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Ambient description of software usability

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Outline

- Emerging need for usability
- Usability concept
- Usability attributes
- Usability models
- Usability research Agenda



Emerging Need for Usability

- The digital technologies have opened the large set of opportunities for new e-services.
- The oversupply of e-services products messages the sound need for usability research and development.
- The in-depth understanding of usability concepts and processes are critical for large scale acceptance of new e-services and knowledge productivity.

Emerging Need for Usability

- Usability is a key concept of human-computer interface and is concerned with making computer systems easy to learn and easy to use through a user-centered design process (*Preece et al., 1994*).
- Poorly designed software can be extremely annoying to users. Smith and Mayes state that „usability is now recognised as a vital determining factor in the success of any new computer system or computer-based service” (*Smith & Mayes, 1996*).

Usability Concept

- Usability is an important factor for all software quality models. It is the key factor in the development of successful interactive software applications. Usability is the most widely used concept in the software engineering field and defines the software system's demand and use (*Madan, et al., 2012*).
- Usability is central to ergonomics that tries to fit office technology to the needs of workers (and not the other way around). Ergonomics has become of great concern to many international organizations, including the International Organization for Standards (ISO) (*Nielsen, 1993*), (*Jirgensons, 2012*).

Usability Concept

- As early as 1991, ISO recognized the need for ergonomic regulation of computers that were increasingly becoming a part of office equipment. In the directive of the same year entitled Ergonomic requirements for office work with visual display terminals, ISO issued guidelines for human computer interactions (ISO, 1991), (*Jirgensons, 2012*).

Usability Concept

- ISO identified usability as the central concern of ergonomics and defined it as follows: “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use,” and the organization has expanded upon this definition in subsequent directives (ISO 9241-11, 1998) (*Jirgensons, 2012*).

Usability Attributes

- Usability can be specified and tested by means of a set of the **operational dimensions** or **attributes**.
- Usability attributes reviewed in the literature for software include:
 - ease of learning (*Guillemette, 1995; Lindgarrd, 1994; Nielsen, 1990; Reed, 1992; Shackel, 1991*);
 - ease of use (*Guillemette, 1995; Nielsen, 1990*);
 - easy to remember (*Nielsen, 1990*);
 - performance effectiveness (*Lindgaard, 1994; Reed, 1992; Shackel, 1991*);
 - few errors and system integrity (*Guillemette, 1995; Nielsen, 1990; Reed, 1992*);
 - flexibility (*Guillemette, 1995; Lindgaard, 1994; Shackel, 1991*);
 - user satisfaction (*Nielsen, 1993, Reed, 1992; Shackel, 1991*).

Usability Models

Model	Sub-Attributes		Definitions
Eason Model (1984)	Task	Frequency	Number of times a task is performed by a user.
		Openess	Extent to which a task is modifiable
	User	Knowledge	The knowledge that the user applies to the task. It may be appropriate or inappropriate.
		Motivation	How determined the user is to complete the task.
		Discretion	The user's ability to choose not to use some part of a system.
	System	Ease of learning	The effort required to understand and operate an unfamiliar system.
		Ease of use	The effort that is required to operate a system once it has been understood and mastered by the user.
		Task match	The extent to which information and functions that a system provides matches the needs of the user.

Usability Models (cont.)

Model	Sub-Attributes	Definitions
Shackel model (1991)	Effectiveness	It is described as system's performance is better than some required level, by some required percentage of the specified target range of users, within some required portion of the range of usage environments.
	Learnability	It is the training of users after some specific time from installation of the system. Also, includes user's re-learnability time for training and support systems.
	Flexibility	It is the positive changes or variations in the system to the existing ones.
	Attitude	It is the acceptance of users within their levels of discomfort, tiredness, frustration and personal effort.

Usability Models (cont.)

Model	Sub-Attributes	Definitions
Nielsen model (1993)	Learnability	The system should be easy to learn and understand. It should be easy for the user to get their job or task executed using the software system.
	Efficiency	Efficiency of the system is directly related to its productivity. The more efficient a system is its throughput is correspondingly high.
	Memorability	It is best suited for intermittent users. The user can return to the system's previous state without starting away from the beginning.
	Errors	The error rate in any system should be less. If any error is occurred, the system should be able to recover from it.
	Satisfaction	It is the pleasant feeling that user gets while or after using the system. It can be observed as likeability for the system and fulfillment of specified task.

Usability Models (cont.)

Model	Sub-Attributes	Definitions
ISO 9241-11 (1998)	Effectiveness	It is the performance measure of a system to complete a specified task or goal successfully within time.
	Efficiency	It is the successful completion of a task by a system. It relate to accuracy and completeness of the specified goal.
	Satisfaction	It is acceptability of a system by the users, in specified context of use.

Usability Models (cont.)

Model	Sub-Attributes	Definitions
ISO 9126 (2001)	Understandability	The capability of the software product to enable the user to understand whether the software is suitable, and how it can be used for particular tasks and conditions of use.
	Learnability	The capability of the software product to enable the user to learn its application.
	Operability	The capability of the software product to enable the user to operate and control it.
	Attractiveness	The capability of the software product to be attractive to the user.
	Usability compliance	The capability of the software product to adhere to standards, conventions, style guides, or regulations related to usability

Conclusions

- Usability concepts has been under focus over the years and has evolved with different definitions by researchers.
- Different attributes have been built for a clear view of usability and its aspects.
- Usability concepts are in line with technology development and with trends in knowledge society development.

Conclusions (cont.)

- Usability seems to become critical for success of e-services deployment.
- There is emerging need for specific usability measurement approaches in different type of e-services.
- There is necessity for setting the research agenda for future work.

Thank You for attention

