الوزير

- مكتب الأبحاث

- دائرة التعليم

- دائرة اللغة

- دائرة العلاقات الدولية

- دائرة العلاقات الخارجية

- دائرة الابتكار وتطوير التعليم

دمشق في / 2004
المواقيف للـ / 2004
التحرير للم : 442942
APPENDIX D

LETTER OF SUPPORT BY THE DIRECTOR OF ENGLISH IN HIMS
Dear Sir,

I am writing to acknowledge the receipt of the following materials (attached) to the school in the Arab countries. I have found this project to be a unique opportunity to enhance my understanding of the Arab educational system and the various challenges facing it.

The data I have received is a comprehensive analysis of the educational system in the Arab world. It includes a detailed analysis of the factors that contribute to the success or failure of educational institutions in the region.

I believe that this study can provide valuable insights for policymakers and educators in the Arab world. It highlights the importance of investing in education and the need for continuous improvement in the educational system.

I would be honored to discuss the results of this study with you further. Please let me know if there is any additional information that I can provide.

Thank you for considering my proposal.

Sincerely,

Abd Al-Kafi Al-Sweini
APPENDIX F

COVER LETTER (ENGLISH VERSION)

Dear [first name, last name]:

I am currently conducting a study on the diffusion of information technology into Syrian schools. The study seeks to determine the attitudes of Syrian high school teachers toward information technology in education and the factors that may have influenced these attitudes. The best information about technology status in Syrian schools comes from you, the teacher. This type of information is useful in decision making concerning future technology implementation plans.

Taking this survey is voluntary, and your job will not be affected in any way by whether you take the survey or not. This survey will take approximately 10 minutes to complete. Please complete the survey and feel free to make notes on the survey as needed. All information will be treated confidentially. Further, responses will be treated only as group data in the written report.

Thank you for providing this valuable information. If you would like to receive the results of this study, please contact me at Albirini.1@osu.edu or phone: 425-496. Your time and effort in completing the survey are greatly appreciated.

Sincerely,

Abdulkafi Albirini
موافقة على الإشراك في البحث

وافق على المشاركة في هذا البحث الذي يحمل عنوان "العمل الموثوق في مواقع مدرسي اللغة الإلكترونية في المرحلة الثانوية والمتوسطة في سوريا"، قام بإعداد تقارير على بيانات مساهمات الأعضاء في تأسيس النظام والتحقيق إجراء مراجعة على أساليب التكوين. كما أُذُن بأي حر في سحب معلومات في أي وقت، إذا قام مشاركون في الدراسة بدون ضرر يلحق.

نذير: قام بأي قرار، وتمت تدوين الموافقة وأُلّفت بها إرادة وحريت وتمت صياغتها على نسخة منك.

التاريخ: 

التوقيع: 

الاسم: 

الترخيص: 

ملاحظة: هل تحتاج للمشاركة في مقابلة هاتفية لحجة علما بأن المشاركة طوعية:

[] نعم، أود المشاركة في مقابلة هاتفية لحجة

[] لا أرغب بالمشاركة

رقم: 

155
APPENDIX H

CONSENT FORM (ENGLISH VERSION)

THE OHIO STATE UNIVERSITY
College of Education
School of Educational Policy and Leadership

121 Barrow Hall
29 West Woodruff Avenue
Columbus, OH 43210-1177 USA
FAX 614-292-7906

CONSENT FOR PARTICIPATION IN RESEARCH

I consent to participating in research entitled: Factors Associated with the Attitudes of High School EFL Teachers in Syria toward Information Technology.

Abdualkafi Albirini has explained the purpose of the study, the procedures to be followed, and the expected duration of my participation. Possible benefits of the study have been described, as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Furthermore, I understand that I am free to withdraw consent at any time and to discontinue participation in the study without prejudice to me.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ____________________________ Signed: ____________________________ (Participant)

Signed ____________________________
Abdualkafi Albirini

Witness: __________________________

Note: Please indicate whether or not you would like to participate in a follow-up phone interview by checking one the boxes below. Participation is completely voluntary:
--- Yes! I would like to participate in a follow-up interview. Signature ______________ (Please sign here)
--- No! I do not like to participate in a follow-up phone interview
جامعة ولاية أوهايو
آراء المدرسين في تقنية الحاسب

تعليمات عامة: تهدف هذه الاستبانة إلى معرفة رأيك من إدخال تقنية المعلومات (الحاسب) إلى قطاع التعليم في سورية. تتألف الاستبانة من ستة أقسام. يبدأ كل قسم بعض التعليمات التي تخص ذلك القسم فقط. قبل أن تبدأ بالإجابة على كل قسم الراجع قراءة التعليمات بدقة ثم الإجابة بصراحة حسب الشكل المطلوب.

