The applied software role in the training of economic specialties students

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Abstract. The article discusses the advantages of training specialists in economics using specialized software products. The use of the computer programs in the learning process makes it possible to prepare students for solving a variety of practical problems encountered in real economic work, including in production. When using information systems as part of the professional competencies formation, the following goals are pursued: development of the student's creative individuality; evolution of abstract and algorithmic thinking; analytical skills amplification through training in conceptual data analysis. In some cases, obtaining practical skills is facilitated by the use of specialized software products, including the Project Expert program. The computer program Project Expert is an IT-product designed for simulation of processes occurring in economic systems with an investment component. The main tasks implemented in the program include: determining the effectiveness of investments, forming and structuring projects, conducting empirical experiments to determine the stability of the developed model. Such the software package wide capabilities allow using the whole range of professional orientation situational tasks at various stages of training students-economists. Based on the experience of using the Project Expert software product in training economists at the Samara State Agrarian University, several levels of its application can be distinguished: from practical lessons to graduate qualifying work (dissertation). The IT-technologies use allows the graduate to carry out practical tasks that the employer puts before him in a quality manner and in the shortest possible time. Knowledge of an applied programs wide range provides a universal character of training future specialists in comparison with traditional approaches.
1. Introduction

Education plays an important role in the person adaptation process to social life, the ability to be responsible for decision-making, the ability to adapt to globalization and the volatility of modern conditions, the desire to improve their professional activities and develop their personality throughout life [1-5].

The education humanization is due to modern problems of teaching practice and is aimed at the socially mature person formation. At the same time, a person is placed in the educational process center, which is formed from the process of teaching and upbringing. A person, in the learning process, is given knowledge about society, culture, contributing to the comprehensive development of personality and individuality [6-11]. Thus, the educational relations humanization should become an important factor in the students’ formation. They are able to adapt to external circumstances and to defend their beliefs, be independent in judgment and offer new ideas [12-14].

The formation of professional competencies in the framework of training specialists during the period of processes digitalization active implementation in the Russian agro-industrial complex should combine the traditional approach in teaching students, which has proven itself well within the Soviet education system framework, and modern teaching methods that widely use the opportunities provided by economic information systems [15-18].

![Figure 1. Solving applied economic problems.](image)

To use information systems in the professional competencies formation, the following goals are pursued: development of the student's creative individuality; evolution of abstract and algorithmic thinking; analytical skills amplification through training in conceptual data analysis (figure 1). [19-22]

This approach provides a comprehensive nature of training students for solving economic problems facing specialists.

When these goals are achieved in the process of training students, as a result, we get a specialist who is familiar with the structure and volume of economic information necessary to solve a particular
problem, the sources of its receipt, who is armed with knowledge of methods for solving the most common economic problems and the ability to offer his own methodology for the emergence of new, not previously encountered problems [23–26].

The agricultural economist training requires specific approaches. In addition to knowledge of the theoretical foundations, the student during the preparation must also acquire practical skills in making managerial decisions, forming packages of documents, and making calculations.

In some cases, the acquisition of practical skills is facilitated by the use of specialized software products, including Project Expert software. The computer program Project Expert is an IT-product designed for processes simulation occurring in economic systems with an investment component. The main tasks implemented in the program include: determining the effectiveness of investments, forming and structuring projects, conducting empirical experiments to determine the stability of the developed model [27–31]. Such wide capabilities of the software package allow using the whole range of professional orientation situational tasks at various stages of training students-economists.

2. Methods and materials
Currently, there is a classification of software that can be used to train students. Within this classification, all programs are subdivided according to the functions performed.

- Programs for drawing up network diagrams (MS Project, Spider Project);
- marketing programs: universal (SPSS, Statistika, MS Excel); specialized (Kasatka, BEST-Marketing);
- programs for investment planning (Project Expert, Alt-Invest, COMFAR, Prime Project);
- programs for calculating the production cost (BEST Plan, programs for calculating technological maps);
- financial analysis programs (Audit Expert);
- enterprise management systems (BEST Pro, 1C).

To combine the theoretical and practical approach in teaching students of economic specialties related to direct production, software products designed for the investment projects development are best suited. They combine almost all of the above functions. Unlike enterprise management systems, they allow you to solve the set economic problems using simple and intuitive algorithms.

In modern conditions, the most common programs for the investment projects development are Project Expert and Alt-Invest.

3. Results and discussion
Based on the experience of using the Project Expert software product when training economists at the Samara State Agrarian University, several levels of its application can be distinguished:

- practical lessons;
- term paper;
- graduation examination;
- graduate qualification work (dissertation) [32–34].

In practical lessons, students develop the making management decisions skills, choosing the best options, planning the enterprise activities, preparing documentation and organizing investment projects, generating documentation when working with commercial banks, etc. [35–37] The main condition for high-quality work of students and fixing knowledge and skills full immersion in the situation, activation of the student's initiative, preparation of the situational task initial parameters, taking into account the peculiarities of the modeled industry, enterprise, the nature of the example.

