

The Most Important Findings on Human-Computer Interaction (HCI)

by a Female School Student

Ekamjot Kaur

CARMEL CONVENT SCHOOL, CHANDGARH

Name - Ekamjot Kaur

Date of birth - 12th January, 2005

School - Carmel Convent School, Sector 9B, Chandigarh, 160009

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Abstract:- The idea of human-computer interaction was born as computer technology progressed. The youthful age group of people who are educated and technically skilled are used in research studies in human computer interaction. In Human-Computer Interaction, this study focuses on the mental model. This review study takes many methods, one of which is to highlight current methodologies, findings, and trends in human-computer interaction, and the other is to identify research that was invented a long time ago but is now falling behind. This study also discusses fidelity prototyping and a user's emotional intelligence to make a product more user-friendly. Why do humans use computers, we investigate in this paper. What is the purpose of a computer system in the human mind? In addition to HCI's computer science. This study examines the literature on human-computer interaction as well as the technological aspects of human-computer interaction using digital technologies. All these challenges are explored and recommendations for designing good human-computer digital devices are provided. Digital devices have continued to increase in efficiency and processing capacity thanks to advancements in both hardware and software. However, many of these systems are growing in size and complexity. While such intricacy normally offers no problems for most users, it frequently creates impediments for users while utilising digital devices. Typically, when designing those digital devices, the human-computer interaction is overlooked.

I. INTRODUCTION

Usability is the practice and research of human-computer interaction. It's about the human-computer interaction, their mutual understandings, and developing software that would make a human's job easier and that people would want to use. It is also a study of how humans interact with computers to complete specific jobs in a way that is both enjoyable and effective. It is made up of three components: the user, the computer, and their interaction, as the name suggests. It entails drawing low and high fidelity, or the degree of precision with which an object is reproduced.

It is widely perceived as the meeting point of computer science, cognitive science, design, and a variety of other

disciplines. The explosive development of computing has made effective human-computer interaction indispensable. Market rivalry for improving output, the need to reduce confusion, and the need to cut overhead expenses such as user training are all continuing to drive increased attention to usability. As computing pervades more aspects of our lives, its need for useful systems gains momentum.

Computers play an increasingly important role in education and healthcare today. Digital technologies, such as laptops, tablet computers, and handheld portable devices, such as cellphones, have become practically ubiquitous. In the sphere of medicine, the use of electronic devices in the healthcare and educational environment is important because it provides a more appealing, realistic, and engaging atmosphere. Using digital gadgets in the classroom, on the other hand, is meant to improve the learning environment for all pupils. Students' motivation, capacity to apply course-based information, and overall academic accomplishment were all improved when digital devices were used in the classroom.

Smartwatches, context-aware computers, interactive digital spaces, and extensive computerised environments are examples of developing technology. Emerging technologies frequently suggest interactions that are different from how computers are typically used. Site car navigation devices are an example of this. Such systems do not use WIMP-based interaction as we know it from typical desktops, instead relying on moving across physical space, getting verbal directions, and touching a few dedicated buttons adjacent to the steering wheel. As a result, such systems raise questions about the breadth of existing human-computer interaction styles and concepts, as well as the relevance of existing approaches and tools for their design..

II. USE OF COMPUTING SYSTEMS BY HUMANS

Humans, who are the users of the Human Computer Interaction product, create and use it. Memory, attention, problem-solving, learning, motivation, motor skills, conceptual models, and variety are all used to better understand humans as information processors, how they communicate, and the characteristics of the human/user as a processor of information. Language, interaction, and

communication - Grammar, dialectic, meanings, interpersonal interaction, and customized languages are just some of the aspects of language. Anthropometrics is the comprehensive evaluation of human physical traits such as dimensional characteristics of body shape and size, along with metabolic aspects of people and their link to their employment and surroundings.

