Module I
Introductio
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User Interface Design Definition

User interface design is a subset of a field of study called human-computer interaction (HCI). Human-computer interaction is the study, planning, and design of how people and computers work together so that a person's needs are satisfied in the most effective way.

The user interface is the part of a computer and its software that people can see, hear, touch, talk to, or otherwise understand or direct. The user interface has essentially two components: input and output.

Input is how people communicate his needs to the system using keyboard or any pointing device and output is how the system returns processing result to user through screen or sound.

The best interface is one which has proper design with combination of effective input and output mechanisms.

Importance of Good Design

Inspite of today's rich technologies and tools we are unable to provide effective and usable screen because lack of time and care.

A well-designed interface and screen is terribly important to our users. It is their window to view the capabilities of the system and it is also the vehicle trough which complex tasks can be performed.

A screen's layout and appearance affect a person in a variety of ways. If they are confusing and inefficient, people will have greater difficulty in doing their jobs and will make more mistakes.

Poor design may even chase some people away from a system permanently. It can also lead to aggravation, frustration, and increased stress.

Benefits of Good Design

The benefits of a well-designed screen have also been under experimental scrutiny for many years. One researcher, for example, attempted to improve screen clarity and readability by making screens less crowded. The result: screen users of the modified screens completed transactions in 25 percent less time and with 25 percent fewer errors than those who used the original screens.

Another researcher has reported that reformatting inquiry screens following good design principles reduced decision-making time by about 40 percent, resulting in a savings of 79 person-years in the affected system.

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Other benefits also accrue from good design (Karat, 1997). Training costs are lowered because training time is reduced, support line costs are lowered because fewer assist calls are necessary, and employee satisfaction is increased because aggravation and frustration are reduced.

Another benefit is, ultimately, that an organization's customers benefit because of the improved service they receive.

Identifying and resolving problems during the design and development process also has significant economic benefits.

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GUI Definition

In brief, a graphical user interface can be defined as follows. A user interface, as recently described, is a collection of techniques and mechanisms to interact with something. In a graphical interface, the primary interaction mechanism is a pointing device of some kind.

What the user interacts with is a collection of elements referred to as objects. They can be seen, heard, touched, or otherwise perceived. Objects are always visible to the user and are used to perform tasks. They are interacted with as entities independent of all other objects.

People perform operations, called actions, on objects. The operations include accessing and modifying objects by pointing, selecting, and manipulating.

Popularity of Graphics

Graphics revolutionized design and the user interface. Graphics assumes three dimensional look whereas text based system assumes one dimensional look.

Information can appear or disappear through floating windows and navigation and commands can be done through menu or pull downs or screen controls

Increased computer power and the vast improvement in the display enable the user's actions to be reacted to quickly, dynamically, and meaningfully.

If properly used graphics can reduce mental and perceptional load and increases information transfer between men and machine because of visual comparisons and simplification of the perception of structure.

Concept of Direct Manipulation

The term used to describe this style of interaction for graphical systems was first used by Shneiderman (1982). He called them ―direct manipulation‖ systems, suggesting that they possess the following characteristics:

The system is portrayed as an extension of the real world: A person is allowed to work in a familiar environment and in a familiar way, focusing on the data, not the application and tools. The physical organization of the system, which most often is unfamiliar, is hidden from view and is not a distraction.

Continuous visibility of objects and actions: objects are continuously visible. Reminders of actions to be performed are also obvious. Nelson (1980) described this concept as ―virtual reality,‖ a representation of reality that can be manipulated. Hatfield (1981) is credited with calling it ―WYSIWYG‖ (what you see is what you get) and Rutkowski (1982) described it as ―transparency,‖

Actions are rapid and incremental with visible display of results: the results of actions are immediately displayed visually on the screen in their new and current form. Auditory feedback may also be provided. The impact of a previous action is quickly seen, and the evolution of tasks is continuous and effortless.

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Incremental actions are easily reversible: Finally, actions, if discovered to be incorrect or not desired, can be easily undone.

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Indirect Manipulation

In practice, direct manipulation of all screen objects and actions may not be feasible because of the following:

- The operation may be difficult to conceptualize in the graphical system.
- The graphics capability of the system may be limited.
- The amount of space available for placing manipulation controls in the window border may be limited.
- It may be difficult for people to learn and remember all the necessary operations and actions.