(1) تعليمات من فضلك ضع دائرة حول الرقم الذي يحدد مدى موافقتك أو عدم موافقتك مع كل من العبارات التالية. الراجع الإجابة على جميع الفقرات.

<table>
<thead>
<tr>
<th>رقم</th>
<th>تعليم</th>
<th>د. 1</th>
<th>د. 2</th>
<th>د. 3</th>
<th>د. 4</th>
<th>د. 5</th>
<th>د. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>لا يخفيفي الحاسب أبداً.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>لا أشعر بالارتياح تجاه الحاسب.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>لا أشعر بتوفر الحاسب بكثرتي هذة الأيام.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>لا أحب التحدث مع الآخرين عن الحاسب.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>لا أحب استخدام الحاسب شيء معين.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>لا أحب أن استخدم الحاسب في التدريس.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>يوفر الحاسب الوقت والجهد.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>ستكون المدارس أفضل بدون الحاسب.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>يجب أن يستخدم الطلاب الحاسب في جميع المواد الدراسية.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>تعلم الحاسب مضيعة للوقت.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>يحب الطلاب الطبلا على زيادة دراستهم.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>الحاسب وسيلة سريعة وفعالة لتحقيق المعلومات.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>لا أشن أي سامتار للحاسب في الصف أبداً.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>يعزز الحاسب تعلم الطلاب.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>يضر الحاسب أكثر مما ينفع.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>أفضل أن أعمل الأشياء بيد علي أن أعملها بالحاسب.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
(2) تعليمات: من فضلك ضع دائرة حول الرقم الذي يحدد مدى موافقتك أو عدم موافقتك مع كل من العبارات التالية. الرجاء الإجابة على جميع الفقرات.

<table>
<thead>
<tr>
<th>رقم</th>
<th>عبارة</th>
<th>موافقتك</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>سوف يُستَخدَم الحاسب التعليمي.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>يمكن التدريس باستخدام الحاسب مزايا أفضل من الطرق التقليدية.</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>لا يمكن تقنية الحاسب أن تحسن نوعية التعليم.</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>استبدال تقنية الحاسب يجعل المدارس أكثر تشويقاً.</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>لا يُجْدِد الحاسب في التعليم.</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>لا يمكن للحاسب في المدارس.</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>يُتَوَفق استخدام الحاسب تاماً مع اهداف المناهج الدراسية.</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>لا يشجع وفق المناهج الدراسية استخدام الحاسب في الصف.</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>يُتَنَبَّأ استخدام الحاسب مع مساعدة الطلبة التعليمية ومستوى معرفتهم بالحاسب.</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>استبدال الحاسب مناسب لتكبير مناهج التعليم.</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>من الصعب على التعليم الحاسب في المدارس.</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>لا أحد يُعْنُد استخدام الحاسب في التعليم.</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>الحاسب يجعل مهتمي في الصف أكثر تحديداً (صعبة).</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>آلة حاسب تعلمنا كيف نتعلم تكنولوجيا (عربية).</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>لم أر طفاً للحاسب في حالة عمل.</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>أثبت الحاسب أنه وسيلة تعليمية فعالة على مستوى العالم.</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>لم أر طفاً للحاسب يستخدم كوسيلة تعليمية.</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>رأيت بعض الدروس التي يستخدمون الحاسب لأغراض تعليمية.</td>
<td>1</td>
</tr>
</tbody>
</table>

(3) تعليمات: من فضلك ضع دائرة حول الرقم الذي يحدد مدى موافقتك أو عدم موافقتك مع كل من العبارات التالية. الرجاء الإجابة على جميع الفقرات.

