

Experience of the Project for the Development of Complex Baking Mixes at the University

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Abstract-The paper presents the experience and conclusions of the project from the idea to the commercial sale of the product in the conditions of active participation of university students. The goal was to assess the role of such a project in the development of students' professional skills. The idea of creating baking mixes with a special composition to simplify the preparation of bread in restaurants was proposed. The project was carried out by a team of eight students and two teachers for one year. The stages of project implementation and the role of students in them are described. It is shown that participation in such a project is more applicable as an assessment of students' professional qualities.

Keywords-education, research project, breadmaking

I. INTRODUCTION

Recently, much attention has been paid to the issues of conducting project work in educational institutions [1, 2], including in universities [3, 4, 5, 6].

The participation of students in the implementation of various kinds of educational projects has several advantages over traditional teaching methods.

The use of the "project method" in teaching distinguishes the way to achieve the main result. The formation of the necessary competencies occurs in the context of collective work [6]. This feature, in contrast to the standard methods of teaching and evaluating learning outcomes, allows the student to display such qualities as communication skills, ability to work in a team, leadership, etc.

The main objective of this method is to motivate students to actively reflect on their activities in the framework of the ongoing project [7].

Another important task of the project work is the formation of practical experience [8]. It is important for mentors to teach students to make decisions independently in project implementation, which helps develop the ability to make important decisions in future professional activities.

The ability to independently find information is often cited as an important competence that students who participate in project activities can master [9].

Currently, project activities are increasingly used in educational institutions as one of the modern methods for identifying and training the most capable students. Also, the use of the "project method" helps to implement an interdisciplinary approach in the organization of training. [3]

A number of studies were carried out in order to identify the influence of student participation in research on their involvement in science in the future [10, 11, 12]. At the same time, graduates retrospectively report higher results compared to comparison groups in such skills as research, information and communication skills. However, these works often consider only a scientific research project. In such conditions, many participants do not understand the significance of the entire project, since their work is associated only with individual elements of global research. This approach is appropriate for fundamental areas of knowledge.

In the field of engineering sciences, students are more oriented towards practical activities in their professional future [13]. Under these conditions, it is necessary to use a slightly different type of project, since the presence of motivation affects the successful manifestation of one's abilities. Motivate project participants in different ways. To the greatest extent, it is in the interests of learning a way that implies maximum practicality of the project. As an extreme form of practicality of the project can be considered the implementation of the project from a scientific idea to the organization of the production of its development and sale of goods. In this case, students will not take their efforts as vain. Also in this case, more skills are learned that are characteristic of future professional activities.

Participation of students in projects at the final stages of education in general can be considered as an alternative to formal certification in terms of a competence-based approach to education [14].

The paper presents the experience and conclusions of the project from the idea to the commercial sale of the product in the conditions of active participation of students. The research within the framework of the project was carried out at the Food Technology Institute of the Kemerovo State University. The project was implemented within one year. The project involved 8 pre-selected students and 2 teachers.

II. RESULTS

A. Introduction to the Project

Traditionally, the restaurant serves Russian cuisine for guests freshly baked homemade bread. These are portion products weighing 40 grams. Such products today offer an increasing number of institutions in different price categories. In search of uniqueness in the preparation of their own bakery products, restaurants go in two directions: bake bread and bakery products on their own according to original recipes or using special mixtures, or buy frozen semi-finished products. Making bread on their own is decided by restaurants wishing to meet a high level, working to create their image.

It is not a secret for anyone that baking bread is hard work, which in the universal kitchen has drawbacks: the diversion of funds for the purchase of various types of raw materials, which are stored in the warehouse for a long time; the need for accurate dosing of small quantities of raw materials due to small volumes of baked products.

The teachers suggested an idea to create a special kind of mixture that includes all the necessary ingredients, except water. These mixtures were later named complex baking mixes (CBM).

A team of eight graduate students was drawn up to implement this idea as a commercial product. An important role in the project was assigned to teachers, as it was planned to attract investment and use of existing production. The division of students into separate groups was not carried out. In varying degrees, each participated in all phases of the project.

During the implementation of the project, the following stages can be singled out: study of the need for bakery products cooked at CBM; justification of the choice of raw materials; development of production technology CBM and products based on them; organization of production CBM; assessment of the effectiveness of the use of CBM in the restaurant.

B. Marketing Research

To assess the need for a product in the market of the city, students conducted marketing research. Using knowledge from other disciplines, students compiled questionnaires and conducted a survey in twenty restaurants of the city of Kemerovo. As a result of processing the questionnaires, it was found that 40% bake their own bread, 60% of restaurants get ready. Of those who acquire - 45% would like to independently produce

bread. Of those who bake themselves more than half use traditional raw materials, then they face the difficulties described earlier. Also, data were obtained on the technical support of production, the form and mass of baked bread, the number of products sold.

Thus, after conducting this phase of the project, it was established that 33% of the restaurants in the city are potential consumers of the CBM.

At this stage, the communicative skills of the project participants were revealed. The whole project team saw the significance of the idea being developed in practice, understood the prospect of the commercial realization of the product.

This stage helped to increase the interest of participants. At this stage, students who have leadership qualities were identified. This allowed us to take into account the abilities of the participants when distributing tasks in the following stages.

C. Product Development

At this stage, research was required to develop a new product.