When this occurs, indirect manipulation is provided. Indirect manipulation substitutes words and text, such as pull-down or pop-up menus, for symbols, and substitutes typing for pointing.

Graphical system advantages

The success of graphical systems has been attributed to a host of factors. The following have been commonly referenced in literature and endorsed by their advocates as advantages of these systems.

Symbols recognized faster than text: symbols can be recognized faster and more accurately than text. An example of a good classification scheme that speeds up recognition is the icons. These icons allow speedy recognition of the type of message being presented.

Faster learning: a graphical, pictorial representation aids learning, and symbols can also be easily learned.

Faster use and problem solving: Visual or spatial representation of information has been found to be easier to retain and manipulate and leads to faster and more successful problem solving.

Easier remembering: Because of greater simplicity, it is easier for casual users to retain operational concepts.

More natural: symbolic displays are more natural and advantageous because the human mind has a powerful image memory.

Fewer errors: Reversibility of actions reduces error rates because it is always possible to undo the last step. Error messages are less frequently needed.

Increased feeling of control: The user initiates actions and feels in control. This increases user confidence

Immediate feedback: The results of actions furthering user goals can be seen immediately. If the response is not in the desired direction, the direction can be changed quickly.

Predictable system responses: Predictable system responses also speed learning.

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Easily reversible actions: This ability to reverse unwanted actions also increases user confidence

More attractive: Direct-manipulation systems are more entertaining, cleverer, and more appealing.

May consume less space: Icons may take up less space than the equivalent in words but this is not the case always.

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Replaces national languages: Icons possess much more universality than text and are much more easily comprehended worldwide.

Easily augmented with text displays: Where graphical design limitations exist, direct-manipulation systems can easily be augmented with text displays. The reverse is not true.

Low typing requirements: Pointing and selection controls, such as the mouse or trackball, eliminate the need for typing skills.

Graphical system disadvantages

The body of positive research, hypotheses, and comment concerning graphical systems is being challenged by some studies, findings, and opinions that indicate that graphical representation and interaction may not necessarily always be better. Indeed, in some cases, it may be poorer than pure textual or alphanumeric displays. Sometimes arcane, and even bizarre. Among the disadvantages put forth are these:

Greater design complexity: Controls and basic alternatives must be chosen from a pile of choices numbering in excess of 50. This design potential may not necessarily result in better design unless proper controls and windows are selected. Poor design can undermine acceptance.

Learning still necessary: The first time one encounters many graphical systems, what to do is not immediately obvious. A severe learning and remembering requirement is imposed on many users because meanings of icons or using pointing device have to be learned.

Lack of experimentally-derived design guidelines: today there is a lack of widely available experimentally-derived design guidelines. Earlier only few studies to aid in making design decisions were performed and available for today now. Consequently, there is too little understanding of how most design aspects relate to productivity and satisfaction.

Inconsistencies in technique and terminology: Many differences in technique, terminology, and look and feel exist among various graphical system providers, and even among successive versions of the same system. So the user has to learn or relearn again while shifting to next terminology.

Not always familiar: Symbolic representations may not be as familiar as words or numbers. Numeric symbols elicit faster responses than graphic symbols in a visual search task.

Window manipulation requirements: Window handling and manipulation times are still excessive and repetitive. This wastes time

Production limitations: The number of symbols that can be clearly produced using today's technology is still limited. A body of recognizable symbols must be produced that are equally legible and equally recognizable using differing technologies. This is extremely difficult today.

Few tested icons exist: Icons must be researched, designed, tested, and then

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introduced into the marketplace. The consequences of poor or improper design will be confusion and lower productivity for users.

Inefficient for touch typists: For an experienced touch typist, the keyboard is a very fast and powerful device.

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Not always the preferred style of interaction: Not all users prefer a pure iconic interface. User will also prefer alternatives with textual captions.

Not always fastest style of interaction: graphic instructions on an automated bank teller machine were inferior to textual instructions.

May consume more screen space: Not all applications will consume less screen space. A listing of names and telephone numbers in a textual format will be more efficient to scan than a card file.

Hardware limitations: Good design also requires hardware of adequate power, processing speed, screen resolution, and graphic capability.

Characteristics of the Graphical User Interface

Sophisticated Visual Presentation

Visual presentation is the visual aspect of the interface. It is what people see on the screen. The sophistication of a graphical system permits displaying lines, including drawings and icons. It also permits the displaying of a variety of character fonts, including different sizes and styles.

