5.1 INTRODUCTION

When information is sought that might indicate the need for complex changes in practice, other conditions of adoption must be met, including commitment to change, a conceptual base for making the change, and time to deliberate over making the change; information seeking might play various roles in this process. If we assume that information seeking results from an identified learning need, then a self-directed system for learning directs that work.

The self-directed curriculum defines three stages of learning, beginning with an awareness of the need to learn or adopt a change in practice. Stage 2 encompasses the learning actually needed to develop that new competency to practice differently.

Stage 3 focuses on managing the new skill by changing the environment or by adapting the new skill to create a good fit with daily life. Three kinds of resources support the stages of change: material resources, especially journals; human resources, especially colleagues; and formal CME programs. The curriculum is self-directed because the learner controls the kinds of changes needed and the resources to support those changes. A learner may address questions by searching for answers informally or formally, such as choosing a
formal CME program, or both. In the general study of information-seeking behaviors, information seeking is defined as purposively acquiring information from selected information carriers. Johnson and Meischke proposed that this behavior may be influenced by the characteristics of the individual seeking information or by the characteristics of the information carrier. Demographic characteristics, experience, salience, and beliefs are individual factors that may affect information-seeking behavior. Information carrier factors include message design and utility.

In connecting these concepts, we hypothesized that physician Internet information-seeking behaviors would be influenced by the stage at which information was sought, previous information-seeking experiences, beliefs, and demographic characteristics, such as practice location where the Internet might offer previously unavailable access to information. We further hypothesized that utility, defined as the usefulness in solving a specific patient problem, would be a key motivator to physician information seeking on the Internet.

Not only have physician information-seeking behaviors been studied in the light of related theories, but also Internet CME on-line activities are not always designed or developed using theoretical constructs related to the physician as an information seeker. These issues are critical to the growing number of CME providers who wish to use the Internet to effectively design and develop CME courses, individual digital learning portfolios, and Internet strategies to promote clinical practice guideline dissemination and adoption. The purpose of this study
was to examine physician medical information–seeking behaviors and their relevance to CME providers who design and develop CME

5.2 NEED, CONTEXT AND SIGNIFICANCE OF THE STUDY

The explosion in advanced communication technology may have created a gap between educational needs and educational providers, but communication technology itself may very well be the best means of bridging that gap. Continuing Medical Education opens opportunities to more physicians, and promises to improve the quality of education for everyone, but excitement concerning the opportunity to use new media must be overcome so that it doesn’t distract us from choosing the most suitable alternatives.

Institutions of higher learning have become involved to a moderate degree in professional training and development programs during the past ten years, and the trend is to be more responsive to the needs of industry rather than to stay with rigid traditional curricula (Moore & Koble, 1995). The Society of Continuing Medical Education (CME) has predicted that university will require more continuing education, more frequently and at more complex levels of application. It also has noted that, rather than being designed in an academic setting, programs will be designed to respond to identified needs of university.

5.3 STATEMENT OF THE PROBLEM

The present study is entitled as “EFFECT OF USING INFORMATION AND COMMUNICATION TECHNOLOGY IN IMPROVING CONTINUING MEDICAL EDUCATION IN IRAN”
5.4 RESEARCH QUESTIONS

1. What is the effect of ICT on CME based on the perception of Medical Professionals?

2. Will the organization’s commitment enhance the quality of Medical education program?

3. Does technology-based input help improving Medical education program?

4. What factors influence organizational unit’s decision-making in the area of technology-based Continuing Medical Education program?

5. Will the types of technology use influence the quality of Continuing Medical Education Programs?

5.5 OBJECTIVES

1. To study the effect of Information and Communication Technologies (ICT) on Continuing Medical Education (CME) based on the perception of Medical Professionals.

2. To study the usage of ICT in Continuing Medical Education in Iran, in terms of organizational variables as follows:

   • the type of organization to which respondents belonged;
   
   • types of Continuing Medical Education programs offered in Iran of information and communication technologies.
   
   • the organization’s commitment to the provision of continuing Medical education by technology-based Continuing Medical Education program;
3. To study the usage of ICT in Continuing Medical Education in Iran in terms of some specific variables as follows:

- factors influencing likelihood of use of information and communication technologies for technology-based Continuing Medical Education;
- factors changing in knowledge, attitudes, skills, practice, behavior, or clinical practice outcome in Continuing Medical Education program development and delivery;
• gender;
• experience in technology-based Continuing Medical Education delivery to health professionals;
• perception of physicians with regard to the following of usage of ICT, internet, their experience, beliefs, motivation, barriers and Important online CME in Continuing Medical Education program development and delivery.

5.6 HYPOTHESES

1. There is no significant difference between Medical Professionals who underwent CME in which ICT was used and the Medical Professionals who underwent CME in which ICT was not used in their perception on the effectiveness of ICT for CME.

2. There is no significant difference between Type of organizational respondent category and organizational influences technology–based Continuing Medical Education in Iran.

3. There is no significant difference between Type of organizational respondent category and professional influences technology–based Continuing Medical Education in Iran.

4. There is no significant difference between Type of organizational respondent category and organizational strengths and resources technology–based Continuing Medical Education in Iran.
5. There is no significant difference between Type of organizational respondent category and Individual strengths and resources technology–based Continuing Medical Education in Iran.

6. There is no significant difference between organizational factors of organizations, and whether they did or did not provide technology–based Continuing Medical Education programs.

7. There is no significant difference between professional factors of organizations, and whether they did or did not provide technology–based Continuing Medical Education programs.

8. There is no significant difference between an organization provision of technology–based Continuing Medical Education and perception of existence of strengths and resources within the organization for the delivery and development of CME in Iran.

9. There is no significant difference between an organization provision of technology–based Continuing Medical Education and the perception of Individual strengths and resources within the organization for the delivery and development of CME.

10. There is no significant difference between level of experience in technology–based Continuing Medical Education and organizational influences.

11. There is no significant difference between level of experience in technology–based Continuing Medical Education and professional influences.
12. There is no significant difference between level of experience in technology–based Continuing Medical Education and organizational strengths and resources.

13. There is no significant difference between level of experience in technology–based Continuing Medical Education and Individual strengths and resources.

14. There is no significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of organizational factors.

15. There is no significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of professional factors.

16. There is no significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of strengths and resources.

17. There is no significant difference between organization units on whether they had formed partnerships for the purposes of technology–based Continuing Medical Education development and delivery on the organizational factors influences.

18. There is no significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of professional factors influences.
19. There is no significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of strengths and resources.

20. There is no significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of individual strengths and resources.

21. There is no significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of the organizational factors influences.

22. There is no significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of the professional factors influences.

23. There is no significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of strengths and resources.

24. There is no significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of individual strengths and resources.

25. There is no significant difference between factors changing in knowledge, attitudes, skills, practice, behavior, or clinical practice outcome in Continuing Medical Education program development and delivery.
26. There is no significant difference among the medical professionals in their perception on physicians’ experience, beliefs, motivation and perception of barriers on the use of ICT in improving Continuing Medical Education.

