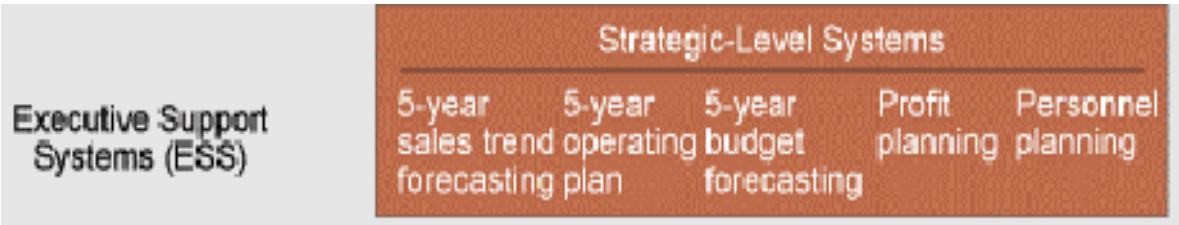
Chapter 11: Executive Information System

Executive Information Systems are graphics-oriented systems designed for senior management at that provide generalized computing and telecommunication facilities for monitoring and controlling a business. Executive Information Support system software and communication package integrates virtually all of information sources into a cohesive network.

- Strategic level
  - Inputs: aggregate data
  - Processing: interactive
  - Outputs: projections
  - Users: senior managers
- Examples:



How EIS helps executives?
EIS helps executives to tackle and address strategic issues and long term trends, both in the firm and in the external environment. Their principal concern is matching changes in the external environment with existing organizational capability. E.g. what will employment level be in 5 years? What are the long-term industry cost trends, and where does our firm fits in? What products should we be making in five years?

1. EIS combines information from all activities of the firms including manufacturing, customer services, finance, human resources, inventory control, cash flow etc. and present it to executives. Without the EIS the top-level managers would receive all of their information from the functional subsystems, and these executives would have to distill and synthesize the data into a form that would be meaningful to them.

2. EIS helps executives make unstructured and semi-structured decisions. They focus on information needs of executive and combine both internal and external data.

3. EIS helps executives monitor the activities of the organizations, and allow them to push the decision making further down in the organization while expanding the executive's span of control.

4. EIS helps executives to analyze the problems quickly and make more time available for creative analysis.

In order to make EIS effective, it must take into consideration:
- Organization's goals, strategies, long-term plans and objectives.
- Organizational structure
- Staffing and labor relations.
- Crisis management
- Strategic control and monitoring.

Qualities of an EIS
- Capability to look over the situation in your company "in half an hour"
- Punctual taking steps in eventual deviation from planning activities.
- Reduced and merged data, interesting for an executive

- Ability to communicate with employees by local email
- It doesn't require any keyboard skills from user, executive can use just mouse
- Graphical presentation of data
- Many kind of printed reports and reviews created from different criteria
- Very adaptable in concrete user environment and satisfaction of his demands.

Components of an EIS
Examining the components of an EIS is dependent upon the definition used. Opinions differ on how much peripheral support, as opposed to amalgamated information should be provided.

Watson (1991): EIS does not include electronic communication (email, word processing etc) and organizing tools (calculator, calendar etc.) EIS should be limited to providing information.

Rockart&de Long (1988): EIS should have the capabilities of Communication, Status Access, Query&Analysis.

Executive Cognitive
In order to design an EIS that effectively support decision making process of executives, developers have to understand how executives make decisions. There are four decision making styles:

- Systematic: decision making based on hard data, logic e.g. cost-benefit analysis.
- Speculative: decision making based on speculation of future possibility with decision trees and sensitivity analysis. e.g. "what-if" analysis
- Judicial: decision making based on quantitative information in conjunction with feed back from decision making groups.
- Heuristic: decision making based on current possibility and mutual adjustment.

Psychological Profiling
Psychological profiling is a method to store and analyzed psychological characteristics of a group of people. It's often done by the means of structured interviews. The profiles are currently used extensively in organizations for providing management with information about the future potential of employees.

There seems to be a role for psychological profiling of executive as a first step in the design of an EIS. This technique is appropriate to the analyzing executives' requirements for EIS.