□ The meaningful interface elements visually presented to the user in a graphical system include windows (primary, secondary, or dialog boxes), menus (menu bar, pull down, pop-up, cascading), icons to represent objects such as programs or files, assorted screen-based controls (text boxes, list boxes, combination boxes, settings, scroll bars, and buttons), and a mouse pointer and cursor. The objective is to reflect visually on the screen the real world of the user as realistically, meaningfully, simply, and clearly as possible.

Pick-and-Click Interaction

To identify a proposed action is commonly referred to as pick, the signal to perform an action as click.

The primary mechanism for performing this pick-and-click is most often the mouse and its buttons and the secondary mechanism for performing these selection actions is the keyboard.

Restricted Set of Interface Options

The array of alternatives available to the user is what is presented on the screen or what may be retrieved through what is presented on the screen, nothing less, and nothing more. This concept fostered the acronym WYSIWYG.

Visualization

Visualization is a cognitive process that allows people to understand information that is difficult to perceive, because it is either too voluminous or too abstract.

The goal is not necessarily to reproduce a realistic graphical image, but to

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produce one that conveys the most relevant information. Effective visualizations can facilitate mental insights, increase productivity, and foster faster and more accurate use of data.

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Object Orientation

A graphical system consists of objects and actions. Objects are what people see on the screen as a single unit.

Objects can be composed of subobjects. For example, an object may be a document and its subobjects may be a paragraph, sentence, word, and letter.

Objects are divided into three meaningful classes as Data objects, which present information, container objects to hold other objects and Device objects represent physical objects in the real world.

Objects can exist within the context of other objects, and one object may affect the way another object appears or behaves. These relationships are called collections, constraints, composites, and containers.

Properties or Attributes of Objects : Properties are the unique characteristics of an object. Properties help to describe an object and can be changed by users.

Actions: People take actions on objects. They manipulate objects in specific ways (commands) or modify the properties of objects (property or attribute specification).

The following is a typical property/attribute specification sequence*:*

- The user selects an object—for example, several words of text.
- The user then selects an action to apply to that object, such as the action BOLD.
- The selected words are made bold and will remain bold until selected and changed again.

Application versus Object or Data Orientation An application-oriented approach takes an action: object approach, like this:

Action> 1. An application is opened (for example, word processing). Object> 2. A file or other object selected (for example, a memo).

An object-oriented object: action approach does this: Object> 1. An object is chosen (a memo).
Action> 2. An application is selected (word processing).

Views: Views are ways of looking at an object's information. IBM's SAA CUA describes four kinds of views: composed, contents, settings, and help.

Use of Recognition Memory

Continuous visibility of objects and actions encourages to eliminate ―out of sight, out of mind‖ problem

Concurrent Performance of Functions

Graphic systems may do two or more things at one time. Multiple programs may run simultaneously.

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It may process background tasks (cooperative multitasking) or preemptive multitasking.

Data may also be transferred between programs. It may be temporarily stored on a ―clipboard‖ for later transfer or be automatically swapped between programs.

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The Web User Interface

Web interface design is essentially the design of navigation and the presentation of information.

Proper interface design is largely a matter of properly balancing the structure and relationships of menus, content, and other linked documents or graphics. The design goal is to build a hierarchy of menus and pages that feels natural, is well structured, is easy to use, and is truthful.

The Web is a navigation environment where people move between pages of information, not an application environment. It is also a graphically rich environment.

Web interface design is difficult for a number of reasons. First, its underlying design language, HTML. Next, browser navigation retreated to the pre-GUI era.

Web interface design is also more difficult because the main issues concern information architecture and task flow, neither of which is easy to standardize. It is more difficult because of the availability of the various types of multimedia, and the desire of many designers to use something simply because it is available. It is more difficult because users are ill defined, and the user's tools so variable in nature.

The popularity of Web

While the introduction of the graphical user interface revolutionized the user interface, the Web has revolutionized computing. It allows millions of people scattered across the globe to communicate, access information, publish, and be heard. It allows people to control much of the display and the rendering of Web pages.

Web usage has reflected this popularity. The number of Internet hosts has risen dramatically.

Users have become much more discerning about good design. Slow download times, confusing navigation, confusing page organization, disturbing animation, or other undesirable site features often results in user abandonment of the site for others with a more agreeable interface.

Characteristics of Web Design

A Web interface possesses a number of characteristics, some similar to a GUI interface, and, as has already been shown, some different.

