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FOSTERING PROFESSIONAL COMPETENCIES OF STUDENTS WITH THE NEW APPROACHES IN HIGHER EDUCATION

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Abstract

The article discusses the problem of the competency gap between employers' expectations and the actual competency profile of university graduates by focusing on the case of the Ural Federal University (UrFU, Russia). It is shown how this problem can be addressed through modern teaching practices aimed at enhancing the quality of education and increasing student motivation. The authors analyze the existing legislative framework of higher education in Russia and the current priority tasks of the university development. To meet these tasks, UrFU management devised a set of measures to modernize the education process and ensure adequate support to the faculty and students. The university is currently developing its own education standards to make its programs more flexible, promote cross-disciplinary interaction and adjust students' competency profile to the demands of the job market. The study puts a special emphasis on the use of online technologies and project-based learning to develop professional competencies and encourage a proactive approach to mastering new knowledge and practical skills. A special incentive program is implemented to maximize personal and professional growth of the university's faculty. One of the instruments applied to address the competency gap problem is the creation of the so-called 'Boiling Point' - a space for free exchange of ideas and collaboration between students and external experts from the business community. A conclusion is made that UrFU has been successful in developing a fundamentally new approach to organizing the education process and adjusting students' competency profile to the demands of the modern job market.

Keywords: Competency gap, higher education, professional competencies, project-based learning, university graduates.

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1. Introduction

Today, with fast changes in technologies and quick transformations of the job market, skills and knowledge that students learn at the university often lose their relevance before graduation. Many employers subscribe to the view that university graduates lack the skills needed in today's job market, regarding not only specific professional fields, but also entrepreneurship, teamwork and project activities.

Therefore, universities are faced with the challenge of having to constantly update their programs and thus bridge the competency gap by offering their students optimal training. This, in turn, means that there is a need for thorough revision of the established approaches to the education process and for wider use of student-centred methods, including project-based and blended learning methods. Universities should be able to devise their own flexible, practice-oriented higher education programs that would help students to obtain and develop professional competencies, thus giving them a competitive edge on today's job market.

In the recent decade, there has been a major paradigm shift in higher education. The conventional, teacher-centred model of higher education, based on simple knowledge transfer from teacher to students, is being replaced by the student-centred model, which inverts this traditional understanding of the learning process and encourages two-way interaction, involving new education technologies such as games-based, project-based, blended and distance learning.

In the light of the above, faculty competency development becomes crucially important: professors need to cease to play the role of authoritative bearers of ready-made knowledge and instead turn into mentors assisting students in solving real-life problems. Moreover, professors should be in full command of modern teaching technologies. Higher education institutions, in their turn, should be able to devise and implement a new kind of programs, based on individualized approach to education, hands-on learning and the use of new education technologies. Only in this case university graduates will be able to build successful careers and make better decisions under the pressure of uncertainty or in crisis.

The system of higher education needs to be capable of catering to the needs of society, which means that universities have to come up with new approaches to help their students reveal their intellectual potential and develop their professional competencies.

2. Problem Statement

A widely shared view is that education has changed considerably in the recent decades, which to some extent can be explained by the fact that human capital has now become one of the key corporate performance drivers.

As Roschin and Rudakov (2016) observe, “the availability of mass higher education usually leads to significant variations in the quality. As there appear more and more universities and the number of students is growing (more school leavers tend to enroll in university), it becomes increasingly hard to maintain high standards of quality in all universities” (p.75).

According to Naboychenko et al. (2017), “universities may also be quite rigid in their decision-making and under pressure of excessive regulation of the state education standards, which impedes them from efficiently responding to the changing needs of the industry” (p. 89).

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For a number of reasons, such as the declining prestige of the teaching profession, comparatively low faculty wages in the majority of Russian universities, and the lack of career growth opportunities, most university faculty fail to meet the modern standards in higher education either due to their age or to the lack of time since they are busy moonlighting in other jobs.