The psychological basis of EIS
An EIS itself does not have a clear cut goal as do most conventional computer based information systems. It is rather a tool which has the flexibility to be used as a source of information when needed. On other hand, executives are very goal oriented in their work on a specific task and rely on sets of intuitive procedures which are known to have worked previously.

Goals partially determine and structure activities. Goals and objects of activities undertaken by executives vary and cannot be anticipated when EIS is being developed. The relationship of goals, objects and activities, as found in Activity Theory, provides a framework on which new development methodologies can be created for the building of flexible EIS where the goals of the user can be determined as the system is used.

Conclusion
EIS is used as a flexible and exploratory tool by the executive to identify problem areas and windows of opportunity thus transforming the very activity it was designed to assist. The EIS must be flexible enough to adapt to these changing requirements and to evolve along with the executive if it is to take its place as a useful tool in a long line of other artifacts adopted by human EIS over the centuries.

Future EIS trends

- EIS use in large firms will become commonplace: small and medium size used prewritten software, large use custom systems.
- Need for lower priced special EIS software: more supplier in the market
- Tomorrow's MIS and DSS will look like today's EIS.
- Executives will keep the computer in perspective: computer is not the most important information source, but meet some of their information needs.

How executives have built their EIS on fundamental management concepts:

Critical success factors

Monitor how well the firm is doing in terms of its objective and critical success factors

Management by exception

Comparing budgeted performance with actual performance. EIS can automatically identify the exceptions and call them to the executive's attention.

Mental models

The primary role of the EIS is to synthesize or distill a large volume of data and information to increase its utility.

Information needs if executives

Mintzberg study: How CEO spent their time (70's)

Desk work (22%), telephone calls (6%), unscheduled meetings (10%), scheduled meetings (59%), and tours (3%)

It is more important for the manager to get his information quickly and efficiently rather than to get it formally.

Jones and McLeon Study (5 executives)

- Most of the executives' information came from environmental sources, by the internal information was valued higher.
- Most of the executives' information came in a written form, but the oral information was valued higher.
- The executives received very little information directly from the computer

Psychological profiling

The use of psychological profiling for employment purposes started as early as the 1960s and became increasingly popular in the 1970s. Until recently, psychological profiling systems were used primarily for executive searches but today, more organisations are turning to such tools to help them recruit employees at various levels. The key objective of such profiling is to predict the candidate's likely fit into the job and the workplace.

Organisations use these instruments to understand, among other things, your interpersonal behaviour (how you communicate and interact with colleagues/bosses/subordinates), your reasoning patterns and problem-solving skills, your leadership style, your values and key motivators. Recruiters use the profiling results to support rather than replace decision-making. Obviously, other factors like your work experience and qualifications, and how you present yourself at the interview, are all taken into consideration as well.

There are various reasons why some companies choose not to use such systems. It could be due to cost constraints or the lack of expertise in administering such tests. Some companies may choose to use psychological profiling only for specific groups of candidates and not others.

Regardless of the tests that you are asked to go through, I would advise you to be honest with your responses, as the systems can detect inconsistencies that could ultimately work against you.

Activity theory

If we want to understand what a person does, we first have to know in which context that person is. Now that I say that comes to my mind a technic that is very often used by film makers, they start the film with a scene that does not have any meaning for the public, it just fills them of question and curiosity. What film makers are doing is just capturing the public's attention. The development the film then explaining the global context, in which the first action was done. This is a very simple example to prove how important it is to understand the context that any action takes place. If we can understand the context that means that we could have an idea of that which actions can be performed and in which sequence. In the field of HCI to know this context is very important and to get a description of that context is always hard to find because attempting to have a good description of that context we could include a lot of information that is not relevant for the design of an interface also we could very easily no recognize a situation that could be very important and that could change the context if we do not give to this situation the value that it can have. The combination of psychology, ergonomics, and computer technology has generated an area of interdisciplinary knowledge known as 'Human-Computer Interaction' (HCI). There are guidelines to assist designers, who no longer have to rely on guesswork or personal experience and expertise to decide between possibilities.

Activity Theory
Activity theory originated in the former Soviet union as part of the cultural-historical school of psychology founded by Vygotskij, Leontjev and Lurija. The theory is a philosophical framework for studying different forms of human praxis as developmental processes, with both the individual and the social level interlinked.
In activity theory the unit of analysis is an activity that is being composed of subject, object, actions, and operation. A subject is a person or a group engaged in an activity. An object is help by the subject and motivates activity. 'Behind the object there always stands a need or a desire, to which [the activity] always answer.'