27. There is no significant difference between specialists and other physicians, medical professionals on their perception on online Continuing Medical Education programs for their professional development.

28. There is no significant difference between male and female physicians in finding and using technology-based Continuing Medical Education in Iran.

5.7 METHODOLOGY OF THE STUDY

5.7.1 Locale of the Study

The locale of the present study is Shiraz University of Medical Sciences in Iran. City of Shiraz is the sixth most populous city in Iran, and the capital of Fars Province. Shiraz is located in the southwest of Iran. Shiraz has a moderate climate and has been a regional trade center for more than thousand years.

The earliest reference to the city, as Tiraziš, is on Elamite clay tablets dated to 2000 BC. In the 13th century, Shiraz became a leading center of the arts and letters, thanks to the encouragement of its ruler and the presence of many Persian scholars and artists. Shiraz was the capital of Persia during the Zand dynasty from 1750 until 1781.

Shiraz University of Medical Sciences (SUMS) is a public medical school located in Shiraz, Iran. It is ranked as one of Iran’s top medical schools, with more than 5000 students studying for 83 different degrees, and a staff of...
nearly 13,000 faculty and personnel. With 13 hospitals, SUMS is a regional health care provider and the main medical center in Fars Province.

Located in central Shiraz, SUMS was founded in 1950 as a college within Pahlavi University. In 1954, a Faculty of Nursing was added, followed by a Faculty of Dentistry in 1969. After the 1979 Islamic Revolution overthrew the Pahlavi dynasty drastic changes were implemented at all universities. The name of Pahlavi University was immediately changed to Shiraz University. In 1986, the Iranian Ministry of Health, Treatment and Medical Education took over the departments and faculties in the medical sciences and SUMS became an independent institution.

5.7.2 Sample of the Study

The entire study has been conducted in Shiraz city of Iran. The population for this survey is defined as Iranian physicians of all types of specialties in active including community practice. As per the most current list of physicians in Iran, there are 500 physicians. A sample of 400 has been taken from this total population of 500 physicians for the study. The researcher has used Cochran’s sampling technique, with a margin of error of 5% and 95% confidence of the 500 physicians in the total population; fax numbers were available for 90% of the population. Random samples were drawn from the pool of available fax numbers and responses solicited until 200 were obtained. 140 male and 60 females that categorized in 7 group medical basic science, ENT, cardiologist, psychiatrists, dermatologist, surgeon and pediatrics.
5.8 VARIABLES OF THE STUDY

5.8.1 Dependent Variables

Improvement of Continuing Medical Education in Iran constitutes as the dependent variable.

5.8.2 Independent Variables

1. Gender: Male and Female

2. Length of experience in use of ICT
   - <1 year
   - 1-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - > 20 years

3. Area of specialists: Cardiologist, Dermatologist, ENT, Pediatrics, Psychiatrists, Surgeon and medical basic science.

4. Faculty support and target audience, organizational influences, strengths and resources, effectiveness of ICT usage, usage of internet, perception on physicians experience, beliefs, motivation and barriers.

5.9 TOOLS USED FOR DATA COLLECTION

Two-research tools viz., Perception scale to know the effect of ICT on CME prepared by the researcher. The second tool is 4-E Model questionnaire developed by Collis et al. (2000) which included items on the type of organization to which
respondents belongs to; the organization’s commitment to the provision of technology-based Continuing Medical Education programme; experience in technology-based Continuing Medical Education delivery to health professionals; factors influencing decision to offer technology-based Continuing Medical Education; source(s) of support for technology-based education program delivery, and access to internal resources to support Continuing Medical Education program development and delivery; type(s) and nature of partnerships formed for the purpose of sharing resources for technology-based Continuing Medical Education program development and delivery; type(s) of technologies used in delivering Continuing Medical Education programs to health professionals; type(s) of faculty development programmes provided to support instructors and faculty in Continuing Medical Education programme development and delivery; composition of target audience/participants in Continuing Medical Education programs; factors influencing technology-based Continuing Medical Education; Types of Continuing Medical Education programs offered in Iran and Factors changing in knowledge, attitudes, skills, practice, behavior, or clinical practice outcome in Continuing Medical Education. These tools were tried out in a small sample to know the suitability of the tools. The questionnaire included items that were designed to collect information in the following areas:

- to study various types of organizations to which respondents belonged;
- to assess organization’s commitment to the provision of Continuing Medical Education by technology-based Continuing Medical Education programming;
• to assess experience in technology-based Continuing Medical Education delivery to health professionals;

• to assess factors influencing decision to offer technology-based Continuing Medical Education;

• to study source(s) of support for technology-based education program delivery, and access to internal resources to support Continuing Medical Education program development and delivery;

• to study type(s) and nature of partnerships formed for the purpose of sharing resources for technology-based Continuing Medical Education program development and delivery;

• to study type(s) of technologies used in delivering Continuing Medical Education programs to health professionals;

• to study type(s) of faculty development provided to support instructors and faculty in Continuing Medical Education program development and delivery;

• to assess composition of target audience/participants in Continuing Medical Education programs;

• to assess factors influencing likelihood of use of information and communication technologies for technology-based Continuing Medical Education;

• To assess types of Continuing Medical Education programs offered in the Iran of information and communication technologies;
• To assess factors changing in knowledge, attitudes, skills, practice, behavior, or clinical practice outcome in Continuing Medical Education program development and delivery;

• To propose factors influences in the perception of usage of programmes effectiveness usage of ICT, usage of internet, perception on physicians experience, beliefs, motivation, barriers and practice outcome in Continuing Medical Education program development and delivery;

• To study the influence of secondary variables (gender, designation, etc.) on the above mentioned factors, which influence the use of ICT;

5.10 STATISTICAL TECHNIQUES USED FOR DATA ANALYSIS

The descriptive statistics and inferential statistics are used for analysis and interpretation of data collected from medical faculty. The t-test was used to study the effect of ICT in CME. The non-parametric tests like Kruskal-Wallis Test; Man Whitney U test and ANOVA are used for testing the formulated hypotheses.

5.11 OPERATIONAL DEFINITIONS OF THE KEY TERMS

Asynchronous: Communication, in which the interaction between participants is delayed, allowing convenient interaction through self-determination of time and place.

Communication Technology: Telecommunications applications such as cable television, fiber-optic, microwave, slow-scan television, satellites or microcomputer networking as introduced and applied to distance education.
**Continuing Professional Education** (CPE): The education of professional practitioners, regardless of their practice setting, that follows their preparatory curriculum and extends learning throughout their careers. Ideally this education enables them to keep abreast of new knowledge, maintain and enhance their competence, progress from beginning to mature practitioners, advance their careers through promotion and other job changes, and even move into different fields (Queeney, 1996, p. 698).

