HUMAN-COMPUTER INTERACTION (IS252) CHAPTER ONE

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CHAPTER ONE :- INTERACTION DESIGN

1.1 INTRODUCTION

- IN THIS CHAPTER, WE BEGIN BY EXAMINING WHAT INTERACTION DESIGN IS. WE LOOK AT THE DIFFERENCE BETWEEN GOOD AND POOR DESIGN, HIGHLIGHTING HOW PRODUCTS CAN DIFFER RADICALLY IN THEIR USABILITY. WE THEN DESCRIBE WHAT AND WHO IS INVOLVED IN INTERACTION DESIGN. IN THE LAST PART OF THE CHAPTER WE OUTLINE CORE ASPECTS OF USABILITY AND HOW THESE ARE USED TO ASSESS INTERACTIVE PRODUCTS. AN ASSIGNMENT IS PRESENTED AT THE END OF THE CHAPTER IN WHICH YOU HAVE THE OPPORTUNITY TO PUT INTO PRACTICE WHAT YOU HAVE READ, BY EVALUATING AN INTERACTIVE PRODUCT USING VARIOUS USABILITY CRITERIA.

THE MAIN AIMS OF THE CHAPTER ARE TO:

- EXPLAIN THE DIFFERENCE BETWEEN GOOD AND POOR INTERACTION DESIGN.
- DESCRIBE WHAT INTERACTION DESIGN IS AND HOW IT RELATES TO HUMAN-COMPUTER INTERACTION AND OTHER FIELDS.
- EXPLAIN WHAT USABILITY IS.
- DESCRIBE WHAT IS INVOLVED IN THE PROCESS OF INTERACTION DESIGN.
- OUTLINE THE DIFFERENT FORMS OF GUIDANCE USED IN INTERACTION DESIGN.
- ENABLE YOU TO EVALUATE AN INTERACTIVE PRODUCT AND EXPLAIN WHAT IS GOOD AND BAD ABOUT IT IN TERMS OF THE GOALS AND PRINCIPLES OF INTERACTION DESIGN.

1.2 GOOD AND POOR DESIGN

- A CENTRAL CONCERN OF INTERACTION DESIGN IS TO DEVELOP INTERACTIVE PRODUCTS THAT ARE SABLE. BY THIS IS GENERALLY MEANT EASY TO LEARN, EFFECTIVE TO USE, AND PROVIDE AN ENJOYABLE USER EXPERIENCE. A GOOD PLACE TO START THINKING ABOUT HOW TO DESIGN USABLE INTERACTIVE PRODUCTS IS TO COMPARE EXAMPLES OF WELL AND POORLY DESIGNED ONES.
- THROUGH IDENTIFYING THE SPECIFIC WEAKNESSES AND STRENGTHS OF DIFFERENT INTERACTIVE SYSTEMS, WE CAN BEGIN TO UNDERSTAND WHAT IT MEANS FOR SOMETHING TO BE USABLE OR NOT. HERE, WE BEGIN WITH AN EXAMPLE OF A POORLY DESIGNED SYSTEM -VOICE MAIL- THAT IS USED IN MANY ORGANIZATIONS (BUSINESSES, HOTELS, AND UNIVERSITIES). WE THEN COMPARE THIS WITH AN ANSWERING MACHINE THAT EXEMPLIFIES GOOD DESIGN.

1.2.1 WHAT TO DESIGN

- DESIGNING USABLE INTERACTIVE PRODUCTS THUS REQUIRES CONSIDERING WHO IS GOING TO BE USING THEM AND WHERE THEY ARE GOING TO BE USED. ANOTHER KEY CONCERN IS UNDER- STANDING THE KIND OF ACTIVITIES PEOPLE ARE DOING WHEN INTERACTING WITH THE PRODUCTS. THE APPROPRIATENESS OF DIFFERENT KINDS OF INTERFACES AND ARRANGEMENTS OF INPUT AND OUTPUT DEVICES DEPENDS ON WHAT KINDS OF ACTIVITIES NEED TO BE SUPPORTED. A KEY QUESTION FOR INTERACTION DESIGN IS: HOW DO YOU OPTIMIZE THE USERS' INTER-ACTIONS WITH A SYSTEM, ENVIRONMENT OR PRODUCT, SO THAT THEY MATCH THE USERS' ACTIVITIES THAT ARE BEING SUPPORTED AND EXTENDED? ONE COULD USE INTUITION AND HOPE FOR THE BEST. ALTERNATIVELY, ONE CAN BE MORE PRINCIPLED IN DECIDING WHICH CHOICES TO MAKE BY BASING THEM ON AN UNDERSTANDING OF THE USERS. THIS INVOLVES:
- TAKING INTO ACCOUNT WHAT PEOPLE ARE GOOD AND BAD AT CONSIDERING WHAT MIGHT HELP PEOPLE WITH THE WAY THEY CURRENTLY DO THINGS
- THINKING THROUGH WHAT MIGHT PROVIDE QUALITY USER EXPERIENCES
- LISTENING TO WHAT PEOPLE WANT AND GETTING THEM INVOLVED IN THE DESIGN USING "TRIED AND TESTED" USER-BASED TECHNIQUES DURING THE DESIGN PROCESS

