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New approaches to university curriculum design in Russia

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Abstract

This study looks some years ahead and analyses trends that are already shaping the future of education in Russia. It explores key challenges to Russian Society – how to transform its educational system to respond effectively to global XXI century needs and aspirations. The educational system in Russia, known as ‘knowledge-oriented’, has traditionally been centered on content. University graduates, being narrowly focused specialists, were not able to adapt themselves easily to different work environments. Now education needs fundamental reforms to allow a better combination of academic and vocational training. Education goals, standards, and curricula are the focus of our work, as we are sure that it is the job of standards and curricula to instill competencies necessary for people to choose content that has depth, and to approach it intelligently. We’d like to realign education goals, standards, and curricula to reflect changing knowledge and dynamic transformations happening to our world.

Keywords: Programme, educational system, education goal, standard, curriculum.

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1. Introduction

One of the biggest challenges facing the human race in the XXI century is education reform, yet few countries, organizations or universities have given this much thought. Today, high schools and universities have to prepare students for more rapid economic and social changes than ever before, for jobs that have not yet been created, to use technologies that have not yet been invented, and to solve social problems that we don't yet know will arise. In a global economy, driven by nimbleness and innovation, it is increasingly clear that success depends on the transformation of an educational system in general. Russian system of education hasn't changed significantly in the last decades, yet the knowledge, skills, and character needed now are fundamentally changing. The third generation of state educational standards, Federal Educational Standard for Higher Education of the Russian Federation (FES RF), has come into force in 2011. All the Russian HEIs have to renew their programmes in accordance with the new standards. The requirements of FES RF for academic programmes are obligatory for the HEIs to get a national accreditation.

This study presents an authoritative assessment of future challenges and opportunities in the educational system in Russia and the implications for jobs and skills. It is based on expert input from university authorities and teaching staff from higher educational institutions in the European part of Russia, potential employers and analysts, as well as a detailed and comprehensive literature review.

2. Literature review

Russia requires its people to be culturally and intellectually equipped in ways appropriate both for their present and for their future. Only thus will they be able to lead meaningful and satisfying lives, personally and collectively. Institutions of higher education have a key role in developing appropriate strategies. It is the responsibility of higher education institutions to prepare their students, in a life long learning perspective, for a productive career and for citizenship. Universities and other higher education institutions increasingly have come to realize that theirs is a moving target, and that their leadership in the field of the elaboration and transmission of knowledge and understanding implies a new sensitivity towards developments in society. They increasingly look to consultation with their stakeholders on a regular basis. Education inspires progress in society, but at the same time it must respond, with foresight, to society, preparing adequate strategies for future programmes of studies.

The term 'curriculum' is used here to refer to the overall plan or design for a course and how the content for a course is transformed into a blueprint for teaching and learning which enables the desired learning outcomes to be achieved.

Curriculum takes content (from external standards and local goals) and shapes it into a plan for 'how to conduct effective teaching and learning'. It is thus more than a list of topics and lists of key facts and skills (the "input"). It is a map of how to achieve the "outputs" of desired student performance, in which appropriate learning activities and assessments are suggested to make it more likely that students achieve the desired results (Wiggins and McTighe, 2006: 6).

The rapid spread of globalization and enormous developments in information technology (IT) have also led to changes in university curriculum design and courses need to be responsive to these changes. New models and novel approaches to education have been called for, which include the interests of industry, students and academia (Anderson and Rask, 2008). One of the approaches that has received attention in education reforms is the use of e-learning and blended learning approaches. The Joint Information Systems Committee (JISC) defines e-learning as 'learning facilitated and supported through the use of information and communication technologies' (Beetham, 2004, p.1). E-learning has also been presented as a continuum of face-to-face learning, which contains no e-