**Continuing Professional Medical Education** (CPME): The pursuit of adding to knowledge in the professional Medical discipline throughout an individual’s career.

**Decision**: A specific commitment to action (usually a commitment of resources).

**Decision Process**: A set of actions and dynamic factors that begin with the identification of a stimulus for action and ends with the specific commitment to act.

**Distance Education**: The simultaneous telecommunicated delivery of instruction from a host site or classroom to distant sites, coupled through advanced communications technology between teacher and students.

**Distance Learning**: The teaching-learning relationship in which participants interact through advanced communications technology.

**Download**: Using the network to transfer files from one computer to another.

**Electronic Mail (e-mail)**: Sending messages from one computer user to another.
Facsimile (Fax): System used to transmit textual or graphical images over standard telephone lines.

Human Elements: Conceptual construct of the “soft” issues of human interaction, such as change forces, likes, barriers, constraints, pressures, stresses, attitudes and roles.

Instructional Television: Microwave-based, high-frequency television used in educational program delivery.

Interactive Video: (Two way interactive video) two sites interact with audio and video as if they were co-located.

Internet: An international network of networks primarily used to connect education and research networks begun by the United States government.

Managerial Choice: The process identifying a choice or judgment to be made, evaluating information about alternatives, and selecting from among the alternatives.

Multimedia: Any document that uses multiple forms of communication, such as text, audio, and/or video.

On-Line: Active and prepared for operation. Also suggests access to a computer network.

Protocol: A formal set of standards, rules, or formats for exchanging data that assures uniformity between computers and applications.

Satellite TV: Video and audio signals are relayed via a communication device that orbits around the earth.
**Server:** A computer with a special service functions on a network, generally receiving and connecting incoming information traffic.

**Synchronous:** Communication, in which interaction between participants is live, real time, and/or simultaneous.

**Telecommunication:** The science of information transport using wire, radio, optical, or electromagnetic channels to transmit receive signals for voice or data communications using electrical means.

**Teleconferencing:** Two way electronic communications between two or more groups in separate locations via audio, video, and/or computer systems.

**Unstructured Decision:** Decision process not previously encountered in the same form and for which no predetermined and explicit set of ordered responses exists.

**Uplink:** The communication link from the transmitting earth station to the satellite.

**Video Teleconferencing:** A teleconference including two way video.

**World Wide Web (www):** A graphical hypertext-based Internet tool that provides access to homepages created by individuals, businesses, and other organizations.

**Community:** A unified body of individuals, people with common interests living in a particular area. An interacting population of various kinds of individuals in a common location, or a group of people with a common characteristic or interest living together within a larger society. A body of persons or nations having a common history or common social, economic, and political interests. A body of persons of common and especially professional interests scattered through a larger
society (Merriam-Webster online dictionary). As we can see, many possible
definitions of groups of individuals or nations, with however, common interests.
Merriam-Webster Online Dictionary.

**CD-ROM**: (an abbreviation for “Compact Disc Read-Only Memory”) a
non-volatile optical data storage medium using the same physical format as audio
compact discs, readable by a computer with a CD-ROM drives. A CD-ROM is a
flat, plastic disc with digital information encoded on it in a spiral from the center
to the limit, the outside edge. Word IQ.

**CME (Continuing Medical Education)**: All learning by healthcare providers,
after basic training. It encompasses in-service and post-graduate learning by all
trained healthcare providers, including doctors, nurses, midwives, clinical officers,
public health staff, etc.

**Digital Divide**: The phrase has been applied to the gap that exists in most
countries between those with ready access to the tools of information and
communication technologies (ICTs), and those without such access or skills.
(Cullen R. 2003)

**e-Health**: Barely in use before 1999, this term now seems to serve as a general
“buzzword,” used to characterize not only “Internet medicine”, but also virtually
everything related to computers and medicine. The term was apparently first used
by industry leaders and marketing people rather than academics. They created and
used this term in line with other “e-words” such as e-commerce, e-business,
e-solutions, and so on, in an attempt to convey the promises, principles,
excitement (and hype) around e-commerce (electronic commerce) to the health arena, and to give an account of the new possibilities the Internet is opening up to the area of health care.

**Information Technology (IT) or Information and Communication Technology (ICT):** The technology required for information processing. In particular the use of electronic computers to convert, store, process, transmit, and retrieve.

**Telehealth:** The use and transmission of video, voice and text data for a multitude of health related issues, including, health management, patient care, and health worker training and education, individual and patient education on health matters.

**The Internet:** The vast collection of interconnected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60’s and early 70’s. An “internet” (lower case i) is any computers connected to each other (a network), and are not part of the Internet unless the use TCP/IP protocols. An “intranet” is a private network inside a company or organization that uses the same kinds of software that you would find on the public Internet, but that is only for internal use. An intranet may be on the Internet or may simply be a network.
5.12 DELIMITATIONS OF THE STUDY
1. In this study only Shiraz Medical Sciences University has been taken for the study.

2. Only the following types of medical professionals have been considered for the study
   - Surgeon
   - Medical Basic Science
   - Paediatrics
   - ENT
   - Psychiatrists
   - Dermatologists
   - Cardiologists

3. The study is limited to Iran only.

5.13 FINDINGS
5.13.1 There was a significant effect of ICT on CME. The medical faculty who use ICT for CME revealed its significant effect in promoting CME.

5.13.2 There was no significant difference between organizational category and organizational influence in Iran.

5.13.3 There was no significant difference between organizational category and professional influence in Iran.

5.13.4 There was no significant difference between organizational category and organizational strengths and resources in Iran.

5.13.5 There were significant difference between organizational category and individual items within the strengths and resources in Iran.
5.13.6 There were significant difference between organizational influence and organization provided Continuing Medical Education programs in Iran.

5.13.7 There was no difference between organizations on their rating of professional factors, and whether they did or did not provide Continuing Medical Education programs in Iran.

5.13.8 There were significant differences between organizations provided Continuing Medical Education programs and perception of existence of strengths and resources within the organization for the improving CME in Iran.

5.13.9 There were significant differences between organizations provided Continuing Medical Education programs and perception of existence individual of strengths and resources within the organization for the improving CME in Iran.

5.13.10 There was no significant relationship between the years of experience in offering Continuing Medical Education programs and the rating of organizational influences in Iran.

5.13.11 There was no significant relationship between the years of experience in offering Continuing Medical Education programs and the rating of professional influences in Iran.

5.13.12 There was no significant relationship between the years of experience in offering Continuing Medical Education programs and the rating of organizational strengths and resources in Iran.
5.13.13 There were significant differences between the individual items within the strengths and resources and level of experience in technology–based Continuing Medical Education in Iran.