In Russia, efforts are made to ensure continuous improvement of the education system. The main principle of the standard setting process in higher education is that identification of learning outcomes should go hand in hand with modernization of education and development of the ways for learning outcomes assessment (Rebrin, 2012). Most large Russian universities use advanced education technologies as a part of the competency-based approach to teaching (Rudskoy et al., 2018). The Ural Federal University provides an interesting case in this respect because, since 2017, it has been applying the project-based and blended learning approaches with some impressive results (Daineko et al., 2019). To modernize education, an array of tools and their combinations is used (Malach & Kysil, 2019; Gushchin, 2012), including games, which are popular all over the world (Bylieva et al., 2018; Korneychuk & Bylieva, 2018), mind maps (Buzan, 2006), infographics (Almazova et al., 2019), technological platforms (Gitelman et al., 2015), flipped classroom model (Derevyankina, 2019), online discussion forums (Adinda et al., 2019) and, of course, online learning technologies (Bystrova et al., 2018; Zhigadlo et al., 2016).

3. Research Questions

In Russia, the government requires flagship universities to be able to compete in international higher education markets, which means that they have to reconsider their approaches to education and adjust their education process accordingly. Our hypothesis is that in order to enhance the quality of higher education, it is necessary to encourage students to take a proactive stance regarding the development of expertise. Such results can be achieved through project-based learning, which means that students participating in a project under the teacher's supervision not only acquire new knowledge but also obtain practical experience and professional competencies necessary for successful entry into the job market. In this respect, the following questions arise: first, how can faculty be motivated to develop and implement new programs oriented towards technology-based innovation and industry-driven education? and second, how can students be encouraged to prioritize the development of their problem-solving abilities and competencies valued by employers over learning information through “cramming”?

4. Purpose of the Study

Global transformations require universities to respond to contemporary challenges more efficiently through constant innovative experiment with the education process. The legislative framework the higher education system is operating in makes it rather difficult to ensure adaptability of educational programs to the needs of the job market. The purpose of this study is to investigate the methods and instruments that would enable higher education institutions and education program designers and practitioners to align the skills of university graduates with the demands of the digital economy.

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5. Research Methods

The study relies on general scientific methods such as analysis and synthesis, comparison and generalization as well as methods of inductive and deductive reasoning. We analyzed the legislative framework Russian universities operate in, including local normative acts that determine universities' strategies of development in the field of education. As Russian universities are transitioning to this new model of education and efforts are made to ease the regulatory pressure, it becomes pertinent to consider specific cases of how higher education institutions cope with this task. In our study, we focus on the experience of the Ural Federal University (UrFU) of developing and setting its own education standards in six different fields of education. UrFU has also launched a pilot program to enhance project-based learning in seven of its institutes. We analyzed the potential of this new model of learning regarding its effects on student motivation and competency development.

6. Findings

The Ural Federal University is one of the largest higher education institutions in Russia. It comprises 11 institutes engaged in research and education activities. In terms of student enrollments, UrFU ranks third in the country after the Moscow State University and Southern Federal University. UrFU offers not only Bachelor's, Specialist's, Master's and doctoral programmes across a wide range of topics but also programs of secondary vocational and basic general education. This study discusses in particular the ongoing modernization of higher education programs (Bachelor's, Specialist's, and Master's programs), as these programs involve the largest numbers of students and are targeted at training qualified workforce for the digital economy.

As of the beginning of the 2019/20 academic year, the university enrolled 35,606 students in its Bachelor's, Specialist's and Master's programs, including both on-campus and off-campus programs. So far, there has been a steady trend of increasing enrolments: in 2019/2020, in comparison with 2017/18, there has been an increase by 4.4% and with 2018/2019, 2.3%. At UrFU, Bachelor's and Master's programs are available in a variety of majors: there are 92 and 90 majors respectively. Overall, the university offers 428 programs: 197 Bachelor's, 35 Specialist's and 196 Master's programs.

UrFU graduates have always been highly valued on the job market as they were usually adequately prepared to meet employers' expectations. Digital transformations of the economy and skilled labour shortages now require the university to revise its approaches to teaching, implement new formats and technologies, shifting from the comprehensive to a more selective approach that would make its graduates able to keep up with the highest industry standards.