learning, to distance education which can be fully e-learning (Bates & Poole, 2003). Blended learning which combines both face-to-face learning and forms of e-learning is placed in the middle of this continuum. Commonly cited reasons for incorporating e-learning into curricula include increased flexibility of learning environments, improvement of quality by increased access to information, reduced cognition load and authentic learning, ability to tap into the global market, widening access, competition and strategic reasons (Normand & Littlejohn, 2006). Despite the initial enthusiasm, e-learning has not lived up to its expectations in both the university and corporate sectors (Driscoll, 2008; Granić et al., 2009). Past evidence of technology introduction to teaching and learning indicates that often such technology has been embraced with naïve enthusiasm only to be later discarded (Lowerison et al., 2008). It is also clear that the predicted decline in face-to-face teaching, due to the introduction of online teaching technologies, has not occurred (Beetham, 2004). However, the potential of online technologies has not yet been fully harnessed for learning. Pedagogical problems, organizational barriers, technical issues and financial problems have been cited as the main impediments of e-learning development (Driscoll, 2008).

3. Curriculum design

To meet all requirements, we suggest that a process of university curriculum design should include the following steps:

Step 1: Programme conception (a brief description of the programme). Development of the programme conception includes identification of the programme stakeholders (constituencies) and creation of a system, which ensures the interaction with the stakeholders and a study of their needs.

Step 2: Definition of the programme educational objectives. A programme developer must define the programme educational objectives based on the needs of the stakeholders. The programme objectives are to be consistent with the mission of the institution and department to ensure a programme's market competitiveness and to meet the demands of the stakeholders.

Step 3: Definition of measurable programme learning outcomes. A programme developer formulates measurable learning outcomes – the knowledge, skills and attitudes that a student acquires during his study of the programme. The programme learning outcomes must correspond with the needs of the stakeholders and ensure the achievement of the programme objectives by the graduates.

Step 4. Modules and credit allocation.

Step 5: Development of the assessment system for achievement of learning outcomes and programme objectives. The evaluation of the achievement of learning outcomes and programme objectives should be run systematically and used for programme continuous improvement. Accreditation of a programme by an accrediting agency is an important part of the assessment system of an institution/department. A more detailed description of these steps, including examples, is given below.

Step 6. Development teaching and learning activities which are designed to exploit both conventional and digital technologies where each is most appropriate. The conventional technologies of teaching and learning—the lecture presentation, tutorials, books, physical resources, etc.—will retain a significant place in the modern curriculum, but some activities can be replaced by introducing more use of digital technologies. They are complementary to conventional approaches, but must not be thought of as additional. There are few contexts in which total learning time can be increased; it is most likely that the pressure will be on reduction of learning time. This means that if digital methods are introduced they will replace some conventional methods. The introduction of digital methods

means that it becomes possible for instructors to include ‘supported open learning’ as part of their teaching. It is *open*, because it is not tied to a place – learners use study materials at any time, in any place. It is supported because the materials are prepared in such a way that they incorporate advice and guidance, and the learners are *supported* through online access to instructors and other learners.

Step 6: Development of a blended learning approach for achievement of learning outcomes and programme objectives.

3.1. Step 1: Programme conception

The starting step in programme design at our University was the definition of its conception. This includes the identification of the programme’s stakeholders, the study of their needs and the definition of programme objectives based on the stakeholders’ needs. The requirements of the stakeholders are very important for each educational programme. A programme developer, taking into consideration the mission and development strategy of a HEI, must clearly understand who are the programme’s stakeholders and design the programme so as to meet their expectations. The programme’s stakeholders comprise federal and/ or regional authorities, educational administration, employers of different branches of the industry, research institutions, students and their parents, faculty, alumni, accreditation agencies, etc. The correct identification of a programme’s main stakeholder (or stakeholders), a study of its needs and the development of the programme concept aimed to satisfy the stakeholder’s needs and expectations, will help avoid difficulties in the development and delivery of the programme and ensure its success in relation to the demand for the programme, graduates’ employability, programme financing, programme content, programme evaluation and quality assurance. A programme must be flexible to survive in a changing environment, so it is important that an effective feedback mechanism is in place.

The faculty or department which designs and delivers the programme must be the principle body responsible for programme. A programme developer must be aware of modern trends in higher education development (and, in particular, in their own discipline) as well as of the requirements of professional organisations and accreditation agencies with regard to graduates’ attributes to ensure the recognition of the graduates’ competences.