5.13.14 There was a significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of organizational factors in Iran.

5.13.15 There was no significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of professional factors in Iran.

5.13.16 There was no significant difference between organization units on whether they had access to the resources of a Continuing Medical Education division and their perceptions of strengths and resources in Iran.

5.13.17 There was a significant difference between organization units on whether they had formed partnerships for the purposes of technology–based Continuing Medical Education improving on the organizational factors influences in Iran.

5.13.18 There was no significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of professional factors influences in Iran.

5.13.19 There was a significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of strengths and resources in Iran.
5.13.20 There was a significant difference between organizations on whether they had formed partnerships with other organizations and their perceptions of individual strengths and resources in Iran.

5.13.21 There was a significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of the organizational factors influences in Iran.

5.13.22 There was no significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of the professional factors influences in Iran.

5.13.23 There was no difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of strengths and resources in Iran.

5.13.24 There was a significant difference between organizations as to whether their parent institution offered Continuing Medical Education courses and their perception of individual strengths and resources in Iran.

5.13.25 There was a significant difference between factors changing in knowledge, attitudes, skills, practice, behavior, or clinical practice outcome in Continuing Medical Education program improving in Iran.

5.13.26 There was a significant difference among the medical professionals on important use of online CME and physicians motivation in improving Continuing Medical Education.
There was a significant difference between specialists and other physicians, medical professionals on their perception on online Continuing Medical Education programs for their professional development.

There was no significant difference between male and female physicians in finding and using technology-based Continuing Medical Education.

**5.14 DISCUSSION OF MAJOR FINDINGS AND CONCLUSIONS OF THE STUDY**

**5.14.1 Discussion of Major Findings**

The response rate to questionnaire-survey studies is always a concern for researchers. Traditionally, questionnaire-survey research methods have resulted in lower response rates than other research methodologies. In this study, a number of strategies were used to increase the survey response rate. Firstly, a cover letter detailing the study’s purpose and the submission deadline was included with each survey. Included with this survey were a follow-up letter and a new submission deadline. After the second deadline had passed, reminder letters were sent to a stratified sample of non-respondents. The highest response rates were received from medical basic science group, and surgeon group respondents. This was not surprising, given that these organizational respondent categories represented academic institutions with a mission to develop and deliver higher educational programming. The lowest response rates were for the psychiatrics, pediatrics and dermatologist group organizations. These organizations do not typically have a mandate to lead the development and delivery of continuing education and training programs, and this may have influenced respondents’ decision to participate in the survey study.
Medical basic science and surgeon group are specialists comprise the largest medical professional groups in the country, as well as in regions of Iran. The majority of medical basic science group and surgeon group reported that they provide technology-based Continuing Medical Education programming to health professionals. The majority of the psychiatrics, pediatrics and dermatologist group respondents reported that they were not providing continuing professional education programming. The results indicate that medical basic science group and surgeon group reported the greatest level of experience in the delivery of continuing professional education programming by technology-based Continuing Medical Education. The majority of ENT and Cardiologist group that indicated involvement in technology-based continuing professional education delivery also reported that their parent organization offered continuing education courses, and that they had access to Continuing Medical Education resources within the parent institution. Institutional experience may also be an important characteristic of those organizational units involved in technology-based Continuing Medical Education delivery.

The majority of surgeon group and Medical basic science respondents reported that the factors that had the greatest influence on their decision to offer technology-based Continuing Medical Education included:

- addressing CME needs of health professionals;
- increasing opportunities for flexible CME access;
- Part of the organization’s mission.
An interesting finding pertained to the factor ‘less expensive delivery modality’. A majority of ENT and Cardiologist group respondents indicated that ‘less expensive delivery modality’ was a significant factor that influenced their decision to offer Continuing Medical Education by technology-based Continuing Medical Education. However, medical basic sciences and surgeon group indicated that this factor was not significant in their decision to offer technology-based continuing medical. The main reason for this difference between organizational respondents may be related to the significant costs associated with the training of health care practitioners. ENT and cardiologist group often have to incur travel and accommodation costs, as well as replacement staff salaries to provide workplace-related training and education to health professionals. Technology-based Continuing Medical Education enables these employers to reduce such costs by providing training and educational programs at the health professional’s work location. This reduces the need for travel and accommodations, and in some instances may reduce replacement salary costs. ENT and Cardiologist group respondents also reported that ‘addressing mandatory CME needs of health professionals’ was an important factor. This finding suggests the importance of employer-related responsibilities in ensuring that health professionals have access to accredited programming to maintain professional and clinical competencies.

The costs associated with technology-based Continuing Medical Education are often higher during the program development stages. Usually, there are costs associated with instructional material and media development, and a need for more
specialized human resources. These costs are normally higher than those that would be associated with the delivery of traditional face-to-face training or instruction. However, technology-based Continuing Medical Education programs normally result in lower delivery costs over the long-term, when compared to costs associated with face-to-face teaching on campus or at workplace sites. In this study, the majority of Medical basic science respondents reported that ‘tuition / registration fees’ and ‘provincial government grants’ were the main sources of support for their Continuing Medical Education programming. Surgeon group respondents reported that ‘industry educational grants’ were a main source of support for their Continuing Medical Education programs. The results suggest that a variety of funding sources are utilized by Medical basic science to cover costs associated with the development and delivery of technology-based Continuing Medical Education. Industry sponsorship appears to be of greater importance in supporting technology-based Continuing Medical Education programming delivered through Medical basic science.

Majority of respondents from the organizational categories of Medical basic science, Surgeon group, and ENT and Cardiologist reported that they had formed partnerships for the purpose of sharing financial, human, and/or technical resources. Across organizational categories, most significant type of partnership was that which was formed with other educational institutions. Medical basic science indicated that partnerships with other departments in parent institution were also an important type of partnership. Surgeon group, however, reported a much lower level of importance of partnerships with other departments in the parent institution. Partnerships with
provincial and national government organizations and community-based agencies were not identified as significant partnership types by the majority of respondents, nor were they identified as significant across the organizational respondent categories.

The Continuing Medical Education technologies that appear to be used the most by respondents in the delivery of continuing professional education by technology-based Continuing Medical Education are:

- electronic mail;
- web-based education;
- videoconferencing;
- correspondence materials;
- video tapes; and
- Audio teleconferencing.

Electronic mail, web-based education technologies and videoconferencing systems appear to be the technologies used to the greatest extent by the organizational respondents.

