COMPUTER AIDED FORMATION AND SELECTION FOR THE INDUSTRY FORMERS

by
Eduard Edelhauser

Abstract. The issue of formation and selection of personnel for the formers in industry is very current no matter on the restructuring policy in this activity area, mainly for this important activity presented in this application. The information systems category which allow a better computer aided formation and selection for the formers are the expert systems (ES) and decision support systems (DSS).

1. Decision support systems and expert systems

The decision quality depends very much on the circumstantial understanding that surrounds one problem and selection of the appropriate strategy. The better the information the better the decision outcome, because there is lesser hazard and lack of security. If it's new, the advanced information technology has to help to making managerial decisions and the organizations must elaborate the plans using this technology.

The decisional support systems are critical in making decisions under all managerial aspects.

The composition of an expert system or a decision support system

The composition of an expert system can be structured on three specific models:

- Knowledge base
- Inferential mechanism
- Facts base

Knowledge base is represented by a structure of data that contain all the specific knowledge introduced into the system by the human expert. Stocked knowledge in the knowledge base represents the objects description in conjunction with the relation between them. Knowledge base is a part of the cognitive systems of the expert systems and it is memorized in a space specially organized.

The inferential mechanism achieves many major objectives after the knowledge from the base has been taken over This means to choose the control strategy according to the problem to be solved, the achievement of the solving problem plan, the shifting from one control strategy to another, the carrying out of the foreseen actions in the solving plan, and the structuring of the information control for fundamental mechanisms of the inference mechanism. The inferential mechanism consists of an ensemble of procedures.

Facts base is represented by an auxiliary memory which contains al facts (initial facts that describe the problem enunciation) and the intermediate results obtained in the deduction procedure .

Cognition representation in the designed expert system

The representation through production networks is the most used way for representation in expert systems. The method relies on the separation of the ordinary calculation components for their easier use.

A production system consists of a database and a package of rules. A rule condition can be seen as a database which returns a success or an error indicator . The conclusion of a rule is an action that manipulate the database and more than that, a control that determines the rule sequence used. The database contains words built-up with symbols from V (limited package of symbols named total alphabet). Therefore a production system R can be considered a duplicate.

$$R=(D, P)$$

where D – database;

P – limited rules package.

The database is set up of a package of terms, and a rule has the general form

$$If\ c\ then\ t$$

where c – condition consisting of several terms,

t – action built for one term.

2. The analysis of the selection and formation subsystem

We have analyzed the human resources management problem, in the selection and formation area, and we considered that DSS or ES is the most available for the level 1, 2 or 3 managers.

One of the main responsibilities of a manager is the formation and training of the personnel he is in charge with. To this purpose the manager has

a shift with the necessary skills, which he can use as a resource to fulfill his obligations, towards his employees.

Firms have established as a personnel formation strategy the organization of a internal formation department, large enough to meet the formation needs of the firm, which involves certain selection and formation activities, related to formers.

The skills of the formers include the knowledge of learning methods and stiles as well as of teaching methods and stiles and of the techniques related to the presentation of learning objective and the design of formation activities. It is also necessary to have skills in the field of determining adequate learning programs, designing the formation programs and sessions, the knowing the training and teaching techniques as well as of the methods of use of the formative aids.

Former need several fundamental skills meant to allow them to put into practice the required abilities. These fields can be summarized as it follows.

Knowledge	Skill
Learning style	**Job design**
Learning barriers	**Formation needs identification**
Fundamental formation methods	**Course design**
Ways of producing knowledge	**Formation session designs**
Formation types and available learning tools	**The use of audio visual aids**
Job design methods and formatting methods	**Presentation and control of formation sessions**
Formation events design	**Discussion supervision**
Fundamental methods of formation validation	**Preparation of had-outs for formation sessions**

Table 1. Skills and knowledge necessary for formers

As a result of these skills I have designed a package of seven criteria necessary to the formers selection.

Occupational education
Managerial experience and labour protection experience
Former required training
Occupational selection
Medical record

Psychological selection

Table 2. Selection criteria

Criteria / Occupation		241207
C1	**Occupational education**	FOREMAN ASSISTANT ENGINEER ENGINEER
C2	**Managerial experience and labour protection experience**	3 YEARS
C3	**Former required training**	AUTHORIZED INSTITUTION
C4	**Occupational selection**	THE TESTING OF KNOWLEDGE ACQUIRED IN FORMATION COURSES
C5	**Medical record**	ACCORDING TO MEDICAL RECORD
C6	**Psychological selection**	ACCORDING TO THE PSYCHOLOGICAL PROFESSIONAL DIAGRAM

Table 3. The content of the selection criteria

The C1 - C5 criteria are very well known for the firm, but the last criteria is studied in detail, the psychological aptitude has been separated on 9 criteria, each one being detailed through three importance degrees:

- Desirable
- Important
- Very important

These 3 degrees became 4 grades further:

Table 4. Grades for the skills importance degrees

CRITERIA	MINIMAL GRADE FOR FORMERS
OCCUPATIONAL EDUCATION	FOREMAN
MANAGERIAL EXPERIENCE	THREE YEARS
TRAINING	DONE
OCCUPATIONAL SELECTION	DONE
MEDICAL RECORD	OK
ANALYTICAL REASONING	VERY GOOD
ANALOGICAL TRANSFER	GOOD
CONCENTRATION	VERY GOOD
WORKING MEMORY	GOOD
VOCABULARY	GOOD
READING COMPREHENSION	VERY GOOD
MATHEMATICAL REASONING	MEDIUM
DECISION	GOOD
CLERK ABILITY	MEDIUM

Table 5. Minimal condition for the former evaluation criteria

3. The application design

Knowledge base design

In the beginning, I have started from the premise of creating an expert system to represent knowledge through a production system, consisting of facts, rules and an inference mechanism using a backward control strategy. The application data haven't been structured in a database, but grouped as facts connected to each subject.

OCCUPATIONAL EDUCATION	**ENGINEER**
MANAGERIAL EXPERIENCE	**FIVE YEAR**
TRAINING	**DONE**
OCCUPATIONAL SELECTION	**DONE**
MEDICAL RECORD	**OK**

ANALYTICAL REASONING	**VERY GOOD**
ANALOGICAL TRANSFER	**GOOD**
CONCENTRATION	**VERY GOOD**
WORKING MEMORY	**VERY GOOD**
VOCABULARY	**VERY GOOD**
READING COMPREHENSION	**VERY GOOD**
MATHEMATICAL REASONING	**GOOD**
DECISION	**GOOD**
CLERK ABILITY	**MEDIUM**

Table 5 – Knowledge base facts according with the former match.

There are 56 rules for this expert system and they have been listed, two of them being explained in detail.

Rule 49 : If

ANALYTICAL REASONING	**yes**
ANALOGICAL TRANSFER	**yes**
CONCENTRATION	**yes**
WORKING MEMORY	**yes**
VOCABULARY	**yes**
READING COMPREHENSION	**yes**
MATHEMATICAL REASONING	**yes**
DECISION	**yes**
CLERK ABILITY	**yes**
Then	
PSYCHO APTITUDE	**yes**

Rule 55 : If

OCCUPATIONAL EDUCATION	**yes**
MANAGERIAL EXPERIENCE	**yes**
TRAINING	**yes**

OCCUPATIONAL SELECTION **yes**

MEDICAL RECORD **yes**

PSYCHO APTITUDE **yes**

Then

FORMER MATCH **yes**

The design of the inference mechanism

I have chosen as a development medium for the expert system a language destined to Windows Visual C++ applications. The application works in two stages:

- Building the facts – fact file
- Running of the expert system for the given facts and getting to the matching:

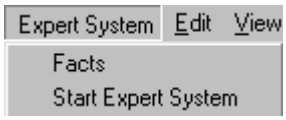

Figure 1 – The main menu of the application written in Visual C.

On selecting the Start System expert option one can get a result such as

Correspondence=Former

The application menus have been thought as grouped dialogues round the dialogue facts, over which I have applied other three menus connected with the six criteria for the selection of the industry formers.

The Microsoft Foundation Classes (MFC) application classes used

From the point of view of the used software (C++), the application has been set up on the link between the two fundamental MFC classes : the Doc class (Date-CsistExp Doc) and theView class (taking over and display data-CsistExp View). The two classes implement the Document-View architecture, used in most of applications as application classes.

Through the Class View any class, function, or variable can be accessed from the project. This class achieves the connection between the main menu and the dialogue type resources. Among the Doc class objects connected to the expert system we can find the methods and the variables.

Another MFC class used is the Dialogue class, which contains all the dialogue boxes and the controls. It have been connected round the fact, taking-over dialogues for the fact categories.

4. Conclusions

The designed and achieved applications package can be implemented almost totally in any firm. The application analysis for the information systems from the human resources management requires:

- The formation and selection criteria structured for the formers
- The package of rules designed for the formers

The information implementation of this system analysis has been made through DSS relying on the following components:

- Elaboration of a full-package rules file structured based on taking over rules from the human experts
- The design of an inferential engine optimized in Visual C ++ language.

To use the application in formation and selection it is necessary that on the computer where the application runs there should exist a Windows operating system. The application has been designed in Visual Studio-Visual C++, consisting of a command file, two text files (facts and rules), one results file, and five DLL Visual C specific files that have to be updated on the host computer.

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Author:
Eduard Edelhauser – University of Petroşani, Romania, E-mail address: edi1ro2001@yahoo.com