To be competitive an educational programme must: be comparable in profile and quality or differ significantly from the similar programmes of other HEIs, while fully corresponding to the needs of its stakeholders; guarantee high standards of teaching and learning; have in place an effective mechanism for the continuous improvement of the programme. A systematic investigation of stakeholders’ needs and an updating of the respective programme’s concept and its objectives in correspondence to these needs are vital for an educational programme in a changing environment. The institution or department responsible for the programme delivery must have an on-going system for continuous programme improvement including a study of stakeholders’ needs, the definition of programme objectives and a systematic assessment of their achievement. The data collected by surveys of different groups of stakeholders (alumni, faculty, employers, etc.) must be analysed and used for the continuous improvement of the programme and for updating the programme’s objectives.

3.2. Step 2: Definition of the programme educational objectives

Definition of programme objectives is the next step in programme design. The programme objectives are brief descriptions of the programme concept in terms of the competences to be acquired by the students for graduation. Programme Educational Objectives are broad statements that describe the career and professional accomplishments that the programme is preparing

graduates to achieve within the first few years after graduation. The programme objectives describe the programme's uniqueness (specific features), but not the content. It is important to understand that programme objectives provide a mechanism for interaction with programme stakeholders.

The objectives must be published and available for all the stakeholders as well as shared by every faculty member participating in programme delivery. Thus, the objectives have to correspond to the needs of society in training specialists of a specific field as well as the needs of potential employers and be attractive for students and underline the programme's uniqueness (specific features) with respect to the programmes of other HEIs in order to make the programme competitive.

The processes of teaching and learning must ensure the achievement of the programme objectives. It is worth noting that the objectives are expected to be achieved within the first few years after graduation. Some objectives can be achieved by all the graduates while others are achieved only by some of them. The evaluation of the achievement of programme objectives is usually done through a survey of programme stakeholders (employers, alumni, etc.). The achievement of programme objectives is an important accreditation criterion as considered by the accrediting organisations, including ENAEE members. Each objective:

- Addresses one or more needs of the stakeholders;
- Must be understandable by the stakeholders being served;
- Must be consistent with the mission of the institution and be shared by each faculty member participating in programme delivery;
- Should be limited to a small number of statements;
- Should stress the uniqueness of the programme;
- Should be achievable;
- Must be supported by at least one learning outcome;
- Should be broader statements than those of the learning outcomes.

3.3. Step 3: Definition of measurable programme learning outcomes

To achieve the programme objectives a programme developer must split them into learning outcomes, create a curriculum with detailed descriptions of modules and disciplines including learning outcomes that support all the objectives. While programme objectives are broad statements that describe the uniqueness of the specialist training and give "a portrait of a graduate" for potential stakeholders, learning outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These are the skills, knowledge, and behaviors that enable graduates to achieve the programme objectives. They are acquired by students as they matriculate through the programme. The programme / module learning outcomes describe knowledge, skills, and behaviors that students must demonstrate upon completion of their studies. It is worth noting that learning outcomes should be acquired by all the students by the time of graduation; while programme objectives are achieved only by the graduates within the few years after graduation (and even then not all the objectives are achieved by all the graduates!). The programme outcomes must satisfy the requirements given below:

- Should be formulated in terms of knowledge, skills and behavior acquired by the graduates upon completion of the programme;

- Should be stated in such a way that students can demonstrate their achievement upon completion of the programme and before graduation;
- Must be a unit of knowledge or skill that supports at least one educational objective;
- Must be concise and clear to potential stakeholders: students, faculty members, employers and external reviewers;
- Must be observable and measurable; collectively, the achievement of all the learning outcomes of compulsory modules must lead to achievement of programme learning outcomes.

The programme learning outcomes are formulated by programme developers based on the programme learning objectives and stakeholders' requirements for professional and personal graduate attributes. The achievement of learning outcomes ensures mastering the programme (in other words, successfully studying and completing all the compulsory modules). Thus, as it was noted above, each objective has to be supported by at least one learning outcome. The programme learning outcomes are split into module learning outcomes. The learning outcomes of a single module are detailed requirements with regard to knowledge, skills and competences and possibly also attitudes that students must demonstrate upon completion of a module / course. They are formulated by programme developers together with the faculty members responsible for module / discipline development and must ensure the achievement of programme learning outcomes.