The majority of Medical basic science and Surgeon group respondents indicated that they were providing training and support to faculty and instructors who taught in their Continuing Medical Education programs. ‘Faculty development seminars/workshops’, ‘instructional development support materials’, ‘mentoring by experienced instructors’, and ‘one-on-one consultation with an educational specialist’ were the main types of faculty development activities reported by the majority of respondents across the organizational categories.
The main audiences of technology-based continuing professional education programs were ‘regional’ and ‘provincial’ in nature, and the majority of respondents reported that participants in their distance learning programs were not predominantly recent university graduates. A majority of surgeon, Cardiologist and ENT respondents indicated that participants were predominantly clinical practitioners. The majority of medical basic science, Psychiatric, Cardiologist and ENT respondents indicated that participants did not require CME credit to maintain licensure, whereas accreditation and CME credit appeared to be more important for Surgeon respondents. These findings would suggest that experienced practitioners are accessing technology-based Continuing Medical Education programs, and CME programs provided through surgeon group and hospital organizations are targeting clinical practitioners. The rationale for these findings may be related to mandatory CME requirements for physicians, and the use of technology-based Continuing Medical Education programs by health care organizations to address the CME needs of health care practitioners. Medical basic science appear to be providing their Continuing Medical Education programs to a more diverse population of health professionals, including both clinical and unclinical health care professionals.

An important purpose of the survey was to identify the type and extent of programming that CME providers were delivering to enhance capabilities in the use and application of information and communication technologies among health care practitioners. The results indicate that the most common ICT-related CME topics being provided across all organizational respondents included:
• Using Computers;
• E-mail Applications;
• Using the Internet;
• Presentation Software;
• Hospital Computer Systems.

The organizational influences scale encompassed items that were intended to measure the influence of organizational factors on the likelihood of ICT adoption in continuing professional education delivery. The results indicate that the type of organization (e.g., academic, hospital, industry, health professional association) did not influence perceptions of organizational influences, nor did years of experience in offering Continuing Medical Education programs. Organizations reporting that they were providing Continuing Medical Education programs did report a significantly higher score on the organizational factors scale. Organizational units reporting that they had access to the resources of a Continuing Medical Education division had formed partnerships for the purposes of technology-based Continuing Medical Education development and delivery. The parent institutions that offer Continuing Medical Education courses also reported higher organizational influence scores. Organizational factors included ‘vision within my organization for technology-based Continuing Medical Education’; ‘support from the leaders in my organization for technology-based Continuing Medical Education’; ‘adequacy of my organization’s technical infrastructure for technology-based Continuing Medical Education’; ‘support of technology-based Continuing Medical Education in my organization’;
‘funding and incentives for technology-based Continuing Medical Education that are available in my organization’; and ‘experiences in the past that my organization has had with technology-based Continuing Medical Education’. Organizations reporting a positive perception of these organizational factors were more likely to be providers of technology-based Continuing Medical Education, have access to the resources of a Continuing Medical Education division, and have formed partnerships.

The professional influences scale comprised items that were intended to measure the influence of professional factors. These included items such as: ‘My peers and colleagues believe the Internet is an important tool’; ‘In the professional field in which I work, many people are Internet users’; ‘In the professional field in which I work, most people think that technology-based Continuing Medical Education is important’; ‘Distance learning is likely to contribute to the solution of learning-related problems relevant to the professional field in which I work’; and ‘It is my personal opinion that technology-based Continuing Medical Education will improve teaching and learning’. The results indicate that the type of organization (e.g., academic, hospital, industry, health professional association) did not influence perceptions of professional influences. Organizations reporting that they were providing Continuing Medical Education programs did not report a more positive perception of professional influences than providers who were not providing Continuing Medical Education. In addition, no relationship was found between years of experience in offering Continuing Medical Education programs; access to the resources of a Continuing Medical Education division; the formation of partnerships;
whether a parent institution offered Continuing Medical Education or not; and perceptions of the influence of professional factors. Factors of professional influence do not appear to be a major impetus to the provision of Continuing Medical Education.

The strengths and resources scale included items related to the availability of resources (e.g., funding, human resources, facilities/equipment, instructors); telecommunication costs and infrastructure; availability of technology access among target audience; attitudes, commitment, and level of perceived computer experience among target audience; and support from employers of target audience. Perceptions of items related to infrastructure and to access to equipment and Internet services were more positive among those organizations that were providing technology-based Continuing Medical Education. Providers of Continuing Medical Education also reported higher mean scores on items related to experience, enthusiasm, and sufficient time commitment among target audience. Organizational respondents who were providing Continuing Medical Education reported that their target audience had high levels of computer experience, was enthusiastic about technology-based CME, and had sufficient time to commit to participation in CME.

5.14.2 Key Conclusions

1. Iranian surgeon and medical basic science group are responsible for a significant number of the technology-based Continuing Medical Education programs offered as CME to health professionals.
2. Iranian surgeon group and medical basic science group report the highest level of experience in technology-based Continuing Medical Education programs offered as CME to health professionals.

3. Existing educational technology resources and expertise (human, technical, and infrastructure) within an organization are important factors influencing the likelihood of a CME organizational unit being a provider of technology-based Continuing Medical Education programs.

4. Factors related to ‘financial gain’ do not influence an academic CME organizational unit’s decision to provide technology-based Continuing Medical Education. Academic CME providers are more likely to provide technology-based Continuing Medical Education as a means of addressing needs of health professionals; to increase opportunities for flexible CME access; and to fulfill an organization’s mission.

5. ENT and Cardiologist group favor technology-based Continuing Medical Education as a more ‘cost-effective’ means of addressing mandatory CME needs of health professionals.

6. Surgeon group report a high level of dependency on ‘industry’ funding as a means of supporting technology-based Continuing Medical Education program development and delivery.

7. Collaborating (with other organizations and institutions or with other internal departments) appears to be a significant characteristic of technology-based
Continuing Medical Education program development and delivery by Iranian CME providers.

8. Surgeon group reported a lower level of importance of partnerships with other internal departments in the parent institution, when compared to other academic organizations.

9. Partnerships with provincial and national government organizations and community-based agencies were not identified as significant partnership types.

10. Internet-based technologies (e.g., e-mail and the World Wide Web) and videoconferencing are the most common educational technologies used by CME providers in technology-based Continuing Medical Education programming.

11. Technology-based Iranian CME providers are mostly targeting ‘regional’ and ‘national’ audiences, not international ones.

12. Participants in technology-based CME programs are varied, and include experienced health professionals.

13. Surgeon group, ENT and Cardiologist group respondents are addressing the needs of a predominantly clinical practitioner audience. Medical basic science group are addressing the needs of both clinical and un clinical practitioners through their technology-based CME programs.

14. The most common ICT-related CME topics being provided to Iranian health professionals include: using computers; e-mail applications; using the Internet; presentation software; and hospital computer systems.
15. Providers of technology-based CME Continuing Medical Education programs are more likely to report a positive perception of: supportive organizational factors; technological infrastructure, access to equipment and Internet services; and levels of computer experience, enthusiasm, and commitment among their Continuing Medical Education programming target audience.

