

## **Course Project "My future individual educational trajectory" as a Basis for the Personality-oriented Professional Training**

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## **INTRODUCTION**

Since 1997 Lomonosov Moscow University of Fine Chemical Technology (MUTHT) uses the multi-level system of education in the science-based chemical technologies, including Bachelor's, Master's Degree and postgraduate level [1,2]. Level is a segment of educational program between two competitive exams. At present the first educational level corresponds with the first year education. Curriculum of the first year for different engineering and science specialties of Bachelor's Degree includes similar set of courses: higher mathematics, computer science, physics, general and inorganic chemistry, foreign language, history, law, physical training as well as special disciplines selected by a student (elective disciplines). This helps students who successfully graduate from the first year change when necessary the specialty of Bachelor's degree without prolonging their period of education. The possibility to change specialty depends on student's study rating and quotas for state- and self-financed places.

## **1 INDIVIDUAL EDUCATIONAL TRAJECTORY AS A PROJECT**

### **1.1 Tasks of University at the first educational level**

In Russia entrance to the universities depends on the summary of grade points for three Unified States Exams. Two of them are compulsory exams in mathematics and Russian and one additional exam depends on the future specialization. The summary of grade points for different students of the University can differ within 35%, which shows difference in the level of school education of students.

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Under the present conditions of the drop of interest to engineering and science-based technologies among young people students with lack of motivation, not acquainted with the future perspectives of their professional activities may enter the University.

Therefore the tasks of University at the first educational level are as follows:

1. adaptive - adjust students to the peculiarities of educational process of the University, it's educational technologies and the level of requirements;
2. developing – give the possibilities to develop personal qualities and satisfy intellectual demands of a student;
3. pedagogical – develop student's personality and the level of personal development;
4. motivating - create strong motivation towards getting higher technical education, interest towards higher mathematics, computer science, physics, engineering graphics, general and inorganic chemistry;
5. professional - stimulate a student to choose the specialty for Bachelor's degree, individual curriculum set, future professional career.

## 1.2 New Discipline “Individual structuring of curricula sets”

To complete these tasks new discipline “Individual structuring of curricula sets” was introduced into the curriculum of the 1st year (2nd semester) for eight Bachelor's Degree specializations. At that time students have passed their first end-of-semester exams and know more about the educational process and their own potential and capabilities.

The discipline consists of two parts:

1) lectures, which contain information about the following aspects:

- organization and methods of education at the University,
- multi-level curriculum structure at the University,
- study rating system of evaluation, grade points system,
- web-resources for information mining;

2) course project “My future individual educational trajectory”, in which students are supposed to construct their individual curriculum set and make preliminary plans about their future professional career.

## 1.3 Formation of training trajectory as an individual project

Main tasks of the course project are:

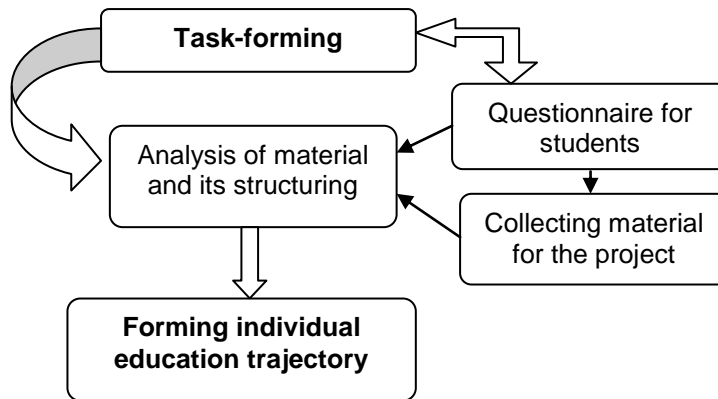
- learn the initial motivation of a student for choosing the University, specialty for Bachelor's degree in chemical engineering, desire to get higher technical education,
- teach the students to match his skills and capabilities with the future possibilities of his professional work,
- give the students information about multi-level curriculum structure of the University, different departments, statistics of job placement for graduates from different programs and different levels of education,
- develop communication skills, capabilities of team-work,
- motivation of students towards engineering specialties through the advantages of choosing individual curriculum sets.

Work at the project consists of the following stages (Fig. 1):

- Task-forming.

Basing on his own needs and requirements a student formulates the aim of education, future type of professional activity (science, engineering, production, organizing, teaching, etc.) and determines which level (levels) of education he or she needs for that (there are three levels of higher education in Russia now: Bachelor's Degree, Master's Degree, .Postgraduate level). Also the type of education should be chosen (applied or academic) and the type of curriculum (field, profile, specialization). The

possibility of choosing different additional programs or getting the second higher education should also be contemplated.