At the level of making term paper, the student in the form of an individual work must consolidate the material received in practical lessons. An independent choice of calculation parameters (the base
enterprise, a set of products, the nature and content of measures to increase economic efficiency), the initial information preparation, the problem final formulation, a practical and feasible solution to the task - all this is fully implemented taking into account all the real features of the situation about the student's readiness for practical activity in the work course as an employee of the enterprise planning and economic service [38-40].

The Project Expert program use as a part of the graduation examination was tested in the course of training students in the specialty 080502 "Economics and management at an agro-industrial complex". When preparing the graduation examination practical part, the task was set to draw up an applied task, which includes most of the specialization disciplines elements. In the course of the solution, the students, on the basis of the proposed initial data, proposes a strategy for the enterprise development. Within the strategy framework an investment project was implemented, the parameters and effectiveness of which had to be calculated. The result of this approach was not only a demonstration of the knowledge amount gained during training [8, 13], but also the professional and psychological readiness of graduates to solve non-standard situations within their competencies in a limited time.

An example of a complex task for the graduation examination in the specialty 080502 "Economics and management at the agro-industrial complex".

Based on the data, it is necessary to choose one of the proposed strategies, calculate its effectiveness using the Project Expert program and draw a conclusion based on the calculations.

The enterprise manufactures the following type of product (table 1). Determine the chosen direction development strategy for a period of 5 years, determine the financing scheme, and draw a conclusion.

**Table 1. Initial data for determining the development strategy of the enterprise.**

| Production | Market growth rate,% | Sales volume, million rubles | Largest competitor enterprise | Largest competitor sales volume, million rubles |
|------------|----------------------|------------------------------|-----------------------------|-----------------------------------------------|
| Pork       | 18.0                 | 180.10                       | «SV-Volga region»          | 321.2                                        |

It is proposed to build a pig farm for 100,000 goals fattening pigs per year. It must be commissioning on 1.08.2017. The capital investments cost associated with this project is 148 million rubles (table 2, table 3).

**Table 2. Construction and installation works.**

| Date       | 1.04.2016 | 1.06.2016 | 1.08.2016 | 1.09.2016 | 1.03.2017 | 1.07.2017 |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Amount, million rubles | 30.0      | 30.0      | 15.0      | 1.0       | 12.0      | 25.0      |

Young animals 6 months age 7 thousand rubles/head purchased according to the scheme (table 3)

**Table 3. Purchase of young animals.**

| Date       | 1.03.2017 | 1.04.2017 | 1.05.2017 | 1.06.2017 | 1.07.2017 |
|------------|-----------|-----------|-----------|-----------|-----------|
| Quantity, head | 1000      | 1000      | 1000      | 1000      | 1000      |

After the first production cycle completion the products sale begins (table 4).

**Table 4. Sales of products (starts from 01.10.2017).**

| Production | Selling price, RUB/kg | Sales volume, tons/month |
|------------|-----------------------|--------------------------|
| Pork       | 35.0                  | 1000.0                   |

When manufacturing products at the enterprise the monthly production costs following level is noted (table 5).
Table 5. Production costs.

| Expenditures | Quantity   | Costs, rubles/month |
|--------------|------------|---------------------|
| Wage         | 230 people | 8000 rubles/person   |
| Feed         | -          | 16 425 000          |
| Energy       | -          | 1 800 500           |
| Overheads    | -          | 3 550 000           |
| Other        | -          | 2 109 000           |

Costs begin when the production phase starts.

Lending parameters: duration 5 years, rate including subsidies - 2.5%, the first payment deferral - 2.5 years.

Tax scheme: value-added tax (VAT) –18%, unified social tax (UST) - 20.3%.

The solution to the complex problem is to determine the strategy for the development of the enterprise using the BCG model, to compile a project efficiency calculation using the Project Expert software product and to formulate conclusions [37]. The time for solving the problem is limited to 1 hour, which is sufficient if the graduate has the necessary qualifications.

At the graduate qualifying work (dissertation) preparation level, the student receives a flexible and effective tool for substantiating the correctness of the selected proposals and measures to increase the particular enterprise economic efficiency. Standard tools used in calculations (determination of performance indicators: profit, payback, profitability, etc.) do not give a complete picture of the proposed measures implementation and often introduce a distorting effect [30, 33]. In this case, the calculations reliability and their accuracy are increased due to the possibility of fully displaying the proposed activities features (duration, financing conditions, initial conditions for implementation).

4. Conclusion

The use of specialized software (including Project Expert) allows you to prepare an economist who meets all the requirements of modern economic conditions, who, in addition to having a good knowledge of the work theoretical aspects and the necessary practical skills. The use of IT-technologies allows the graduate to carry out practical tasks that the employer puts before him in a quality manner and in the shortest possible time. Knowledge of a wide range of applied programs provides a universal character of training future specialists in comparison with traditional approaches.

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