The current strategic goal of UrFU development is identified as 'formation of the advanced education, research and innovation centre in the Ural Federal District'. This strategic goal is going to be achieved by reaching the following objectives:

- to design and implement education programs (including network education programs) to meet the workforce needs of regional and national economy;
- to implement modern education technologies (distance learning technologies, e-learning) and provide the necessary methodological support;

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- to establish a system for training of highly qualified engineering staff;
- to provide support for personal and professional development of the university's faculty and students, including academic mobility programs, performance-based contract employment and open international competition for faculty positions.

To address the first objective, UrFU leaders announced the beginning of the university's transition to programs based on self-imposed educational standards (SIES), starting from the enrollment period of 2019. Out of 403 programs, SIES-based programs were introduced for 123 majors (specializations), including 64 Bachelor's degree majors (81 programs), 54 Master's degree majors (105 programs) and 5 Specialist's degree majors (5 programs). Standards for Bachelor's programs have a unified (core) component providing a solid foundation for the development of universal competencies of university graduates. It is important to ensure harmonization of general professional competencies across all spheres of education as well as the possibility to design and implement cross-disciplinary programs (cross-disciplinary major programs). Starting from 2020, it is planned to complete the transition to SIES-based programs.

To address the second objective, in 2019, UrFU continued to implement online learning, expand its connections with partner universities within the network university cooperation program, and stimulate virtual mobility of students. In the academic year of 2018/19, over 10,000 students used online courses integrated into their education programs (this figure increased by 74% in comparison with the 2017/18 year). The percentage of programs involving online courses was 36% in 2018/19, which is twice as much as in the previous academic year – 77 programs or 18%. In 2019/20, 90% of UrFU programs use online courses offered by the university itself or its partners. Online courses may either constitute a core part of the respective education programs or be used as minors, enabling students to build their individual education trajectories in addition to fulfilling the core competency areas. The number of students taking online courses offered by UrFU's partners within university network programs already exceeds 3,000.

Distance learning relies on series of online webinars for off-campus and evening students: in 2018, 196 faculty members conducted over 5,800 hours of webinars. The university can now live stream lectures and classes, which means that they can be accessed remotely via an external CDN server.

To address the third objective, in the 2017/18 academic year, the university launched a program to encourage the use of project-based learning methods in undergraduate studies. This program has become one of the key areas of the university's development in the sphere of education. Initially, in 2018, it was decided to modernize six education programs in three institutes. The corresponding normative documentation was designed in order to expand this practice to other programs and institutes in the following periods. As a result, apart from the qualitative changes to the curriculum, there were realized 98 student projects involving 383 students (Figure 1). 27 faculty members received training to act as project supervisors and mentors. In order to get students, business experts and partners from other universities to participate in projects, the university hosted eight hackathons involving over ten industrial enterprises and associations of employers. As a result, 44 experts agreed to participate in joint projects with students. Moreover, UrFU signed agreements to realize six joint education programs with Peter the Great St.Petersburg Polytechnic University and Ufa State Aviation Technical University.

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In 2019, 1,012 more students joined the projects: during the spring semester of the 2018-2019 academic year and the autumn semester of 2019-2020, they realized 570 projects, including 98 joint projects with enterprises of the real sector (Figure 1).