3.4. Step 4. Modules and credit allocation

A programme developer must plan how the programme learning outcomes are to be achieved by defining the programme modules. Each module has its own module learning outcomes (MLO) which contribute to the achievement of programme learning outcomes (PLO). A module's syllabus, teaching methods and technologies, and supporting facilities must be focused on the achievement of module learning outcomes. The achievement of any MLO requires a certain student learning activity (or activities) which is determined by the nature of MLO, the learning environment, technologies etc. Each MLO is assigned a number of ECTS credits, which is related to the average student workload needed to achieve that MLO. Thus, a programme designer allocates the total number of (mandatory) programme's credits among the MLOs according to their contribution to the achievement of programme outcomes. The notional learning time (student workload required) for a module is defined in accordance with its credit value. Each module must have assessment methods and tools in place to evaluate the achievement of the intended learning outcomes. Credits should not be assigned to a module if the module does not include an appropriate assessment of the outcomes to be achieved.

3.5. Step 5: Development of the assessment system for achievement of learning outcomes and programme objectives

There are many ways to collect evidence of student learning. To simplify the options, somewhat, assessment efforts are categorised as direct and indirect measures. Direct measures are probably more familiar to teaching faculty. A direct measure is based on a sample of actual student work, including reports, exams, demonstrations, performances, and completed works. The strength of direct measurement is that faculty members are capturing a sample of what students can do, which can be very strong evidence of student learning. A possible weakness of direct measurement is that not everything can be demonstrated in a direct way, such as values, perceptions, feelings, and attitudes. Because each method has its limitations, an ideal assessment program would combine direct and indirect measures from a variety of sources. This triangulation of assessment methods can provide converging evidence of student learning.

Dr. Gloria Rogers, who has been working with colleges and universities for over 20 years in the areas of programme assessment of student learning and institutional effectiveness, proposes for implementation following pool of direct and indirect methods. We summarised her ideas and presented these methods in Table 1.

Table 1. Direct and Indirect Assessment Methods

Direct Methods	Indirect Methods
Standardised exams	Written surveys and questionnaires
Locally developed exams	Exit and other interviews
Portfolios	Archival record
Simulations	Focus groups
Performance Appraisal	
Oral exams	
Behavioral observations	
External Examiner	

One of the comprehensive approaches to learning outcomes assessment, which is described in many sources, is *curriculum mapping*. Curriculum mapping is an assessment method, which is used to determine where, when, and how learning outcomes are taught and assessed within a degree programme. It provides an effective strategy for articulating, aligning and integrating learning outcomes across a sequence of courses, and explicitly identifying to students, instructors, administrators and external stakeholders how student learning outcomes are delivered within a degree programme.

The value of curriculum mapping is demonstrated when instructors collaborate to review data collected from the questionnaires in order to identify strengths, gaps, redundancies and inconsistencies in the curriculum. Based upon the aggregate data related to the intended and delivered learning outcomes, instructors are able to discuss the strengths and weaknesses and establish specific recommendations for improvement. They can evaluate the range and frequency of instructional and assessment methods, and examine how the depth and complexity of student learning experiences varies across the degree programme.

In accordance with the Glossary of Terms Relevant to Higher Education (Engineering), assessment with regards to students, is the total range of written, oral and practical tests, as well as projects and portfolios, which are used to decide on their progress in the Course Unit or Module. These measures may be used by the students to assess their own progress (formative assessment) or by the University to judge whether the course unit or module has been completed satisfactorily against the learning outcomes of the unit or module (summative assessment). Nowadays there are many assessment

techniques for modules or courses that a teacher could use after defining the intended module learning outcomes. In the book “Teaching Engineering” Peter Goodhew provided a helpful list of them:

- Closed-book examination;
- Open-book examination;
- On-line test, involving different options;
- Oral presentation with or without questions;
- Oral examination on a predetermined topic;
- Oral examination on open topics;
- Written report (with or without a pro-forma);
- Designs or manufactured artefacts;
- Poster or e-poster;
- Assignment involving numerical or essay questions;
- A portfolio of work, or an e-portfolio;
- A wiki.