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GUI versus Web Design

Characteristics	GUI	WEB
Devices	User hardware variations limited. User hardware characteristics well defined Screens appear exactly as specified.	User hardware variations enormous. Screen appearance influenced by hardware being used.
User Focus	Data and applications.	Information and navigation.
Data	Typically created and used by known and trusted	Full of unknown content.
Information	Sources are trusted. Properties generally known. Typically placed into system by users or known people and organizations.	Source not always trusted. Often not placed onto the Web by users or known people and organizations. Highly variable organization.
User Tasks	Install, configure, personalize, start, use, and Open, use, and close data files. Familiarity with applications often achieved.	Link to a site, browse or read pages, fill out forms, upgrade programs. register for services, participate in transactions, download and save things. Familiarity with many sites not established.
Presentation	Windows, menus, controls, data, toolbars Presented as specified by designer. Generally standardized by toolkits and style specifications. guides.	Two components, browser and page Within page, any combination of text, images, audio, video, and animation. May not be presented as specified by the designer dependent on browser, monitor, and user Little standardization.
Navigation	Through menus, lists, trees, dialogs, and wizards.	Through links, bookmarks, and typed URLs.

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Interaction	Interactions such as clicking menu choices, pressing buttons, selecting list choices, and cut/copy/paste occur within context of active program.	Basic interaction is a single click. This can cause extreme changes in context, which may not be noticed.
Response Time	Nearly instantaneous	Quite variable, depending on transmission speeds, page content, and so on. Long times can upset the user.
System Capability	Unlimited capability proportional to sophistication of hardware and software.	Limited by constraints imposed by the hardware, browser, software, client support, and user willingness to allow features because of response time, security, and Privacy concerns.
Task Efficiency	Targeted to a specific audience with specific tasks. Only limited by the amount of programming undertaken to support it.	Limited by browser and network capabilities. Actual user audience usually not well understood. Often intended for anyone and everyone.
Consistency	Major objective exists within and across applications. Aided by platform toolkit and design guidelines. Universal consistency in GUI products generally	Sites tend to establish their own identity. Frequently standards set within a site. Frequent ignoring of GUI guidelines for identical created through toolkits and design guidelines. Components, especially controls.
User Assistance	Integral part of most systems and applications. Documentation, both online and offline, Customer service support, if provided, usually provided. Personal support desk also usually provided.	No similar help systems. Accessed through standard mechanisms. The little available help is built into the page oriented to product or service offered.

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Integration	Seamless integration of all applications into the platform environment is a major objective.	Apparent for some basic functions within most Web sites (navigation, printing, and so on.) in accomplishing this objective Sites tend to achieve individual distinction rather than integration.
Security	Tightly controlled, proportional to degree of willingness to invest resources and effort. Not an issue for most home PC users.	Renowned for security exposures. Browser-provided security options typically understood by average users. When employed, may have function-limiting side effects
Reliability	Tightly controlled in business systems,	Susceptible to disruptions caused by user, telephone proportional to degree of willingness line and cable providers, Internet service providers, to invest resources and effort. Hosting servers, and remotely accessed sites.

Printed Pages versus Web Pages

Page size: Printed pages are generally larger than their Web counterparts. They are also fixed in size, not variable like Web pages. The visual impact of the printed page is maintained in hard-copy form, while on the Web all that usually exists are snapshots of page areas. The visual impact of a Web page is substantially degraded, and the user may never see some parts of the page because their existence is not known or require scrolling to bring into view. The design implications: the top of a Web page is its most important element, and signals to the user must always be provided that parts of a page lie below the surface.

Page rendering: Printed pages are immensely superior to Web pages in rendering. Printed pages are presented as complete entities, and their entire contents are available for reading or review immediately upon appearance. Web pages elements are often rendered slowly, depending upon things like line transmission speeds and page content. Design implications: Provide page content that downloads fast, and give people elements to read immediately so the sense of passing time is diminished.

Page layout: With the printed page, layout is precise with much attention given to it. With Web pages layout is more of an approximation, being negatively

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influenced by deficiencies in design toolkits and the characteristics of the user's browser and hardware, particularly screen sizes. Design implication: Understand the restrictions and design for the most common user tools.

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Page resolution: the resolution of displayed print characters still exceeds that of screen characters, and screen reading is still slower than reading from a document. Design implication: Provide an easy way to print long Web documents.