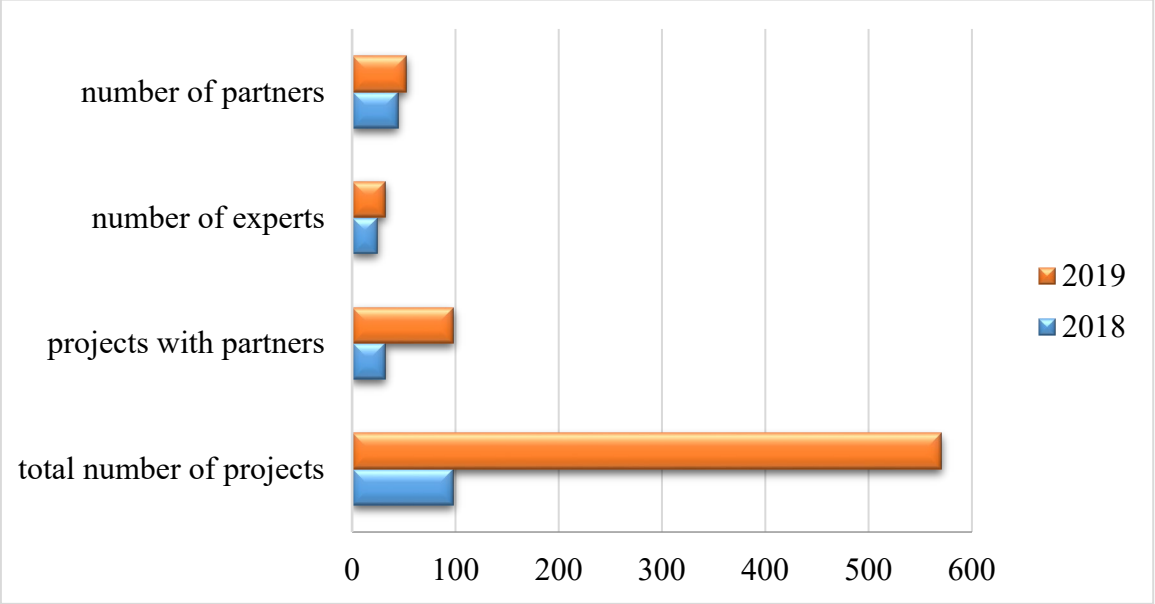

Figure 01. Results of the program to encourage project-based learning at UrFU in 2018-2019

Throughout the two-year period of the program's realization, the university has managed to establish stable connections with 32 large and medium-sized enterprises. Moreover, 52 experts took part in the projects and problematizing events. In addition, the university together with its partner enterprises organized two career guidance events– 'Peak IT' and 'Engineering Reconstruction 4.0', aimed at making school students and students from other educational institutions more aware of project-based learning principles.

In 2019, the university implemented an IT support system for project-based learning: the system covers all stages from project initiation to completion and allows to accumulate data on students' digital footprints (https://teamproject.urfu.ru/, figure 2). To this end, the following services were introduced: services for application processing and maintaining contact with the client at the project initiation phase; services aimed at assisting students in their choice of projects and projects groups via individual online accounts; services for integrating this information into the corresponding support data systems; services for facilitating project work at all stages of the project life cycle, flexibly adjusted for each project group's individual needs; and, finally, services for assessment of each student's individual performance within their respective project teams.

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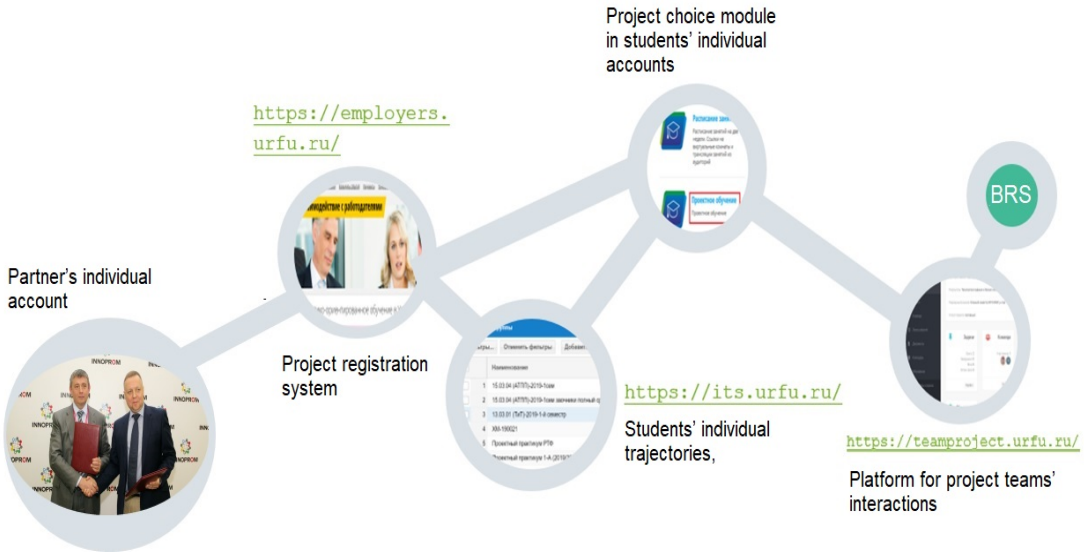

Figure 02. IT support systems for project-based learning

To address the fourth objective, in the 2018-2019 academic year, 30 courses were created on the platform openprofession.ru to upgrade the qualifications of the faculty and other university staff in the sphere of online education technologies. These include courses using online simulation to help learners develop their professional competencies and assess their learning outcomes. Overall, 1,797 faculty and staff members of UrFU successfully completed these courses.