16. There are differences in use by gender, practice location, and specialty that suggests unique approaches by different groups of physicians and special uses important for developers of CME programs for physicians. Age or experiences with the Internet since medical school are not simple predictor’s of use. Traditional activities, journals, and local CME meetings remain important to physicians for their learning. Most physicians use the Internet to support those learning activities and to find medical information. More specifically, its importance is in the area of professional development in a general approach to providing better care rather than for patient-physician communication.

5.15 RECOMMENDATIONS

1. Information and communication technologies (ICT) play a significant role in the delivery of Continuing Medical Education (CME) programming that addresses the mandatory continuing professional education and lifelong learning needs of health professionals. These technologies are essential in facilitating the effective Continuing Medical Education programming that maintains the competencies of these practitioners and reduces the level of professional isolation they experience. Access to and uses of ICTs in CME
delivery are vital components of any effective strategy to enhance retention and recruitment of health care providers.

One of the distinguishing characteristics of a profession is the commitment by its members to the promotion of continued study and lifelong learning. In order to provide high-quality health care services, health professionals require access to effective ongoing professional development and continuing education programs. With the rapid advances that are occurring in the health sciences, it is becoming increasingly challenging for health care professionals to stay abreast of the latest health research information (Whitten, Ford, Davis, Speicher, & Collins, 1998). Knowledge in the health sciences is constantly expanding as new information is published, disseminated, and quickly updated or revised. In this context, the health care practitioner is placed in the unenviable position of having to provide the best health care to the public while trying to use and apply a rapidly changing body of knowledge (Lorenzi, Kues, & Anthony, 1984).

In Iran, the trend appears to be towards greater use of ICTs in the health care system and in the continuing education of health professionals. In recent years, Internet-based technologies have been adopted as a means of delivering information that can be linked to patient care issues in a timely and interactive fashion. The Internet has the potential to widen continuing education access, increase flexibility for health professionals, and improve the quality of the training and education they receive. The use of the Internet as a knowledge translation medium can also lead to improved cost-effectiveness by enabling new target groups to be reached and higher-quality learning outcomes to be gained at a lower marginal cost per adult learner. The
use of Internet technologies and the increased capacities of ICTs are contributing to a movement away from traditional CME.

In this study, ENT and Cardiologist group respondents reported that ‘addressing mandatory CME needs of health professionals’ was an important factor that influenced their decision to provide technology-based CME. This finding suggests the importance of employer-related responsibilities in ensuring that health professionals have access to accredited CME programming to maintain competencies. Although potential users of programs may or may not require mandatory CME credits to maintain licensure, the results do suggest that employers place a high level of importance on CME credits.

2. Academic institutions are responsible for providing the majority of Continuing Medical Education (CME) programming via technology-based Continuing Medical Education. Academic institutions view this programming as an important part of their mission and their commitment to addressing and supporting the lifelong learning needs of health professionals, particularly those practicing in Iran.

The results of this study confirm that Iranian surgeon and medical basic science group are responsible for a significant amount of the technology-based Continuing Medical Education programs offered as CME to health professionals. Iranian surgeon group also report the highest levels of experience in technology-based Continuing Medical Education programs offered as CME to health professionals.
These academic CME providers are more likely to provide technology-based Continuing Medical Education as a means of addressing the needs of health professionals; to increase opportunities for flexible CME access; and to fulfill an organization’s mission. These institutions are less likely to be providing technology-based CME as a way of increasing revenue for the institution. Iranian CME providers are mostly targeting ‘regional’ and ‘provincial’ audiences, and surgeon group, ENT and Cardiologist respondents are addressing the needs of a predominantly practitioner audience. Medical basic science group appear to be addressing the needs of both practitioners through their technology-based CME programs.

3. The Internet and videoconferencing are the main educational technologies being used by Iranian continuing medical professional (CMP) providers in the delivery of technology-based Continuing Medical Education.

Electronic mail, web-based education, and videoconferencing systems appears to be the technologies reported as being used the most by organizational respondents. The growth of the Internet and the World Wide Web has created new opportunities for providing Continuing Medical Education. Proponents of the Internet suggest that it has had a far greater impact on global communications than any other previous communication technology development. Greater Internet developments in the future will include continued improvements in the speed of Internet access as ISDN (Integrated Services Digital Network) line developments increase the potential for downloading large files, such as real time video. Proponents of online CME suggest that more and more courses will be delivered through the World Wide Web (WWW)
by accredited CME web service providers. Health professionals will be able to pay for CME services with digital cash or credit cards, and submit online evaluations via the Web.

The Internet is an excellent location for medical reference material, as the information is universally available, easily updated, and quickly obtained (Huntley, 1998). The Internet allows CME to be easily delivered to the site of clinical activity (Peterson et al., 1999). Internet-based CME is advantageous also because it allows the user to select the content, pace, and place of learning. It allows health care providers to obtain CME from regional, national, and international experts, without having to travel. The main benefits of Internet-based CME include easy access, low expense, interactive multimedia format, and an ability to create interactive clinical cases. The flexibility of HTML, the language in which web pages are written, allows for high-quality video and audio to be presented. Using multimedia components such as sound and movies, electronic publishing can present ideas that could not possibly be offered in printed text. Much of web-based material can easily be stored on a CD-ROM and used locally within a PC with access speeds far higher than those achievable with most online courses. According to Turchin & Lehmann (2000), the WWW provides opportunities for the development of new educational tools, and facilitates learning through interactivity and self-paced study. Publication on the Internet offers the added advantages of world-wide information distribution, and ease and speed of updating to reflect the state of the art.

Videoconferencing, also known as video teleconferencing or interactive television, is a presentation mode that can link an instructor and adult learners at
various remote sites using a two-way audio and video connection. Videoconferencing technology has been rapidly emerging as an increasingly useful tool for improving patient care delivery and expanding access to CME. As the pressure mounts to reduce health care delivery costs and increase access to quality medical care, the efforts of many individual hospitals, regional health care systems, and governments to install interactive videoconferencing systems have quickly been intensifying. The emergence of relatively inexpensive, compressed video systems that permit two-way video and audio interactions has increased the acceptance of this communication modality in situations where face-to-face instruction had been the established norm.

Videoconferencing systems have undergone significant growth in recent years, due to increased digital transmission options at reduced costs, vast improvements in video compression technologies, and improvements in the systems, with an associated decrease in their cost. The main interest in videoconferencing is based on the interactive, real time, two-way communication it permits. This interactive communication allows participants at two or more sites to receive immediate clarification, and it also enables instructors to garner immediate feedback from participants and adjust their presentations accordingly. Video transmissions appear on a monitor resembling a traditional television, while sound emanates through the system’s speakers. The signal transmission is usually so rapid that sender and receiver can interact in a simultaneous manner.
4. Organizational support is a critical factor in the development and expansion of resources for the successful and sustainable delivery of technology-based Continuing Medical Education to health professionals.