<table>
<thead>
<tr>
<th>رقم</th>
<th>عبارة</th>
<th>موافقتك</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>لن يُعْقَد الحاسب شيناً في صفوفنا ومدارسنا أو حياتنا.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>يحتاج الطلاب إلى معرفة استخدام الحاسب من أجل الحصول على مهنة.</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>الطلاب يتعلمون من نسج العالم على التعليم من الحاسب.</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>تكسب معرفة بالحاسب اختبار الأدبيين.</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>تحتاج إلى جانب نسج الثقافة العربية والفلسفة العربية.</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>سوف يعترضنا الحاسب على تحقيق مستوى معينتانا.</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>لا يُبِعُر استخدام الحاسب الأدبي في الإجابة عن مسائل ثقافية والدينية.</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>يزداد انتشار الحاسب في بلدنا بسرعة كبيرة جداً.</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>يستمر ذو المهارة الحاسب على مزايا لا يحصل عليها غيرهم.</td>
<td>1</td>
</tr>
</tbody>
</table>
시설 الحاسب من اعتمادنا على البلاد الأجنبية.

هناك الكثير من المسائل الاجتماعية التي يجب التطرق إليها قبل مسألة نشر الحاسب في مجال التعليم.

إن الانتشار المتزايد للحاسب سيعمل الحياة أسهل.

يجدر الحاسب المجتمع من القلم الإنسانية.

لا يدفع العمل على الحاسب علاقة الناس بعضهم البعض.

يشجع الحاسب على الانتشار اللافتات.

الحاسب يجب أن يكون من أولويات التعليم.

 $('#example').show();

(٤) تعليمات: من فضلك ضع دائرة حول الرقم الذي يحدد مستوى مقدرتك بالحاسب

(أي مستوى معرفتك و مهارتك باستعمال الحاسب)

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
<td>٦</td>
</tr>
</tbody>
</table>

(٥) تعليمات: من فضلك حدد عدد المرات التي تستطيع فيها الوصول إلى الحاسب

في كل من الأمكنتة التالية:

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
</tr>
<tr>
<td></td>
<td>١</td>
<td>٢</td>
<td>٣</td>
<td>٤</td>
<td>٥</td>
</tr>
</tbody>
</table>

انون

© ١٩١٠
1. ما هو جنسك؟  □ ذكر □ أنثى
2. كم عمرك؟ □ بين ٢٠ و ٢٩ □ بين ٣٠ و ٣٩ □ بين ٤٠ و ٤٩ □ بين ٥٠ و ٥٩ □ ٦٠ أو أكثر
3. ما معدل دخلك الشهري بالليرة السورية؟ □ بين ٥٠٠٠٠ و ١٠٠٠٠ □ بين ١٠٠٠٠ و ١٥٠٠٠ □ بين ١٥٠٠٠ و ٢٠٠٠٠ □ ٢٠٠٠٠ أو أكثر
4. كم عدد سنوات خبرتك في التدريس بما فيها هذه السنة؟ □ من ١ إلى ٥ سنوات □ من ٦ إلى ١٠ سنوات □ ١١ سنة أو أكثر
5. ما نوع المدرسة التي تدرس فيها؟ □ في المدنية □ في ضواحي المدنية □ في الريف
6. ما هي أعلى درجة علمية حصلت عليها؟ □ شهادة التأهيل التربوي □ إجازة جامعة □ شهادة ماجستير □ الجدية أو الماجستير □ الدبلوم □ البكالوريوس □ البكالوريوس أو أكثر □ غير ذلك
7. هل سبق لك أن حضرت أي دورة أو دورة تدريبية أو ندوة عن استخدام الحاسب الآلي؟ □ نعم □ لا □ لنع معلوم، هناك عدة ندوات تخص استخدام الحاسب الآلي، أنصح بحضورها.
8. ما هي طريقة التدريس التي تستخدمها غالباً؟ □ المناقشة الفعالة □ الأنشطة الجماعية □ الشرح □ التعليم عن طريق الأداء □ الإقامة □ التعلم عن طريق نصب أوراق □ التعليم بمصادر الحاسب □ التعليم الصوتي □ أي غيرها (حدد من فضلك)...
The Ohio State University
Attitudes toward Computer Technology

General Instructions: The purpose of this questionnaire is to examine your attitudes toward the introduction of information technology into Syrian education. The questionnaire consists of six sections. Each section begins with some directions pertaining to that part only. As you begin each section, please read the directions carefully and provide your responses candidly in the format requested.