*Fig. 1. Cycle of working at the project.*

- Questionnaire for students.

Filling in questionnaire reveals student's initial motivation for choosing technical specialty, helps students to estimate the level of their pre-university knowledge, first results of the University study, collect first materials for the project. The questionnaire consists of three sections. The first section deals with school education: grade points at school, whether the student has been interested in natural sciences and mathematics, achievements in these fields if any. The student analyses whether his school knowledge is enough for university study in most difficult engineering courses. The second section deals with the process of choosing the university: how much in advance did the student start to choose a university and specialty, criteria and motivation in choosing the university. The third part deals with study at the University: whether a student is satisfied with the process of study and his (her) own results, problems in the process of education and self-study, retaining interest towards science and engineering. A student should give self-estimate of his (her) studies, calculate his or her study rating. Questionnaire is an important part of preparation of the project, because makes the student analyze the connection "school – university", helps to check that the future specialty is chosen correctly and that the university education meets his (her) demands.

-Collecting material for the project.

A student should get acquainted with organization and methods of teaching at the University, with State standards for the given specialty for the Bachelor's Degree, get to know departments of the University, connections of particular departments with future employers, statistics of job placement for graduates of particular departments, job market for a definite specialty.

Then comes analysis of material and its structuring, choosing information useful for selecting the individual curriculum set.

At this stage a student matches his capabilities and possibilities of education with his aim, estimates how much work should be applied and determines what should be done to arrive at his purpose.

- Forming individual education trajectory.

The student structures his own education trajectory: Bachelor's specialty, profile for Bachelor's Degree, department, from which the student chooses to graduate, specialty for Master's Degree (if necessary), entering the job market or proceeding his education as a postgraduate.

Then oral report supported by a presentation is delivered at a group seminar (25-30 students and a teacher).

Then comes discussion at the seminar, remarks, and questions.

Drawing conclusions.

Normally the project is prepared by a group of 3-4 students, but about 10% of students want to work individually. Students may consult a teacher when necessary. Work in a group stimulates interaction among students, improves their communication skills.

## 2 CONCLUSIONS

Work at the project presupposes revealing motivation, aims and purposes, personal experience of a student, develops conscious approach to study and future professional activities, provides conditions for the development of student's personality. Many Russian students go deep into solving everyday problems, trying just to "study well", but not asking themselves about what are they studying for, what are they going to do after graduating from the University, what are their aims and goals in their future career. Work at the project helps them to combine their current results and their professional future, to understand which disciplines should be studied deeper and why, how to optimize their time-table so as to have enough time for both work and rest, how to become a high-class specialist and what should be done for it. The effectiveness of the course "My individual trajectory of education" has been studied by comparison of the results of competitive selection of students for different specialties of Bachelor's Degree for the year 2008/2009 (before the course was introduced) and 2012/2013. In 2008/2009 45% of students decided to change their specialty, and 30% of them wanted to switch from engineering specialties to economical and management profile. The main reasons of the desire to leave technical specialties were: complexity of programs, dissatisfaction with own results, difficulties in understanding the difference between various technical specialties. In 2012/2013 only 10% wanted to quit engineering specialties for non-technical ones. Another 30% of students change one engineering specialty to another engineering one basing on their wish and the quotas for state- and self-funded places. The motivation of students towards choosing the university and the specialty has also been studied. 37% of students started to choose a university and a specialty a few months before entering it, 40% - a year in advance and only 23% - 2-3 years before entering the university.

15% of students passed two and more additional Unified State exams, because they didn't know which program (engineering or humanities) they are going to choose further. The possibility to find a good job after a university was considered as the most important criteria (65% of students). Students not always understand the perspectives of their future professional activity, they are not enough motivated towards scientific and engineering work, can't properly estimate their potential and capabilities, the complexity of the chosen program often remains understood. The results of the first competitive exams satisfy only 32% of students, 59% are partially satisfied and 9% dissatisfied.

Getting acquainted with the multi-level curriculum system of the University, students realize the main factors influencing the direction of future training: desire of the student, his or her study rating, quotas of State- and self-financed places for particular year. This stimulates students to get quality chemical engineering education. For the University it solves the problem of motivated and adequate for personal capabilities choice of students for engineering specialties of different level of complexity and later forming person-oriented study process under the conditions of multi-level curriculum structure of the University.

## 3 FURTHER RESEARCH

We want to analyze and research students' motivation for quality higher chemical engineering education (including the gender aspect).

## REFERENCES

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