The availability of technological infrastructure and specialist support to CME providers are important factors influencing the likelihood of technology-based CME delivery. In this study, providers of technology-based CME Continuing Medical Education programs were more likely to report a positive perception of supportive organizational factors. Organizational support, through the provision of human and financial resources and technical infrastructure, is essential for success. According to this study appropriate technology infrastructure is an essential requirement for technology-based education. The integration of technology into education and training places an increasing priority on an institution’s technology plan. As a result, there is often a need for a systematic process in which training and education needs are identified and taken into account in technology planning (Bates, 2000).

Existing educational technology resources and expertise (human, technical, and infrastructure) within an organization are important factors influencing the likelihood of a CME organizational unit being a provider of technology-based Continuing Medical Education programs. Majority of surgeon group and medical basic science group indicated involvement in technology-based CME delivery also reported that their parent organization offered Continuing Medical Education courses, and that they had access to Continuing Medical Education resources within parent institution. Institutional experience was an important characteristic of those
organizational units involved in technology-based Continuing Medical Education delivery.

The development of high-quality web-based education systems necessitates a range of specialist skills. Educational technology staff, such as graphic designers and HTML programmers, will be required to support the development and application of educational materials. Educational technology specialists who provide instructional design, faculty development, project management, and evaluation support to faculty will also be required to support the use of technology for training and education. The centralization of educational technology support services may be appropriate in a new institution with a commitment to make ICTs a focus of its vision and strategy. However, such a strategy is less likely to be appropriate for the old or well-established divisional universities with large and powerful faculties. In this study, surgeon group were less likely to report the formation of partnerships with internal departments within the parent institution. This might suggest the existence of a certain level of concern among surgeon group academic units that centralization of educational technology services may weaken the surgeon group control over the teaching process. These organizations may prefer to establish their own ‘flexible learning or multimedia unit’. This type of model could contain a mix of centralization and decentralization. A small ‘Center for Educational Technology’, with a few highly specialized and skilled staff, could coordinate and facilitate collaboration between faculty members, subject matter experts, and support units.
5. The use of information and communication technologies (ICTs) in the delivery of Continuing Medical Education (CME) places unique and special demands on instructors and subject matter experts (SMEs) who are unfamiliar with these technologies in training and educational delivery. Faculty and instructional development support are key services in assisting instructors and trainers in the effective use of ICTs in Continuing Medical Education.

The majority of surgeon group respondents indicated that they were providing training and support to faculty and instructors who taught in their Continuing Medical Education programs. ‘Faculty development seminars / workshops’, ‘instructional development support materials’, ‘mentoring by experienced instructors’, and ‘one-on-one consultation with an educational specialist’ were the main types of faculty development activities reported by the majority of respondents across the organizational categories. Support for instructors and SMEs in the use of information and communication technologies (ICTs) is an essential prerequisite for successful technology-based instruction. A comprehensive and systematic approach to technical and professional support for faculty is required. The establishment of an educational technology support unit to assist faculty with development activities is a necessity, as is a focus on faculty development programs and services. Faculty development is reported to work best when the institution has "a culture pervaded by the use of technology and supported by a wide range of strategies...a strong strategic plan in which the use of technology for teaching plays a prominent role....support
from senior leadership for the use of technology for teaching....support, in a wide
variety of ways, for faculty members who wish to use technology for teaching”.

According to Ranstrom (1997), ample orientation efforts must be targeted at
delivering support, in a wide variety of ways, for faculty members who wish to use technology for teaching”.

According to Ranstrom (1997), ample orientation efforts must be targeted at faculty and learners in order to assist them in becoming familiar with the variety of equipment they may need to use. Orientation sessions may be of particular importance for faculty, many of whom may need to alter their teaching styles in order to use the equipment most effectively. An orientation session can provide faculty with the opportunity to learn new strategies for overcoming the challenges of facilitating learning at a distance.

6. Health professionals require a fundamental understanding of information and communication technologies (ICTs) in order to be able to utilize these technologies in pursuing lifelong and Continuing Medical Education opportunities. Appropriate stakeholders need to ensure that optimal efforts are made to provide Continuing Medical Education (CME) opportunities, so that health care practitioners can develop the skills needed for optimal use of ICT systems.

It will become increasingly difficult to accept people as being fully educated if they did not know how to use the Internet to communicate with other professionals, or if they do not know how to find web sites that will provide relevant and reliable information in their field of study. Learning in the workplace will be initiated by individuals as part of their working lives. It will be informal (i.e., not leading to any formal qualification), self-directed, and piecemeal (i.e., broken into small chunks of
learning, some as small as a few minutes a day). The learning context will also need to enable people to work alone, interact with learning material (which may be available locally or remotely), and work collaboratively (and in equal relationship) with peers at different remote sites.

The results of this study indicate that the most common ICT-related CME topics being provided to Iranian health professionals include: using computers; e-mail applications; using the Internet; presentation software; and hospital computer systems.

7. Technology-based Continuing Medical Education (CME) development and delivery costs are generally higher than those associated with face-to-face CME delivery. Many organizations undertake these programs as a means of addressing the mission of their institution or the mandatory CME requirements of health professionals. External funding to support such initiatives is essential, in order to offset those costs that are normally not covered in institutional operating budgets.

In this study, the majority of medical basic science group respondents reported that ‘tuition/registration fees’ and ‘provincial government grants’ were main sources of support for their Continuing Medical Education programming. Surgeon group respondents reported that ‘industry educational grants’ were the main source of support for their Continuing Medical Education programs. According to Bates, if technology-based CME is to be a key component of the institution, then the institution has to build it into its base operating budget (Bates, 2000). Provincial and national
departments and agencies also have an important role to play in terms of funding technology-based CME. Bates (2000) believes that ‘earmarked government funding’ is a good strategy for getting institutions to pay attention to developing and delivering technology-based Continuing Medical Education.

The provision of an equitable and sustainable level of health care in clinical communities is a challenge, due in part to the difficulties associated with recruiting and retaining clinical health care providers. Clinical health care delivery is a demanding and challenging form of practice, regardless of the profession. This isolation necessitates a level of clinical competence beyond that of his/her unclinical health care peers. This isolation also makes it difficult for the health care provider to maintain his / her professional competencies. Professional isolation is believed to be related to job dissatisfaction with clinical practice. Clinical health care providers are generally dissatisfied with their opportunities for participation in CME.

8. **Partnerships involve the combining of expertise and resources.** Partnerships are essential in the development and delivery of technology-based Continuing Medical Education (CME). Partnering helps to avoid duplication and allows organizations to share limited resources, equipment, and infrastructure. CME providers need to partner with other organizations and communities in the development and delivery of technology-based CME programs, in order to ensure program sustainability and acceptance. Municipal, provincial, and national levels of department have a role to play in encouraging, facilitating, and supporting such partnerships.
Partnering, whether it be with other organizations and institutions or with other internal departments, appears to be a significant characteristic of technology-based Continuing Medical Education program development and delivery by Iranian CME providers. Building and strengthening a collaborative approach between institutions has the advantage of avoiding duplication, and accessing higher levels of infrastructure and resources than would otherwise be possible. More importantly, it enables institutions to learn and grow from the experience of working together, and to leverage important qualitative improvements and economies of scale (Bates, 2001). Partnership arrangements work best when partner institutions are of roughly the same status and have complementary strengths (i.e., different areas of research or subject expertise that complement the others). The main advantage of partnering, in addition to a reduction of cost, is that learners are able to access a wider range of expertise.