Page navigation: Navigating printed materials is as simple as page turning. Navigating the Web requires innumerable decisions concerning which of many possible links should be followed. Design implications are similar to the above provide overviews of information organization schemes and clear descriptions of where links lead.

Interactivity: Printed page design involves letting the eyes traverse static information, selectively looking at information and using spatial combinations to make page elements enhance and explain each other. Web design involves letting the hands move the information (scrolling, pointing, expanding, clicking, and so on) in conjunction with the eyes.

Page independence: Because moving between Web pages is so easy, and almost any page in a site can be accessed from anywhere else, pages must be made freestanding. Every page is independent. Printed pages, being sequential, fairly standardized in organization, and providing a clear sense of place, are not considered independent. Design implication: Provide informative headers and footers on each Web page.

Merging Graphical business system and Web

□ Strength of the Web lies in its ability to link databases and processing occurring on a variety of machines within a company or organization. The graphical business system and the Web will merge into a common entity. These Web systems are called intranets.

Intranet versus the Internet

They differ, however, in some important ways as

Users: The users of intranets, being organization employees, know a lot about the organization, its structure, its products, its jargon, and its culture. Customers use Internet sites and others who know much less about the organization, and often care less about it.

Tasks: An intranet is used for an organization's everyday activities, including complex transactions, queries, and communications. The Internet is mainly used to find information, with a supplementary use being simple transactions.

Type of information: An intranet will contain detailed information needed for organizational functioning. Information will often be added or modified. The Internet will usually present more stable information: marketing and customer or client information, reports, and so forth.

Amount of information: Typically, an intranet site will be much larger than an organization's Internet site. It has been estimated that an intranet site can be ten to one hundred times larger than its corresponding public site.

Hardware and software: Since intranets exist in a controlled environment, the kinds of computers, monitors, browsers, and other software can be restricted or

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standardized. The need for cross-platform compatibility is minimized or eliminated; upgraded communications also permit intranets to run from a hundred to a thousand times faster than typical Internet access can. This allows the use of rich graphics and multimedia, screen elements that contribute to very slow download times for most Internet users.

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Design philosophy: Implementation on the intranet of current text-based and GUI applications will present a user model similar to those that have existed in other domains. This will cause a swing back to more traditional GUI designs—designs that will also incorporate the visual appeal of the Web, but eliminate many of its useless, promotional, and distracting features. The resulting GUI hybrids will be richer and much more effective.

Extranets

An extranet is a special set of intranet Web pages that can be accessed from outside an organization or company.

Typical examples include those for letting customers check on an order's status or letting suppliers view requests for proposals. An extranet is a blend of the public Internet and the intranet, and its design should reflect this.

Principles of User Interface Design

It should be useful, accomplishing some business objectives faster and more efficiently than the previously used method or tool did. It must also be easy to learn, for people want to do, not learn to do.

The interface itself should serve as both a connector and a separator: a connector in that it ties the user to the power of the computer, and a separator in that it minimizes the possibility of the participants damaging one another. We will begin with the first set of published principles, those for the Xerox STAR.

Principles for the Xerox STAR

The illusion of manipulable objects: Displayed objects that are selectable and manipulable must be created. A design challenge is to invent a set of displayable objects that are represented meaningfully and appropriately for the intended application. It must be clear that these objects can be selected,

Visual order and viewer focus: Effective visual contrast between various components of the screen is used to achieve this goal. Animation is also used to draw attention, as is sound. Feedback must also be provided to the user.

Revealed structure: The distance between one's intention and the effect must be minimized. The relationship between intention and effect must be tightened and made as apparent as possible to the user.

Consistency: Consistency aids learning. Consistency is provided in such areas as element location, grammar, font shapes, styles, and sizes, selection indicators, and contrast and emphasis techniques.

Appropriate effect or emotional impact: The interface must provide the appropriate emotional effect for the product and its market. Is it a corporate, professional, and secure business system? Should it reflect the fantasy, wizardry, and bad puns of computer games?

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A match with the medium: The interface must also reflect the capabilities of the device on which it will be displayed. Quality of screen images will be greatly affected by a device's resolution and color-generation capabilities.

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General Principles

The design goals in creating a user interface are described below. They are fundamental to the design and implementation of all effective interfaces, including GUI and Web ones. These principles are general characteristics of the interface, and they apply to all aspects.