1.3 WHAT IS INTERACTION DESIGN

- BY INTERACTION DESIGN, WE MEAN
- ***"DESIGNING INTERACTIVE PRODUCTS*** TO ***SUPPORT PEOPLE IN THEIR EVERYDAY AND WORKING LIVES"***.

1.3.1 THE MAKEUP OF INTERACTION DESIGN

- ONE OF THE BIGGEST CHALLENGES AT THAT TIME WAS TO DEVELOP COMPUTERS THAT COULD BE ACCESSIBLE AND USABLE BY OTHER PEOPLE, BESIDES ENGINEERS, TO SUPPORT TASKS INVOLVING HUMAN COGNITION (E.G., DOING SUMS, WRITING DOCUMENTS, MANAGING ACCOUNTS, DRAWING PLANS). TO MAKE THIS POSSIBLE, COMPUTER SCIENTISTS AND PSYCHOLOGISTS BECAME INVOLVED IN DESIGNING USER INTERFACES. COMPUTER SCIENTISTS AND SOFTWARE ENGINEERS DEVELOPED HIGH-LEVEL PROGRAMMING LANGUAGES (E.G., BASIC, PROLOG), SYSTEM ARCHITECTURES, SOFTWARE DESIGN METHODS, AND COMMAND-BASED LANGUAGES TO HELP IN SUCH TASKS, WHILE PSYCHOLOGISTS PROVIDED INFORMATION ABOUT HUMAN CAPABILITIES (E.G., MEMORY, DECISION MAKING).

1.3.2 WORKING TOGETHER AS A MULTIDISCIPLINARY TEAM

- BRINGING TOGETHER SO MANY PEOPLE WITH DIFFERENT BACKGROUNDS AND TRAINING HAS MEANT MANY MORE IDEAS BEING GENERATED, NEW METHODS BEING DEVELOPED, AND MORE CREATIVE AND ORIGINAL DESIGNS BEING PRODUCED. HOWEVER, THE DOWN SIDE IS THE COSTS INVOLVED. THE MORE PEOPLE THERE ARE WITH DIFFERENT BACKGROUNDS IN A DESIGN TEAM, THE MORE DIFFICULT IT CAN BE TO COMMUNICATE AND PROGRESS FORWARD THE DESIGNS BEING GENERATED. WHY? PEOPLE WITH DIFFERENT BACKGROUNDS HAVE DIFFERENT PERSPECTIVES AND WAYS OF SEEING AND TALKING ABOUT THE WORLD (SEE FIGURE 1.1).

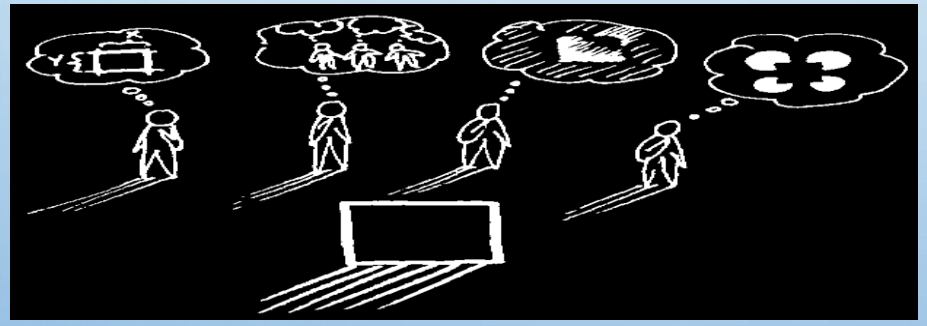

FIGURE 1.1 FOUR DIFFERENT TEAM MEMBERS LOOKING AT THE SAME SQUARE, BUT EACH SEEING IT QUITE DIFFERENTLY

1.3.3 INTERACTION DESIGN IN BUSINESS

INTERACTION DESIGN IS NOW A BIG BUSINESS. IN PARTICULAR, WEBSITE CONSULTANTS, STARTUP COMPANIES, AND MOBILE COMPUTING INDUSTRIES HAVE ALL REALIZED ITS PIVOTAL ROLE IN SUCCESSFUL INTERACTIVE PRODUCTS. TO GET NOTICED IN THE HIGHLY COMPETITIVE FIELD OF WEB PRODUCTS REQUIRES STANDING OUT. BEING ABLE TO SAY THAT YOUR PRODUCT IS EASY AND EFFECTIVE TO USE IS SEEN AS CENTRAL TO THIS.