For research in the field of development of the CBM, as well as related research, the student association "Center of Home Bakery" (CHA) was created at the institute. The tasks of his work were: the development of CBM recipes; creating a methodology for selecting the composition of mixtures; analysis of technological, biochemical, microbiological and other indicators of raw materials; hygienic and commodity evaluation of mixtures; equipment testing and development of technologies for the application of CBM; development of technical documentation. For the activity of the CHA, sponsors purchased some technological equipment.

The main principles laid in the development of CBM steel: the content of all raw materials required for baking bread; only natural ingredients; no special requirements for equipment for making bread; maximum reduction in the process of making bread.

From the standpoint of an integrated approach, the development of baking CBM makes it possible to predict their composition in accordance with the needs of customers and create new mixtures for the development of bakery products of preventive and therapeutic purposes with desired functional properties.

The development of CBM was a multi-pronged procedure, which includes a number of necessary and interrelated aspects, and is carried out in stages.

At the first stage, the properties of the main raw materials and their influence on the properties of dough and the quality of bread were investigated. Raw materials were selected that were optimal for the criteria that characterize the nutritional value. The criteria were developed depending on the purpose of the design — the functional purpose of the CBM and the bread prepared on their basis.

Thus, by request of the consumer, CBM was developed for making bread with special taste, for example, tomato.

As a result of research, students developed a model for the rapid design of the composition of the CBM with the required properties. This model allowed in the shortest possible time to develop new names CBM.

Activities in the CHA have become the main link of the project participants with academic disciplines. Conducted research became the basis for undergraduate and master's theses. The research results were published in journals [15].

The product documentation was developed and passed the process of approval.

At this stage, students mastered teamwork, learned to plan their time, with a little help from teachers organizing research work. Learned to evaluate the results and adjust further development.

In this activity, students with prudence, critical thinking, and deeper knowledge of technology have achieved greater success.

D. Organization of Production

The uniqueness of the implemented project was the launch of mass production developed by CBM. The organization of production was carried out within the framework of the operating small enterprise, the founder of which is the university.

By agreement with the company, areas and some unused technological equipment were provided. The project manager attracted a small investment from a commercial firm. Students participated in the preparation of a business plan for production.

Students under the guidance of teachers made the necessary calculations of the performance of the equipment, made a plan for its placement in the designated areas. Provided for a slight upgrade. Students searched for suppliers of raw materials and negotiated contracts.

Scientific developments and sets of technical documents were transferred to the enterprise for industrial implementation. In the early stages, the entire project team participated in the production of workplaces. At the same time, students offered solutions to emerging problems, participated in the organization and optimization of production.

At this stage, students received a unique experience and tried on the role of managers of a small enterprise. In this opportunity, students with leadership qualities and innovative thinking showed themselves. In spite of the equal rights of the students, the team independently formed a division of duties depending on their personal qualities - the organizers and responsible performers stood out.

E. Efficiency Evaluation

One of the ways to simplify and facilitate the process of baking high-quality bread in a restaurant kitchen is the use

of complex baking mixtures containing all the ingredients necessary for making dough, except water.

After the release of the first batches of CBM, students accompanied their introduction at interested restaurants.

According to the feedback received from consumers, some corrections were made to the recipe of CBM and the packaging materials were changed.

One of the restaurants received data on the cost of producing bread from CBM. This made it possible to calculate the economic efficiency of their implementation. Direct production costs have not decreased significantly. When using CBM, the consumer showed a number of advantages compared to traditional methods of making bread: stability of quality due to the absence of errors associated with a violation of the dosing of raw materials; reducing the duration of the technological process of making bread, by eliminating certain operations; reduction of costs associated with the delivery of various types of raw materials, which had to be purchased from different suppliers; reduction of commodity stocks of raw materials, due to the mass of CBM packaging, convenient for the restaurant; an increase in such an indicator as "inventory turnover"; increase in labor productivity; the possibility of using on the operation of baking bread unskilled workers.

By helping consumers use CBM, students were able to critically evaluate the advantages and disadvantages of the developed product. We learned how to interact with various enterprises, flexibly adapt to different production conditions to demonstrate the capabilities of CBM.

III. CONCLUSION

Developed by CBM were presented at the thirteenth Russian agro-industrial exhibition «Golden Autumn», and at the regional exhibition-fair in the city of Kemerovo. The project leaders and one of the students received regional state awards.

Three project participants, who actively manifested themselves, after completing the education, were offered work in transnational companies involved in the production of baking mixes.

The implementation of the main stages of the project was carried out by one team during the year. Despite the continued existence of the production of CBM, the new project participants were engaged only in the research part, carried out the development of new CBM items, using the experience gained. The main and non-standard problems during the project implementation were solved in the first year. Thus, the main experience and skills were obtained by the first eight participants of the project.

With a qualitative assessment of the results of the project managers, you can draw some conclusions on the effectiveness of the implemented method for educational purposes.

It can be noted that the predominance of certain personal qualities that were observed among students before the start of the project - participation in the project allowed them to manifest. Participation in all stages of the project could help the student in self-determination of his preferences within the framework of the studied specialty.

Undoubtedly, for all participants, the experience of such work gave the versatile knowledge and skills necessary for the successful realization of oneself in the mastered specialty.

The project was relatively short-term, with graduation students participating. Despite the improvement of professional skills, participation in such a project is more applicable as an assessment of professional skills.

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