Aesthetically Pleasing

— Provide visual appeal by following these presentation and graphic design principles:
  - Provide meaningful contrast between screen elements.
  - Create groupings.
  - Align screen elements and groups.
  - Provide three-dimensional representation.
  - Use color and graphics effectively and simply.

Clarity

— The interface should be visually, conceptually, and linguistically clear, including:
  - Visual elements
  - Functions
  - Metaphors
  - Words and text

Compatibility

— Provide compatibility with the following:
  - The user
  - The task and job
  - The product

— Adopt the user's perspective.

Comprehensibility

— A system should be easily learned and understood. A user should know the following:
  - What to look at
  - What to do
  - When to do it
  - Where to do it
  - Why to do it
  - How to do it

— The flow of actions, responses, visual presentations, and information should be in a sensible order that is easy to recollect and place in context.

Configurability

— Permit easy personalization, configuration, and reconfiguration of settings.
  - Enhances a sense of control.
  - Encourages an active role in understanding.

Consistency

— A system should look, act, and operate the same throughout.
Similar components should:

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    - Have a similar look.
    - Have similar uses.
    - Operate similarly.
- The same action should always yield the same result.
- The function of elements should not change.
- The position of standard elements should not change.

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— In addition to increased learning requirements, inconsistency in design has a number of other prerequisites and by-products, including:
— More specialization by system users.
— Greater demand for higher skills.
— More preparation time and less production time.
— More frequent changes in procedures.
— More error-tolerant systems (because errors are more likely).
— More kinds of documentation.
— More time to find information in documents.
— More unlearning and learning when systems are changed.
— More demands on supervisors and managers.
— More things to do wrong.

Control

— The user must control the interaction.
    - Actions should result from explicit user requests.
    - Actions should be performed quickly.
    - Actions should be capable of interruption or termination.
    - The user should never be interrupted for errors.
— The context maintained must be from the perspective of the user.
— The means to achieve goals should be flexible and compatible with the user's skills, experiences, habits, and preferences.
— Avoid modes since they constrain the actions available to the user.
— Permit the user to customize aspects of the interface, while always providing a proper set of defaults.

Directness

— Provide direct ways to accomplish tasks.
    - Available alternatives should be visible.
    - The effect of actions on objects should be visible.

Efficiency

— Minimize eye and hand movements, and other control actions.
    - Transitions between various system controls should flow easily and freely.
    - Navigation paths should be as short as possible.
    - Eye movement through a screen should be obvious and sequential.
— Anticipate the user's wants and needs whenever possible.

Familiarity

— Employ familiar concepts and use a language that is familiar to the user.
— Keep the interface natural, mimicking the user's behavior patterns.
— Use real-world metaphors.

Flexibility

— A system must be sensitive to the differing needs of its users, enabling a level and type of performance based upon:
    - Each user's knowledge and skills.
    - Each user's experience.
    - Each user's personal preference.

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- Each user’s habits.
- The conditions at that moment.

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Forgiveness

- Tolerate and forgive common and unavoidable human errors.
- Prevent errors from occurring whenever possible.
- Protect against possible catastrophic errors.

Predictability

- The user should be able to anticipate the natural progression of each task.
  - Provide distinct and recognizable screen elements.
  - Provide cues to the result of an action to be performed.
- All expectations should be fulfilled uniformly and completely.
- When an error does occur, provide constructive messages.

Recovery

- A system should permit:
  - Commands or actions to be abolished or reversed.
  - Immediate return to a certain point if difficulties arise.
- Ensure that users never lose their work as a result of:
  - An error on their part.
  - Hardware, software, or communication problems.

Responsiveness

- The system must rapidly respond to the user's requests.
- Provide immediate acknowledgment for all user actions:
  - Visual.
  - Textual.
  - Auditory.

Simplicity

- Provide as simple an interface as possible.
- Five ways to provide simplicity:
  - Use progressive disclosure, hiding things until they are needed.
- Present common and necessary functions first.
- Prominently feature important functions.
- Hide more sophisticated and less frequently used functions.
  - Provide defaults.
  - Minimize screen alignment points.
  - Make common actions simple at the expense of uncommon actions being made harder.
  - Provide uniformity and consistency.

Transparency

- Permit the user to focus on the task or job, without concern for the mechanics of the interface.
  - Workings and reminders of workings inside the computer should be invisible to the user.

Trade-Offs

- Final design will be based on a series of trade-offs balancing often-conflicting design principles.

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— People's requirements always take precedence over technical requirements.

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