Section (1): Instructions: Please indicate your reaction to each of the following statements by circling the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computers do not scare me at all.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Computers make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I am glad there are more computers these days.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I do not like talking with others about computers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Using computers is enjoyable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I dislike using computers in teaching.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Computers save time and effort.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Schools would be a better place without computers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Students must use computers in all subject matters.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Learning about computers is a waste of time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Computers would motivate students to do more study.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Computers are a fast and efficient means of getting information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I do not think I would ever need a computer in my classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------</td>
<td>---------</td>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>14. Computers can enhance students’ learning</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Computers do more harm than good.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I would rather do things by hand than with a computer.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. If I had the money, I would buy a computer.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I would avoid computers as much as possible.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I would like to learn more about computers.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I have no intention to use computers in the near future.</td>
<td>1  2  3  4  5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Section (2) Instructions:** Please indicate your reaction to each of the following statements by circling the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.
**Section (3) Instructions:** Please indicate your reaction to each of the following statements by circling the number that represents your level of agreement or disagreement with it. Make sure to respond to every statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computers will not make any difference in our classrooms, schools, or lives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Students need to know how to use computers for their future jobs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Students prefer learning from teachers to learning from computers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Knowing about computers earns one the respect of others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. We need computers that suit better the Arabic culture and identity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Computers will improve our standard of living.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Using computers would not hinder Arab generations from learning their traditions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Computers are proliferating too fast.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. People who are skilled in computers have privileges not available to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Computers will increase our dependence on foreign countries.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. There are other social issues that need to be addressed before implementing computers in education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. The increased proliferation of computers will make our lives easier.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Working with computers does not diminish people’s relationships with one other.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Computers encourage unethical practices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. Computers should be a priority in education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Section (4) Instructions:** Please indicate your current computer competence level (i.e., both your knowledge of and your skill in using computers) regarding each of the following statements. Make sure to respond to every statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>No competence</th>
<th>Little competence</th>
<th>Moderate competence</th>
<th>Much competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install new software on a computer.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Use a printer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Use a computer keyboard</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Operate a word processing program (e.g., Word).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Operate a presentation program (e.g., PowerPoint).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Operate a spreadsheet program (e.g., Excel).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Operate a database program (e.g., Access)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Use the Internet for communication (e.g., email &amp; chatroom)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Use the World Wide Web to access different types of information.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Solve simple problems in operating computers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
11 Operate a graphics program (e.g., Photoshop).

12 Use computers for grade keeping.

13 Select and evaluate educational software.

14 Create and organize computer files and folders.

15 Remove computer viruses

Section (5) Instructions: Please identify how often you have computer access in the following contexts:

1 In your home

2 At school (computer lab or library)

3 Other (like Internet cafes, etc.)

Section (6) Instructions: Please indicate your response to the following questions by checking the appropriate boxes:

1 What is your gender? □ Male □ Female

2 What is your age? □ 20-29 □ 30-39 □ 40-49 □ 50-59 □ 60 and over

3 What is your monthly average household income in Syrian Liras? □ 5,000—9,000 □ 10,000—14,000 □ 15,000—19,000 □ 20,000-24,000 □ 24,000 and over

4 Including the current year, how many years have you been teaching? □ 1-5 □ 6-10 □ 11-15 □ 16-20 □ over 20

5 In what type of school do you teach? □ Urban □ Suburban □ Rural

6 What is your highest completed academic degree? □ Teacher Certificate □ Bachelors □ Master’s

7 Have you ever attended any training course, workshop, or seminar on using computers? □ No □ Yes.

If “Yes”, please specify the number of hours and/or days: _______ hours _______ days

8 What is the teaching method you use most often?

□ Active discussion □ Collaborative activities □ Demonstration □ Hands-on learning □ Lecturing □ Role playing □ Computer-assisted instruction □ Other (please specify): …………………………….