BOX 1.2 What's In a Name? From Interface Designers to Information Architects

Ten years ago, when a company wanted to develop an interface for an interactive product it advertised for interface designers. Such professionals were primarily involved in the design and evaluation of widgets for desktop applications. Now that the potential range of interactive products has greatly diversified, coupled with the growing realization of the importance of getting the interface right, a number of other job descriptions have begun to emerge. These include:

- interactive/interaction designers (people involved in the design of all the interactive aspects of a product, not just the graphic design of an interface)
- usability engineers (people who focus on evaluating products, using usability methods and principles)
- web designers (people who develop and create the visual design of websites, such as layouts)
- information architects (people who come up with ideas of how to plan and structure interactive products, especially websites)
- user-experience designers (people who do all the above but who may also carry out field studies to inform the design of products)

1.4 WHAT IS INVOLVED IN THE PROCESS OF INTERACTION DESIGN?

ESSENTIALLY, THE PROCESS OF INTERACTION DESIGN INVOLVES FOUR BASIC ACTIVITIES:

1. IDENTIFYING NEEDS AND ESTABLISHING REQUIREMENTS.
2. DEVELOPING ALTERNATIVE DESIGNS THAT MEET THOSE REQUIREMENTS.
3. BUILDING INTERACTIVE VERSIONS OF THE DESIGNS SO THAT THEY CAN BE COMMUNICATED AND ASSESSED.
4. EVALUATING WHAT IS BEING BUILT THROUGHOUT THE PROCESS.

THESE ACTIVITIES ARE INTENDED TO INFORM ONE ANOTHER AND TO BE REPEATED. FOR EXAMPLE, MEASURING THE USABILITY OF WHAT HAS BEEN BUILT IN TERMS OF WHETHER IT IS EASY TO USE PROVIDES FEEDBACK THAT CERTAIN CHANGES MUST BE MADE OR THAT CERTAIN REQUIREMENTS HAVE NOT YET BEEN MET.

IN ADDITION TO THE FOUR BASIC ACTIVITIES OF DESIGN, THERE ARE THREE KEY CHARACTERISTICS OF THE INTERACTION DESIGN PROCESS:

1. USERS SHOULD BE INVOLVED THROUGH THE DEVELOPMENT OF THE PROJECT.
2. SPECIFIC USABILITY AND USER EXPERIENCE GOALS SHOULD BE IDENTIFIED, CLEARLY DOCUMENTED, AND AGREED UPON AT THE BEGINNING OF THE PROJECT.
3. ITERATION THROUGH THE FOUR ACTIVITIES IS INEVITABLE.

1.5 THE GOALS OF INTERACTION DESIGN

PART OF THE PROCESS OF UNDERSTANDING USERS' NEEDS, WITH RESPECT TO DESIGNING AN INTERACTIVE SYSTEM TO SUPPORT THEM, IS TO BE CLEAR ABOUT YOUR PRIMARY OBJECTIVE. IS IT TO DESIGN A VERY EFFICIENT SYSTEM THAT WILL ALLOW USERS TO BE HIGHLY PRODUCTIVE IN THEIR WORK, OR IS IT TO DESIGN A SYSTEM THAT WILL BE CHALLENGING AND MOTIVATING SO THAT IT SUPPORTS EFFECTIVE LEARNING, OR IS IT SOMETHING ELSE? WE CALL THESE TOP LEVEL CONCERNS USABILITY GOALS AND USER EXPERIENCE GOALS. THE TWO DIFFER IN TERMS OF HOW THEY ARE OPERATIONALIZED, HOW THEY CAN BE MET AND THROUGH WHAT MEANS. USABILITY GOALS ARE CONCERNED WITH MEETING SPECIFIC USABILITY CRITERIA (E.G., EFFICIENCY) AND USER EXPERIENCE GOALS ARE LARGELY CONCERNED WITH EXPLICATING THE QUALITY OF THE USER EXPERIENCE (E.G., TO BE AESTHETICALLY PLEASING).

