Importance of Human Computer Interaction (HCI) in Critical Success Factors (CSFs) of e-Learning

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Abstract—Distance learning is not a new concept in education. Hundreds and thousands of people around the world have got degrees and diplomas through this method and there is no second opinion too on its benefits. In this paper it is going to be examined e-learning which is a modern form of distance learning method. A survey has been conducted in different under-graduate and post-graduate classes at the Firat University to find out these Critical Success Factors (CSFs) which act as bearers in student’s success. Survey results have shown that Human Computer Interaction (HCI) is one of the most CSFs for e-learning method.

Keywords—Distance Education, e-Learning, Critical Success Factors (CSFs), Human Computer Interaction (HCI);

I. INTRODUCTION

Distance learning program was first time introduced in late 18th century at Chicago, USA. It was correspondence program, all study material had been sending to students by mail [1]. Invention of radio and later television provided better delivery mechanisms for instruction. While over-all system was still not perfect because it was all one-way communication; students could listen and watch but could not ask any question. Computer and internet have taken place of radio and television in the society and many institutes are also using that medium for their distance learning programs. In this paper it is going to be examined that when computer and internet is providing a better communication facility why still in distance learning or in e-learning, students are not having satisfactory results. A survey was conducted during spring and fall semesters of 2013 academic year in the department of Software Engineering at Firat University. Survey results showed that the biggest bearer in success is students’ interaction with e-learning systems. Many students who enroll in these courses don’t have any previous experience about e-learning tools or systems and they feel it difficult to use. Second it has been also observed that designers of these systems try to make systems very complex and they forget that user is an average student who is going to start studying after a long break. HCI is actually the study how humans and computers can interact with each other more effectively.

A. Critical Success Factors (CSFs)

Critical Success Factors (CSFs) are the factors which play important role in performance or in success of any department, institution or system [2]. This paper is about e-learning systems so all factors related to e-learning systems will be discussed here. E-learning is based on three things, course material, e-learning system and students as shown in Figure 1. The most important thing which connects all three stakeholders is HCI. In simple words it can be said like this HCI acts like a bridge between three.

![Figure 1. An interactive e-learning model.](image)

B. Human Computer Interaction (HCI)

Designers of e-learning systems mostly focus on course materials or on standards of e-learning systems, but these two things are not enough for students to have success. In traditional face-to-face class room teaching, students can communicate with their teachers. They can ask questions and all things which they don’t understand but e-learning is not as simple. In e-learning system computer is not only a course book for students but also a teacher. As much good students will be able to communicate with their computers as much good it will be for their results.

II. SURVEY

In survey 15 questions had been asked from students. These questions were typically about views on their e-learning experiences.

- What are their views on e-learning systems;
• What benefits they can have by choosing e-learning courses;
• What technology they have been using to deliver and access e-learning materials;
• What are their expectations on the learning in virtual environments;
• Best practical examples.

A. Method

For survey emails were sent to all under-graduate and post-graduate students from the chair of the department (Prof. Dr. Asaf VAROL) [3]. In addition survey was also advertised on the homepage of the department website. Total number of students that participated in the survey was 450, 380 under-graduate and 70 post-graduate students during the spring and fall semesters of the 2013 academic year.

B. Key Findings of the Survey

Benefits of e-Learning

In survey, respondents identified two main benefits of e-learning: Figure 2 is about graphical representation of survey results.

• Accessibility and availability of courses and course material.
• Flexibility of time.

As a mother, it is a lot easier for me to attend a lesson from home and at my own free time.” (Postgraduate Student)

“As a part-time student, study according to my work schedule is biggest help for me.” (Postgraduate Student)

“I do live quite far from campus, so travelling to campus for classes and for submission of assignments is not easy and affordable. E-learning is best solution for me in this condition.” (Undergraduate Student)

Figure 2. Graphical representation of Survey results.

[Note: Randomly selected 400 respondents and divided into 40 groups of 10 students]

According to 58% of respondents in survey, the biggest benefit of e-learning is availability to access the course material from any location particularly the option to work from home. For 34% of respondents, time when they want to study and how much they want to study is second biggest benefit. Some respondent views:

Drawbacks of e-Learning systems

According to majority of respondents in survey, there are three main drawbacks of e-learning and e-learning systems:

• Lack of communication between student and teacher;
• Technical issues regarding e-learning systems;
• Computer and internet access requirement.