Thank you very much for your response.
### INTERVIEW INSTRUMENT (ARABIC VERSION)

| ما شعورك تجاه انتشار الحاسب في سورية؟ | 1 |
| ما هو تأثير هذا الانتشار عليك أو على أطفالك أو عائلتك؟ | 2 |
| ما هو تأثير هذا الانتشار على المجتمع السوري والمدارس السورية؟ | 3 |
| يقال أن الحاسب يعكس القيم الأخلاقية للناس الذين صنعوه (بلاد الغرب) وطريقة تفكيرهم بالحياة. ما رأيك بهذا القول؟ | 4 |
| هل تعتقد أن الحاسب كاداه غاربية الصنع سيكون مختلفًا لو صنع باللغة العربية؟ | 5 |
| لو أفترضنا أن شخصًا مهم النظام للحاسب يشير مواقف هذا الحاسب (ليس من الناحية التقنية بل من ناحية مناسبيتها لطبيعة الإنسان العربي والطابع العربي). ما رأيك؟ | 6 |
| ما شعورك تجاه دخول الحاسب في مجال التربية والتعليم؟ | 7 |
| برأيك ما هي بعض النواحي التي يمكن للحاسب أن يكون فيها مفيداً في مجال التربية والتعليم؟ | 8 |
| عند قراءتي لإجاباتك على الاستبانة لاحظت أن موقفك من الحاسب إيجابي جدا مع أنك (كما لاحظت) لم تمتلك بعد المهارة في ذلك. كيف يمكن أن تشبه ذلك، سيكسيرك ذلك؟ | 9 |
| هل تعجب أن تضيف شيئاً آخر؟ | 10 |
| هل لديك أي سؤال آخر؟ | 11 |
| شكراً جزيلاً على إجاباتك و على وقتكم. | 12 |

استبيان رقم 1

| عند قراءتي لإجاباتك على الاستبانة لاحظت أن موقفك من الحاسب إيجابي جدا مع أنك (كما لاحظت) غير منفتح لك لا في البيت ولا في المدرسة ولا في أماكن أخرى. ما تفسيرك لذلك؟ | 9 |
| بنظر إلى موقفك الإيجابي من الحاسب، كيف ستمقوم بزيادة فرصة توفر الحاسب لك واستخدامه؟ | 10 |

استبيان رقم 2

| عند قراءتي لإجاباتك على الاستبانة لاحظت أن موقفك من الحاسب إيجابي جدا مع أنك (كما لاحظت) لم تنهك ذلك فرصة الحصول على تدريب على استخدام الحاسب. ما تفسيرك لذلك؟ | 9 |
| برايك ما هي فرص التدريب على الحاسب التي يجب أن تحصل عليها المدرسون كي يستطيعوا استخدام الحاسب في التعليم؟ | 10 |
APPENDIX L

INTERVIEW INSTRUMENT (ENGLISH VERSION)

**Computer Competence Group:**

1. How do you feel about the spread of computers in Syria?
2. How would that affect you, your children, or your family?
3. How would that affect Syrian society and schools?
4. Computers are said to reflect the values and ways of thinking of those who make them? What is your opinion about this saying?
5. Do you think that computers would be different if they were made by Arab people? How?
6. If you were to design a computer, what would it be like?
7. How do you feel about the entry of computers into Syrian education?
8. In general, in what ways do you think computers can be useful for education?
9. In reading your survey responses, I noticed that you have a very positive attitude about computers in education although you have little computer competence. How would you explain that?
10. Given your positive attitude toward computers, how would you go about increasing your competence? Would you take any training, for example?
11. Would you like to add anything else?
12. Do you have any questions for me?

**Thank you for your responses and time**

**Substitution questions for group 2 (Low Computer Access):**

9. In reading your survey responses, I noticed that you have a very positive attitude about computers in education although you have limited access to computers. How would you explain that?
10. Given your positive attitude toward computers, what are the ways you are trying to follow to increase your computer access?

**Substitution questions for group 3 (Low Training):**

9. In reading your survey responses, I noticed that you have a very positive attitude about computers in education although you seemed to have no computer training. How would you explain that?
10. What training opportunities do you think should be provided for teachers in order to use computers in teaching?
## APPENDIX M

### INTERVIEW TRANSCRIPTION KEY

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>…</td>
<td>Incomplete thought or change of thought</td>
</tr>
<tr>
<td>(…)</td>
<td>Speakers’ words edited out</td>
</tr>
<tr>
<td>[ ]</td>
<td>Explanation added for clarification of meaning</td>
</tr>
</tbody>
</table>