



Individual peculiarities of engineering students attending minor degree programs. Research on psychology and education.

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Professional activity of a contemporary global engineer requires constant improvement of engineering training¹. One of the ways to make the educational system more flexible and correspondent to the real labor market environment in Russia is the so-called “Additional professional education” (minor courses). At the Kazan National Research Technological University there is an option for the top students to acquire an additional degree in Education, Management, Law, Psychology, Foreign Languages, etc. at the Faculty of Additional Education (FAE)². Our research showed that students who attend the FAE courses have some psychological peculiarities. The study was aimed at creating a psychological profile of the minor degree students majoring in engineering. A survey was given to the students and to the faculty who studied the following minors: “Corporate management”, “Education”, “Professional translation”, and “Legal fundamentals for business processes”. The sample group consisted of 50 minor degree students (21 male and 29 female) aged 19-22. The survey results allowed concluding that minor degree gives more opportunities for individualization.

As a rule the most gifted and target-driven students are enrolled at the Faculty of Additional Education. A student’s decision to apply for a minor degree is determined by strong intrinsic motivation (academic interest, professional ambitions, personal development) that cannot be fully satisfied in the major.

Empiric research of professionally important qualities business efficiency³ showed that FAE students are characterized by a better psychological and business potential. The survey revealed the following parameters:

- *personal orientation* – values, attitudes, motivational trends, moral and ethical patterns;
- *business efficiency* – business qualities, necessary for efficient management;
- *dominance need* - desire to have force and to be significant for others, strive for success, strong achievement motivation;
- *assertiveness* – independence, self-confidence, communicative competence;
- *conservatism* – persistence, resistance to changes, ultimatism;
- *negativism* – vindictiveness, suspiciousness, petulance, unforgivingness, criticism, distrustfulness, resistance to any influence;
- *compliant behavior* – social maladjustment, low self-esteem, lack of initiative, shyness;
- *dependence* – infantilism, limpness, need for being guided, helplessness;
- *conformism* - commitment to the others’ opinions, public views, strive for social approval, suggestibility, sociability;
- *responsiveness* – sympathy, empathy, sensibility, devotion, unselfishness, helpfulness.

The average indexes of the above-listed parameters of the survey sample (“Corporate management”, “Education”, “Professional translation”, and “Legal fundamentals for business processes” minor degree students) are presented in Table 1. The quantitative-qualitative correspondence is the following:

1-4 – nominal zone;
 5-8 – potential zone;
 9-12 – advanced zone;
 14-15 – super-zone.

Table 1. Average indexes of personal qualities of FAE students

Personal quality	Minor degree program			
	Corporate management	Education	Professional translation	Legal fundamentals for business processes
Personal orientation	9	12	9	10
Business efficiency	12	8	8	11
Dominance need	8	8	6	9
Assertiveness	10	10	7	7
Conservatism	7	8	4	8
Negativism	2	2	2	5
Compliant behavior	4	4	4	4
Dependence	3	3	3	3
Conformism	5	6	10	4
Responsiveness	7	12	8	7

Typical personal profiles of students who attend various minor degree programs were made basing on the survey data.

As it is seen from Table 1, the students have high indexes of personal orientation and business efficiency, therefore FAE students have leadership potential.

There were some peculiarities revealed between the minors. Future managers are characterized by high assertiveness and business efficiency, and future educators are very responsive. Students who study professional translation have a more “smooth” profile, but are characterized by high conformism and the least conservatism. Future lawyers have comparatively higher negativism and are the least conforming. Thus the personality profiles of FAE students reflect the professional specifics of the chosen minors.

Professors who teach at the FAE were also given a questionnaire that consisted of two parts: assessment of the students’ cognitive skills (analytical, systemic, logical thinking) and of their personal traits (independence, responsibility, reliability, etc). In general faculty gave big points to the FAE students as intellectual, creative persons with broad outlook, original way of thinking and leadership potential⁴. The 5-point scale was used. The survey sample comprised 43 professors with the teaching experience from 5 to 27 years.

According to the professors' opinion FAE students have better cognitive skills and personal qualities than those who study only their major. The generalized portrait of a FAE student given by the teaching staff revealed the following qualities: developed intellect, creativity, wide general outlook, original thinking, initiative, target-orientation, enthusiasm, curiosity, independence, responsibility, persistence, respectfulness, sociability and leadership. They are able to work with information, and have a more analytical and critical way of thinking than other students of the University.

Within engineering major a student has not enough flexibility to choose courses according to their personal peculiarities and motivation, meanwhile in minor degree courses their individuality is reflected⁵. In general students who prefer to study additional courses simultaneously with their engineering major have integrated personality, are fully aware of their values and motives and have businesslike character. At the same time every particular program attracts students of specific type of personality. Self-confidence, assertion, and leadership potential characterize those who choose minor courses in management. Empathy and outgoingness make them choose pedagogy and psychology. Students who choose foreign languages and professional translation are communicative, conforming and the least conservative. Students with critical thinking and low conformism study law. Thus their individual traits correspond their minor.

Additional professional education of engineering students is per se an exclusive possibility for the top students to increase their marketability and to realize their personal potential in the future engineering career.

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