To stimulate the faculty's personal and professional growth, in 2015, UrFU adopted the performance-based contracting policy, which implies that the faculty are paid remunerations for meeting their individual performance targets. Over a half of the indicators in performance-based contracts fall within the sphere of education and encourage the faculty to use new technologies in their teaching. In 2018, the faculty incentive scheme was revised. This scheme had been in use for the previous 15 years and comprised 39 indicators divided into four groups: teaching; research; internationalization; and other activities. The criteria for teaching performance assessment were adjusted in accordance with the university's current priority areas and the incentive program now includes such indicators as creation and active use of new online courses and adherence to project-based learning principles. These incentives are expected to enhance the quality of education and contribute to further adjustment of the education process to the changing professional environment.

In pursuit of the above-described objectives, UrFU joined the nationwide technological initiative called 'Boiling Point', launched in October 2019. UrFU is one of the 41 universities that supported this initiative and opened their own 'Boiling Points' – spaces for collective work on innovative projects. Universities' 'Boiling Points' are meant to assist students in creating and developing their own individual education trajectories. Moreover, both students and faculty are encouraged to use the University 20.35 platform to master the necessary digital competencies more efficiently. UrFU's 'Boiling Point' is a platform for interactions between members of the academia, business community and government agencies regarding matters related to the quality of the country's human capital and its improvement. Thus, the platform can be used to devise new approaches to education, to expand the range of education formats and models of communication.

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The 'Boiling Point' is a space that enhances professional growth in the digital economy and brings together all participants of the eco-system for joint development of technologies, education, and socio-economic activities in Russia. UrFU's 'Boiling Point' enables free exchange of ideas and collaboration and thus stimulates students to develop and apply their professional competencies, even though these may be not directly linked to the students' majors.

In the context of our research, of paramount importance is the 'Boiling Point''s function of facilitating communication between businesses and young innovators and popularization of technical and social entrepreneurship, transfer of skills and experience as well as increasing students' motivation to master basic and advanced digital technologies. Students taking part in project work may find themselves lacking in certain knowledge and skills that cannot be developed within their respective education programs. This problem can be addressed through the 'Boiling Point', which constitutes a suitable platform for public lectures, readings, workshops and discussion clubs. The 'Boiling Point' can be also used to support small innovative entrepreneurship, to obtain external expert advice and assessment of the projects' innovation potential, to forge long-term collaborations with businesses. UrFU's 'Boiling Point' has demonstrated a high level of efficiency by encouraging students to pursue excellence and develop the skills identified in the WorldSkills and Future Skills specifications. The 'Boiling Point' also helps the university build up its research potential as it can be used by student teams to prepare for competitions of different levels and provides opportunities for talent search and talent development.

7. Conclusion

The Ural Federal University seeks to modernize its education process by updating its content and formats and embracing new education technologies. Its efforts have brought to light the high potential and efficiency of these measures. This way the university can stay attuned to the evolving needs of society and enable its graduates to gain and maintain decent employment. In their turn, UrFU faculty, students and their potential employers have demonstrated their commitment to advancing the transformation of the education process.

In our fast-changing and competitive world, learners need to be cognitively adaptive and develop new skills in response to the demands of the job market. On the part of higher education institutions, this process requires the use of new education technologies, which are more flexible and efficient in comparison with traditional learning methods. It is through innovation and modernization that universities can close the widening digital skills gap. New approaches and methods will open new opportunities for all participants of the education process and ensure their personal and professional growth.

By the next step of our research we are going to analyze the digital trail of students' activities at the platform for project teams interaction. It will allow to construct the students' competency profile and reveal gaps between the existing level of competencies and the demands of the real economics. These gaps can be overcome by including new courses or online-courses from the leading universities and business partners in educational programs or organizing expert lectures and additional training in the University 'Boiling Point.

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