People from a diversity of perspectives contribute to the success of HCI due to its heterogeneous character. Man-machine interaction (MMI) or computer-human interaction are other terms used to describe HCI (CHI). The point of interaction between the human user and the computer is referred to as the human-computer interface. The interface loop is the transmission of communication between a human and a computer. Specific Environment, Machine Environment, Areas of both the Input Flow Gateway, Outcome, and Evaluation are some of the elements that make up the interface loop.

Computers have been used for academic, technical, and crypto calculations since the early days of the internet. The data that computers comprehended were written and read by primitive users of computers. Humans utilised characters (numeric, characters, and grammar) and words to write instructions that translators converted into machine readable commands before the development of programming languages and translators such as assemblers and compilers. Computers, on the other hand, changed their ways.

Human-computer interaction can be presented as two strong information processors (human and machine) communicating and interacting with one another across a low-bandwidth, limited interface. (ACM SIGCHI, 1996) defines Human-Computer Interaction (HCI) as "a field concerned with the design, development, and implementation of computing systems for human use, as well as with the research of major phenomena surrounding them." As a result, it's Questionable whether HCI is a science, a design science, or an engineering discipline. HCI is a science, according to Allen Newell and Stuart Card (1985), and it is modulated by approximation, giving technology theories and skills for designers. HCI was defined by Carroll and Campbell (1989) as a design science that established a craft-based methodology and new research methods to evaluate existing systems in their planned and task settings, with the results guiding designers for the next generation of systems. As an engineering subject, the design and strategy of humans and computers interacting to complete tasks successfully (Long & Dowell, 1989).

The basic purpose of Human Computer Interaction is to make user-computer interactions better. It makes computers more functional and responsive to the needs of their users. Human-computer interaction helps to establish or improve particular design goals. The four major objectives are Safety, Effectiveness of Utility, Efficiency & Usability.

III. DESIGN PROCESS OF HUMAN COMPUTER INTERACTION & RESEARCH ON INTRACTION BETWEEN HUMANS AND COMPUTERS:

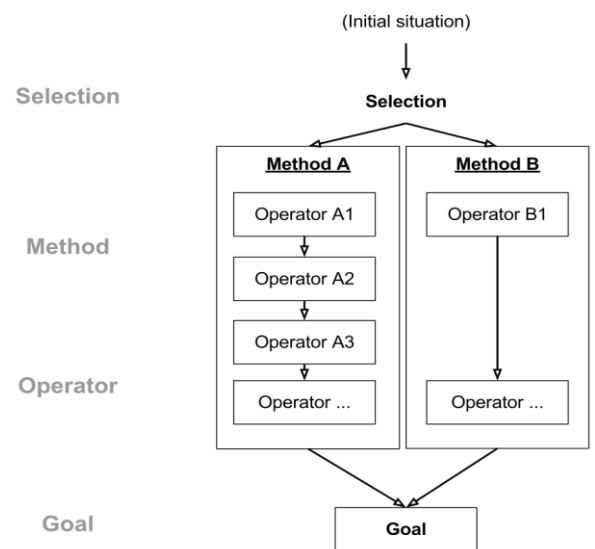
Ebert outlined four human-computer interaction design principles that can be applied to user interface designs to create a user-friendly, systematic, and instinctive experience for users. In a single user interface design, one or more techniques can be employed. The following are the four techniques to designing a user interface:

S#	Technique
1	Predictive Modelling Approach
2	Cognitive Approach
3	Empirical Approach
4	Anthropomorphic Approach

➤ Predictive Modelling Approach

The GOMS method examines and considers a user's experience in terms of the amount of time it takes them to complete a goal efficiently and effectively.

GOMS stands for goals, operators, methods, and section rules, with g representing goals, o representing operators, m representing methods, and s representing section rules. The time it takes a human to accomplish a specific goal is calculated using precise measurements of the human's performance.