One model of partnering that appears to be applicable to technology-based CME is that of ‘consortia’. In a consortium model, different institutions share common resources (such as marketing, electronic and human networks, Continuing Medical Education expertise, and learning centres) and agree among themselves to avoid duplication and to work together whenever possible on joint course development and delivery (Bates, 2001, p. 61). Successful consortia need funding mechanisms that reward and facilitate collaboration, and they need a change of culture within organizations from one of fierce competitiveness between institutions to one of trust and goodwill between the partner organizations.
Governments have an important role to play in stimulating efforts in the
development and delivery of technology-based Continuing Medical
Education (CME). Apart from funding to support the development and
delivery of technology-based CME and appropriate technological
infrastructure networks, there is a role for government to play in facilitating
partnerships between institutions and organizations.

According to Bates (2000), the roles of government in managing technological
change in education and training can include the following: stimulator of ‘best
practices’; ‘enabler, funder, and broker of partnerships’; ‘creator of technology
networks’; and ‘informer and protector of consumers’. Governments can also play a
key role in articulating a collective vision with respect to the place of ICTs in health
professional education and training. Information and communication technologies
have a great deal of relevance in the enhancement of health care delivery in regions of
Iran. Professional isolation is a key factor influencing the recruitment and retention of
health professionals in these areas, and a shortage of clinical health care professionals
is having a significant effect on the nature of health care services available in regions.

Government can influence public policy decisions in this area by:

- enabling the delivery of cost-effective CME to health professionals;
- increasing the capacity of organizations and institutions to utilize the power of
technology to carry out their teaching, research, and service functions;
- Enhancing a better conception of what constitutes best practice in the field of e-
  learning, distributed learning, and Continuing Medical Education.
Strategies for the use of information and communications technologies in health services need to be embedded within a wider framework of government policy for health care delivery. At present, several countries are leading significant e-learning initiatives in the area of online CME. According to Bates, governments may want to consider the establishment of different centres of excellence in different institutions, in order to ensure the development of programming for different market niches. Governments can also lever economies of scale, and concentrate scarce skills in developing and running e-learning programs by encouraging or building strong national.

10. CME providers redefine their role in terms of how information seeking links to traditional planning for CME. Physicians construct the kind of knowledge they need by using their own experience and the information they find. Rather than a single piece of data or a single randomized controlled trial as a defining answer, the study suggests that physicians build a picture by using several pieces of data from several sources.

At this time, help in locating materials, rather than the development of those materials, may be an important function for CME in this environment. For example, rather than a focus on new content, links between professional association updates, breaking news, and sources for specific patient management strategies might be helpful. Teaching search skills or facilitating searches at a more sophisticated level would provide ready access to content developed within the Internet system.
11. The Internet provides an extensive and ever-growing resource center available to physicians as part of a self-directed curriculum. Its range of options and varying quality of information provide both a challenge and a barrier in terms of defining new terms for credibility and effectiveness and, most importantly, finding relevant answers to questions. Support for physicians using the Internet from those in CME requires some new roles for CME providers.

In designing on-line CME programs, patient problems presented as cases could make important information more accessible than transforming traditional lectures into on-line CME. Indexing to make relevant clinical content accessible to physicians who may not be sophisticated in information-seeking strategies is also an important role. Supporting retrieval of information, pointing to and consolidating resources, and looking for definitions of credibility may take precedence over traditional kinds of programming. Although the Internet creates an educational delivery system that reaches nearly all physicians, it also poses significant challenges to CME providers who must provide accessible, credible content that addresses relevant patient problems.

5.16 IMPLICATIONS OF THE STUDY

Medical education, particularly Continuing Medical Education (CME), has been greatly influenced by studies of adult learning. The observation that it is not teaching but learning that leads doctors to change their practice has resulted in a shift in perspective: rather than education being regarded as instruction, it is regarded as
facilitation of learning. This paradigm shift has been based on research into how and why doctors change their practice and into the role of learning in that process.

The direction of Continuing Medical Education in Iran and elsewhere has changed in response to the new perspective that has emerged from contemporary studies of learning and change. The nature of this new perspective is evident from a comparison of the common elements of CME in the 1980s with the approach that is now being used. Traditionally a CME programme was an educational event that applied appropriate resources and methods to fulfill set instructional objectives. Such programmes were often considered to be good if the information was valuable, the lecturer skilful, and the setting comfortable. Too often, however, there was little or no actual effect on medical practice, even though all three conditions were met.

The critical difference in the 1990s is that it has increasingly been accepted that CME programmes are based—or should be—on the principle of teaching and education as a means of facilitating learning. This new approach has been adopted in response to studies on how and why doctors change their performance in clinical practice and the role of learning in that process. This article describes some of these models and sets out the key principles that have emerged for Continuing Medical Education in the past decade.

- The purpose of Continuing Medical Education is to facilitate change in clinical practice
- CME should be based on the natural processes learners use to change
• Three interconnected systems are used in making changes: self directed curriculums, small group interaction, and organizational learning

• CME must construct systems to complement and support the learning of practice based learning

Understanding and managing change is an essential part of professional practice. Just as doctors wish to intervene in illness to change the health status of patients, the aim of CME is to intervene in those aspects of medical practice that can be improved. CME is a systematic attempt to facilitate change in doctors’ practice.

Differences observed over time in patients’ health and in doctors’ performance and their knowledge and skills are the types of changes that have been the focus of research on CME. Change in one of these areas may or may not lead to changes in another. For example, a change in the ability to perform a clinical procedure does not always result in that procedure is being incorporated into clinical practice. Furthermore, a change in clinical performance does not automatically lead to a change in patients’ outcomes.

These distinctions have challenged planners of Continuing Medical Education to identify their objectives more clearly. What has emerged is an emphasis on doctors’ performance as the target of strategies to facilitate learning and change. This focus calls for needs and outcomes that are described in terms of the performance of doctors rather than their competence or the health status of their patients.
5.17 SUGGESTIONS FOR FURTHER RESEARCH

1. In this study, only Shiraz University has been taken. Therefore, it is suggested to take other Universities in Iran to find out the effect of ICT on CME.

2. A comparative study can also be undertaken between and among universities in the world to find out the impact of ICT interventions on CME.

3. In this study only seven types of medical professionals have been considered. Therefore it is suggested to take many more types of medical professionals to find out the effect of ICT on CME.