Nardi points out that the use of Activity theory framework implies
1. A research time frame long enough to understand users' objects
2. Attention to broad patterns of activity
3. The use of a varied set of data collected techniques
4. A commitment to understanding things from users' points of view.

Martin Ryder
In its simplest terms, an *activity* is defined as the engagement of a subject toward a certain goal or objective. In nature, an activity is typically unmediated. Picking a berry from a bush and eating it is a simple, unmediated activity that involves direct action between the subject and object. In most human contexts our activities are mediated through the use of culturally established instruments, including language, artifacts, and established procedures. Picking mushrooms in the forest and eating them is an activity that is ill-advised without some form of mediation. Our subject would prudently appropriate some prior knowledge - a field guide, prior education in mycology, the direct advice of an experienced mushroom forager, or some other embodiment of human experience with mushrooms. Some means is necessary to bring the prior experience of history into the current activity. Animals have only one world, the world of direct objects and situations, mediated only through instinct. Humans have the vicarious worlds of other humans that they can invoke into the present through the use of language and artifacts. (Luria, 1981)
An activity is undertaken by a human agent (subject) who is motivated toward the solution of a problem or purpose (object), and mediated by tools (artifacts) in collaboration with others (community). The structure of the activity is constrained by cultural factors including conventions (rules) and social strata (division of labor) within the context.
Engeström calls attention to the mediational role of the community and that of social structures including the division of labor and established procedures. In our mushroom example, a more knowledgeable forager could serve in the capacity as foreman, dictating which mushrooms to pick and which to leave alone. More likely, the expert would serve in the capacity as a tutor or

coach, explaining the criteria she uses to discriminate between the edible mushrooms and the poisonous. Or the necessary knowledge could come in the form of a structured set of rules which clearly specify the detailed procedures that must be followed in the selection of edible mushrooms. It is concievable to make use of some exotic instrument which can sample a piece of the mushroom and perform necessary chemical analyses to detect poisonous substances. The knowledge which is necessary in an activity system can emerge in any one or a combination of instruments, artifacts and mediational roles.

Practical exercise: Capturing the context of HCI with the Activity Checklist
During the practical exercise participants will be introduced to the Activity Checklist based on the principles of Activity Theory. The Checklist is a conceptual tool for identifying the most important factors influencing the use of computer technologies in a particular setting. By applying the Checklist to a series of examples, participants will get a hands-on experience of using Activity Theory as a framework for design and interpretation of studies of human computer interaction. The exercise will be organized into five phases:

1. In the first phase participants will be provided with some observational data which they will be asked to analyze, i.e., to indicate potential problems, formulate requests for further analysis, and provide some suggestions on how the problem can be solved.
2. In the second phase the Activity Checklist will be introduced. The general structure of the Checklist corresponds to the four main perspectives on the use of the technology to be evaluated:
    1. **focus on the structure of the user's activities** -- the extent to which the technology facilitates and constrains attaining the user's goals and the impact of the technology on provoking or resolving conflicts between different goals;
    2. **focus on the structure of environment** -- integration of target technology with requirements, tools, resources, and social norms of the environment;
    3. **focus on the structure and dynamics of interaction** -- internal vs. external components of activity and support of their mutual transformations with the target technology;
    4. **focus on development** -- developmental transformation of the above components as a whole.
3. In the third phase we will explain to participants how to use the Checklist. Two issues will be discussed:
    1. adjusting the Checklist to specific purposes of an analysis, and
    2. selecting an appropriate methodology for conducting empirical research.
4. In the next phase another set of observational data will be provided. Participants will apply the Activity Checklist to the data and come up with interpretations, working individually or in small groups.
5. The final phase of the exercise will be organized as a full group discussion.

In both cases, Activity Theory takes a different position. **First, the object-orientedness of Activity Theory determines a fundamental redefinition of what must be the object of research: it states that it is not fruitful to study "interfaces" as isolated entities, but they have to be embedded in purposeful actions, where both the object of those actions, the purpose of them, and the larger context in which they are taking place are significant.**