1.5.1 USABILITY GOALS

TO RECAP, USABILITY IS GENERALLY REGARDED AS ENSURING THAT INTERACTIVE PRODUCTS ARE EASY TO LEARN, EFFECTIVE TO USE, AND ENJOYABLE FROM THE USER'S PERSPECTIVE. IT INVOLVES OPTIMIZING THE INTERACTIONS PEOPLE HAVE WITH INTERACTIVE PRODUCTS TO ENABLE THEM TO CARRY OUT THEIR ACTIVITIES AT WORK, SCHOOL, AND IN THEIR EVERYDAY LIFE. MORE SPECIFICALLY, USABILITY IS BROKEN DOWN INTO THE FOLLOWING GOALS:

- EFFECTIVE TO USE (EFFECTIVENESS)
- EFFICIENT TO USE (EFFICIENCY)
- SAFE TO USE (SAFETY)
- HAVE GOOD UTILITY (UTILITY)
- EASY TO LEARN (LEARNABILITY)
- EASY TO REMEMBER HOW TO USE (MEMORABILITY) FOR EACH GOAL, WE DESCRIBE IT IN MORE DETAIL

USABILITY GOALS CONT.

- ***EFFECTIVENESS*** IS A VERY GENERAL GOAL AND REFERS TO HOW GOOD A SYSTEM IS AT DOING WHAT IT IS SUPPOSED TO DO.
- ***EFFICIENCY*** REFERS TO THE WAY A SYSTEM SUPPORTS USERS IN CARRYING OUT THEIR TASKS.
- ***SAFETY*** INVOLVES PROTECTING THE USER FROM DANGEROUS CONDITIONS AND UNDESIRABLE SITUATIONS. IN RELATION TO THE FIRST ERGONOMIC ASPECT, IT REFERS TO THE EXTERNAL CONDITIONS WHERE PEOPLE WORK
- ***UTILITY*** REFERS TO THE EXTENT TO WHICH THE SYSTEM PROVIDES THE RIGHT KIND OF FUNCTIONALITY SO THAT USERS CAN DO WHAT THEY NEED OR WANT TO DO.
- ***LEARNABILITY*** REFERS TO HOW EASY A SYSTEM IS TO LEARN TO USE. IT IS WELL KNOWN THAT PEOPLE DON'T LIKE SPENDING A LONG TIME LEARNING HOW TO USE A SYSTEM. THEY WANT TO GET STARTED STRAIGHT AWAY AND BECOME COMPETENT AT CARRYING OUT TASKS WITHOUT TOO MUCH EFFORT. THIS IS ESPECIALLY SO FOR INTERACTIVE PRODUCTS INTENDED FOR EVERYDAY USE (E.G., INTERACTIVE TV, EMAIL) AND THOSE USED ONLY INFREQUENTLY (E.G., VIDEO CONFERENCING).
- ***MEMORABILITY*** REFERS TO HOW EASY A SYSTEM IS TO REMEMBER HOW TO USE, ONCE LEARNED. THIS IS ESPECIALLY IMPORTANT FOR INTERACTIVE SYSTEMS THAT ARE USED INFREQUENTLY. IF USERS HAVEN'T USED A SYSTEM OR AN OPERATION FOR A FEW MONTHS OR LONGER, THEY SHOULD BE ABLE TO REMEMBER OR AT LEAST RAPIDLY BE REMINDED HOW TO USE IT.

1.5.2 USER EXPERIENCE GOALS

- THE REALIZATION THAT NEW TECHNOLOGIES ARE OFFERING INCREASING OPPORTUNITIES FOR SUP- PORTING PEOPLE IN THEIR EVERYDAY LIVES HAS LED RESEARCHERS AND PRACTITIONERS TO CON-SIDER FURTHER GOALS. THE EMERGENCE OF TECHNOLOGIES (E.G., VIRTUAL REALITY, THE WEB, MOBILE COMPUTING) IN A DIVERSITY OF APPLICATION AREAS (E.G., ENTERTAINMENT, EDUCATION, HOME, PUBLIC AREAS) HAS BROUGHT ABOUT A MUCH WIDER SET OF CONCERNS. AS WELL AS FOCUSING PRIMARILY ON IMPROVING EFFICIENCY AND PRODUCTIVITY AT WORK, INTERACTION DESIGN IS INCREASINGLY CONCERNING ITSELF WITH CREATING SYSTEMS THAT ARE:

- SATISFYING
- ENJOYABLE
- FUN
- ENTERTAINING
- HELPFUL
- MOTIVATING
- AESTHETICALLY PLEASING
- SUPPORTIVE OF CREATIVITY
- REWARDING
- EMOTIONALLY FULFILLING