There were mixed responses about the technical issues and requirement to have computer and internet. 14% of respondents said technical issues as a drawback of e-learning. The main issues are following as shown in Figure 3:

• Unavailability of internet and system failures;
• Systems security (especially for assessment purposes);
• Data losses;
• Slow-running systems.

Figure 3. Graphical representation of Survey results.

[Note: Again randomly selected 400 respondents but this time divided into 16 groups of 25 students]
9% of respondents in survey expressed concern about availability of internet access. While 77% of respondents remarked on usability and interaction issues. They had difficulty in finding required course contents from e-learning systems. To overcome this problem there is a need for research in improving the HCI of e-learning systems. As much it will be easy to find required course contents as much it will be helpful for students to have better results. It is therefore concluded that if HCI of e-learning systems can be improved, one further barrier to success will be removed. Some respondent views:

“Available course material is unnecessarily complicated. Sometime I spend more time in finding than reading.” (Undergraduate Student)

“Each course module has its own style of page and icons whenever I start a new module first I spend a lot time in learning navigation of the page.” (Undergraduate Student)

“Even all course contents are available, but still sometime I feel it would be better to have a teacher who could explain where that my required material will be found.” (Undergraduate Student)

III. HUMAN COMPUTER INTERACTION (HCI) FOR E-LEARNING

There are some very important issues in HCI which should be keeping in mind when designing an interface of a learning environment.

- Command Line Languages (CLLIs) and Instructions
  The Command Lines Interactions (CLIs) usually have cryptic keywords and strict syntax. They are not easy to use and even missing a single character produces error [4], so it can be said like that CLIs are better for experienced students than new ones.

- Menus Design
  The biggest advantage of menus is that they could be recognized easily rather than recalling. Design should be logical and meaningful so required option could be recognized easily. It is evident that menus eliminate number of errors and reduces time for complex tasks.

- Direct Manipulation Tool
  Direct Manipulation Interfaces (DMI) is very useful and successful especially in e-learning systems and for new students. They don’t require any previous training and are analog to basic human skills. Students feel great control over the displayed contents, windows and slides [5]. Some important points of DMI:
  - Few minutes’ demonstration is enough for new students to learn basic functionality;
  - Experienced students can work fast and more easily;
  - Easy to memorize operational concepts;
  - Easy to visualize the direction of activities;
  - Error rates are relatively very low.

- Form fill-in Design
  Form filling is oldest and simplest way of interaction between the user and the system. There are two important points in form designs. Form design should not be too sophisticated or form should not be too long.

- WIMP Interface Tool
  WIMP stands for windows, icons, menus, and pointers. It is human nature, human learns more easily and more quickly from visualization than any other way [6]. It is an old and true saying “a picture is worth a thousand words”. So it can be said that WIMP provides most influential option for interaction in e-learning systems.

A. Theories and Models

Some people argue that HCI is just a tool and it does not need any study or theory. It is not right. Aim is not to develop a system with some course material and some links. Aim is to deliver knowledge, skill and education without complications and without face-to-face interaction [7]. Before going to design an HCI model it is necessary to understand what a student really expects from a virtual class room and what his previous experience is? An effective HCI model cannot be produced without understanding of mental capabilities of students [8]. HCI is actually combination of human psychology and computerization.

B. General principles for HCI Designs

- Define the students’ requirement.
- Define the environment in which system will be used.
- How much control students should have over the system?
- Nature of course contents and other material.
- Duration of the course.
- Feedback concept.

IV. CONCLUSION

This research paper serves as a guide line for institutes and departments who wish to start e-learning programs or going to develop new systems for existing e-learning courses. E-learning is a lot different than tradition class room. Students have only screens in front of them and they are their course
books and teachers both at same time. HCI cannot take the place of a teacher but in some ways it can fulfil some communicational gap between the students and system. Survey results shown that majority of students who get enroll in e-learning or distance learning programs they don’t have much experience about internet and computer systems. So it is necessary to think about this issue before designing a system second as it is a general concept that HCI means just a colorful page with a lot of contents. That concept is totally wrong. HCI is a tool which makes easy for user to interact with system. HCI design should not have any complications. As a conclusion it can be said like this e-learning systems are just for delivering course material to students so they should be as simple as possible and not have anything which students need to learn before using them.

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REFERENCES