EXAMPLE OF EDITING A MANUSCRIPT

(by Bonnie E. John and David E. Kieras . It is a simple CMN-GOMS on editing a manuscript) CMN Stands for Card, Moran and Newell

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GOAL: EDIT-MANUSCRIPT
. GOAL.  EDIT-UNIT-TASK ...repeat until no more unit
tasks
.. GOAL.  ACQUIRE UNIT-TASK ...if task not remembered
... GOAL.  TURN PAGE ...if at end of manuscript
... GOAL.  GET-FROM-MANUSCRIPT
.. GOAL.  EXECUTE-UNIT-TASK ...if a unit task was
found
... GOAL.  MODIFY-TEXT
.... select. GOAL.  MOVE-TEXT* ...if text is to be moved
..... GOAL.  DELETE-PHRASE ...if a phrase is to be
deleted
..... GOAL.  INSERT-WORD ... if a word is to be
inserted
.... VERIFY-EDIT
    
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➤ Cognitive Approach

This method was used to create a user interface that is friendly to the end user and takes into account the brain's and senses' capabilities.

➤ Empirical Approach

The usefulness of multi-conceptual designs is examined and compared using this method.

➤ Anthropomorphic Approach

This technique entails creating a human interface with human-like qualities.

IV. COMMAND LINE LANGUAGES

This is a common way for people and computers to interact. The computer will now accept some meaningful commands that have been typed into it. Because a user can usually only type one command at a time, data entry is sluggish. The user's subsequent inputs are processed or executed by the application, and feedback is provided.

It has several significant benefits, but the contact becomes a dialogue only; in particular, the human is the more active side and faces more workload than the machine. Table below lists two key advantages and disadvantages of command line languages in relation to academic assistive devices.

Advantages	Disadvantages
Flexibility	Low visibility
Cost effective	Handling of errors

V. VOICE RECORDING

In most situations, speaking is a natural means of interacting. However, obtaining and maintaining continuous vocal output is difficult. Despite the fact that it is simple to record voice through interfaces in devices with a low error rate and without interruption, much of the debate is conducted using voice as input. Finding a technique to collect voice input and incorporate it into a multimode interface is particularly important research. In this example, using a microphone is a simple way to get voice input, but you may run into issues if

you're in a noisy setting. In such instances, it's critical to provide a parallel input system to prevent data or lecture inputs from being lost.

VI. RECOGNITION OF HANDWRITTEN LETTERS

It's also a more natural manner of communicating than using your voice. Handwriting recognition interfaces allow users to avoid the unwelcome dialogue.

Handwriting recognition interfaces can work together to eliminate the need of other input devices like the mouse and keyboard, reducing the amount of time it takes to enter data. It can be used to solve or write mathematical and diagrammatical inputs.

VII. CONCLUSION

The above study examines the literature on human-computer interaction, as well as technology issues such as interaction styles, and weighs the benefits and drawbacks. We also looked for improved interaction styles among the ones that already existed. Several conflicts must be considered when building moral, effective, and user-friendly interfaces. This study argues that there is theoretical justification for human-computer interaction. In this work, we discuss how Human Computer Engagement may be used to achieve high degrees of interaction between users and gadgets. We conclude that in order to create a worthwhile human-computer interaction, we must choose the appropriate style of interaction and type of interface for the set of users for whom it is meant, while human issues must also be considered. As a result, we advocate ,voice recognition, device interoperability, and handwriting recognition as significant modalities of engagement. Related human-computer interaction design is something we recommend.

HCI is most likely to become the AI (Artificial Intelligence) research community's sole truly worldwide study issue. The world could be changed forever if a breakthrough in HCI design is made. Many parts of HCI technology are concerned with more in-depth interpretations of human behaviour. HCI will have a huge impact on the globe. Because human-computer interaction is based on humans interacting with computers, it is more preferable because it is simple to use, completely reliant on humans/users, and operates according to their directions. People's work will be made easier in the future if they do a tiny amount of effort in this field.

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