USE OF INFORMATION TECHNOLOGIES IN TRAINING EXPERTS FOR LATVIAN NATIONAL ECONOMY

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ABSTRACT

In order to meet the goals laid down in the national economic policy, the new labour market requires an education and policy that would ensure optimal utilization of human resources, thus creating a productive base for the country’s economic growth. The system of studies at Riga Technical University is developed so that it could train specialists required by the Latvian national economy, which would be capable and competent to understand the goals of solving existing problems, as well as would be able to professionally participate in the management and development of implementation of projects dealing with solution of problems.

The research focuses on the possibility of using up-to-date information technologies in organization and implementation of projects.

One of management control instruments of business performance of enterprises is evaluation of its effectiveness. Traditional methods of evaluation of effectiveness of business performance of enterprises in fact are already outdated and are not at all oriented to the future. The authors suggest the use of up-to-date methods, including simulation modelling.

The professional bachelor programme provided by the Chair of Economy of Production and Entrepreneurship of the Faculty of Engineering Economics of Riga Technical University is aimed at training specialists for the economy of the Republic of Latvia.

The goal set by the professional bachelor programme is to train economists competent:
- to perform economy-related work assignments;
- to analyse performance results both at the microeconomic and macroeconomic level;
- to identify the problem;
- to make forecasts with regard to most optimum methods of attaining the targets set;
- to plan and implement the planned targets.

The graduates of professional studies are equipped with relevant knowledge in microeconomics, macroeconomics, economic forecasting, economic analysis and planning, economics of entrepreneurship, finances, accounting, marketing, information technologies, management sciences, quality management, methodology of doing research, as well as are offered a possibility to master the required command of foreign languages to be used in daily business-related professional environment.

The graduates should have practical working skills, which are acquired during studies, as well as should be able to apply the knowledge gained during practical placement when elaborating academic papers, projects, and the diploma project.

The graduates have to be capable of understanding the goal, when addressing the problem, and have to professionally participate in the elaboration and management of implementation of the project.

The number of graduates of the professional RTU FEE CEPE bachelor programme “Entrepreneurship and management” (for the period from 2003 – 2005) is presented in fig. 1.

![Figure 1. Number of graduates of the RTU FEE CEPE professional bachelor programme “Entrepreneurship and management”](image-url)
The statistics presented in fig. 1 show an annual growth trend in the number of professional bachelors trained within the framework of the programme. In 2005, 165 professional bachelors graduated the programme.

The themes of the diploma papers cover a wide scope of business areas, including optimisation of production costs, evaluation of performance results of enterprises, the system of business risks, new technologies and economic effectiveness aspects of technology, insurance development prospects, ecology issues etc.

All diploma papers have addressed topical problems, contain novelty elements and are of practical relevance.

The areas most extensively investigated in the diploma projects are:
- improvement of planning of production enterprises;
- enhancement of competitiveness of enterprises;
- projects of reduction of costs of production enterprises;
- enhancement of effectiveness of the performance of enterprises.

The number of defended engineering and diploma projects is presented in table 1.

<table>
<thead>
<tr>
<th>Specialities</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics and modelling in entrepreneurship</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Economics of entrepreneurship</td>
<td>19</td>
<td>11</td>
<td>114</td>
<td>143</td>
</tr>
<tr>
<td>Financial analysis</td>
<td>9</td>
<td>12</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Marketing and trade</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics, accounting and taxation</td>
<td>24</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing and economics of trade</td>
<td></td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>118</td>
<td>126</td>
<td>165</td>
</tr>
</tbody>
</table>

Figure 2. Research methods investigating economic objects and systems, and the scheme
Fig. 2 presents the research methods applied in research of economic objects and systems, and the scheme of selection of methods.

The focus on these problems is explained by the fact that, presently, each enterprise faces different conditions, which affect the decision-making process, therefore these are relevant factors that must be taken into account.

A problem is known to be an issue requiring for a solution. Therefore, classification of problems is frequently based on the principles of classification of solutions, according to which problems are divided into groups considering:

- the degree of complexity;
- level of application;
- level of management.

According to the level of complexity, problems may be subdivided into three subgroups:

- general problems;
- specific problems;
- local problems.

General problems are dealt with in completed projects and their results, e.g., a report on the research work, production development project, business plan, sets of operational planning documentation etc., projects and sets of project documentation.

Specific problems are part of general problems. This subgroup of problems includes specific production, technological, organizational and other tasks, which are dealt within the course of production process (i.e., selection of machinery and tools to be used, selection of materials and parts, selection of parameters of a technological process and other tasks).

Local problems consist of several specific problems. Due to this, local problems should not necessarily be completed. The results obtained when dealing with local problems help to resolve general problems.

When considering the possibilities of resolving specific economic problems, it is necessary to take into account the fact that these problems are inseparably connected with a definite economic system or process. Therefore, the solution of a particular problem should commence with the investigation of the particular economic system or process the specific problem is connected with.

The process of modelling economic systems is presented in figure 3.

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**Figure 3. General scheme of modelling processes of economic systems.**

- Model of economic system
- Modelling
- Modelling results
- Analysis
- Examination of suitability of modelling results
- yes
- no
- Formal world
- Real world
- Utilisation of modelling results
Most frequently the objects (systems) investigated in diploma projects present complex economic systems which are impossible to accurately represent in the form of analytical models, or it is simply not profitable to do from financial considerations.

In such cases simulation modelling is used, as a result of which the changes of specific parameters (characteristics) of the object, which is being investigated, are simulated.

The purpose of simulation modelling is to create an environment or a model that would allow, by means of experimenting, to obtain necessary information about the investigated object, based on the investigation of the model or environment created.

The basic idea of simulation modelling is creation of a mock-up of the object or system being investigated, i.e. creation of the so-called “simulation”, which reflects the basic characteristics of the object and/or the system under investigation as well as the regularities in the changes of these parameters in space and time.

Simulation modelling envisages the use of quantitative (numerical) parameters, thus all parameters, as well as interaction of parameters have to be expressed numerically.

Generally, the model in this stage may look as a “black box” (see fig. 4).

The necessity to use simulation modelling arises in cases when direct experiments with the object under investigation are not possible, due to their complexity or inaccessibility, or in the cases when direct experiments with the object of investigation are not justified due to their high costs.

Application of information technologies in the research of economic systems is demonstrated in fig. 5.

In order to enhance the effectiveness of operation of any economic system it is necessary:

- to study and disclose the regularities of functioning of the process (system) being investigated;
- to mathematically describe the regularities of functioning of the respective process (system) in time;
- to model, based on the regularities disclosed, the process being investigated;
- to analyse the results of modelling and benchmark them against the corresponding parameters of the real process (system);
- based on the regularities disclosed, to elaborate recommendations aimed at enhancement of the effectiveness of the operation of the process (system) being investigated.

The process of formalisation of input parameters is reflected in fig. 6.
Decision-making is the process of selection of one or several possible alternatives. Decision is the result of the decision-making process hereinafter referred to as the decision-making process.

All types of economic decisions may be subdivided into the following two groups:
- programmed decisions;
- non-programmed decisions.

If some specific problem is recurrent (i.e., occurs frequently), managers usually resolve it by applying a routine scenario. Decisions taken in such a way are considered to be programmed decisions. Such decisions do not require big time expenditure and efforts, since they are connected with the use of already established rules and programmes.

If a particular case has characteristics, which have not been encountered in resolving previous problems, a specific approach is needed. Such decisions are defined as non-programmed decisions and they are taken when resolving new non-standard problems. Figure 7 presents the process of making programmed and non-programmed decisions.

Decision alternative means establishment of one single option of operation, but a decision alternative very often can consist of a simultaneous establishment of several operation parameters. In connection with mathematically defined decision models, decision alternatives are all possible operation alternatives, including also the ones that are impossible to implement at all; exclusion of such alternatives is made by means of additional conditions.

An increase of the amount of information does not yet mean enhancement of the effectiveness of the decision. Therefore, in the decision-making process it is very important to differentiate between relevant and useless or irrelevant information.

The output data must be registered, by selecting the data that do not relate to the specific problem, leaving only the data necessary to be used in the decision-making process. In addition, the neces-
Use of information technologies in training experts for Latvian ... 39

Fig. 8. Data selection in the decision-making process.

Fig. 9. Evaluation of alternatives in the decision-making process.

sary information directly refers to the specific problem, person, goal, and time period (fig. 8).

Fig. 9 shows the algorithm for evaluation of problem alternatives.

The use of up-to-date information technologies in the educational process will contribute to the enhancement of the quality of specialists trained, as well as to the improvement and optimisation of the process of resolving problems.

References