To create a culture of success, where all learners believe they can achieve the module learning outcomes, teachers need to:

- 1) • make sure that learners are clear about:
 - What they are meant to be doing
 - How it will be assessed
 - What they are doing well
 - What is wrong and what needs to be done to put it right
- 2) • avoid reference to ability and competition and
 - Comparison with others.

The assessment practitioner must have some of the skills of the statistician and a good deal of the vision of the leader. Well versed in social science research methods, the assessor must be able to frequently and effectively discuss the validity of the process in one-on-one situations with faculty and the administration.

3.6. Step 6: Development of a blended learning approach for achievement of learning outcomes and programme objectives

There are three main reasons for adopting a blended learning approach to the design of teaching learning activities: (i) it makes the logistics of the training provision more flexible; (ii) it improves the quality of the learning process; (iii) it improves the productivity of both teachers and learners. Flexibility learners can use digital resources at any time or place with access to a laptop or personal technology, making it possible for learners to work more at their own pace, to study more flexibly, and take part in discussion and collaboration at a distance (Bates 2005); Quality – digital technologies bring unique capabilities to education, which improve the quality and effectiveness of the learning experience: practice with automated and individualized feedback, integration of collaboration with

self study, animated presentation, and interactive simulations (Clark and Mayer 2008). Productivity – in asynchronous online discussions, the teacher can give guidance tailored to learner needs more efficiently, and to large numbers of learners; a single digital resource can be reused and adapted in different contexts to be amortised over larger learner numbers; learners spend more of their time working at their own pace in a personalised adaptive environment, using their time better than in a single-paced whole class environment.

4. Conclusions

The authors consider that these features reflect the relation of FES with trends in global higher education and give “international dimension” to Russian educational standards and programmes.

These distinguishing features are the following:

- Transition to two-tier structure (Bachelor - Master) of higher education corresponding with “A Framework for Qualifications for the European Higher Education Area”.
- Transition to credit systems complying with ECTS to evaluate the workload of modules and programmes.
- Expansion of social responsibility of Russian higher education in general and its institutions for personal and interpersonal students’ skills, ensuring their ability to professional and social activity upon completion of educational programme.
- Interdisciplinary and transdisciplinary approach to design and implementation of educational programmes.
- Ensuring consistency with traditions of Russian higher education to provide students with fundamental disciplinary knowledge and high level of their professional thinking.
- Tendency to balance cognitive learning with acquiring practical skills in communications, problem and critical thinking; strengthening of creative approach to the educational process.
- Using of module principle in design and implementation of educational programmes.
- Focusing on students’ achievement by applying adequate assessment tools and technologies.
- Increasing the level of students’ freedom when choosing individual educational paths.
- Expansion of universities’ autonomy and academic freedom in design and implementation of educational programmes, particularly in defining their content and using educational technologies alongside with the increasing HEI responsibility for the quality of education. FES give the universities right to structure their educational programmes taking into consideration institution mission, traditions, aims, and stakeholders’ demands.
- Development of efficient social dialogue between HEIs and industry as a prerequisite for designing of successful educational programmes.
- Increasing of staff and students’ responsibility for efficiency of educational process.
- Identified FES features such as multi-tier system, interdisciplinarity, collaboration with industry, will contribute to efficient development of competencies of engineering graduates.

The new FES differs from the previous standards first of all by usage of the outcomes-based approach and the two-tier system (introduction of Bachelor-Master programmes for majority of specialities / disciplines in higher education). The third generation of the Standards incorporates

changes in nature of master programmes in Russia. Master programmes have become 2-year study programmes that provide graduates with in-depth competencies in the relevant field of study. They are now separated from the Bachelor ones (it is worth mentioning that Master studies were considered to last 6 years including 4 years of Bachelor studies according to previous legislation).

The new FES differentiate master study programmes between research- and practical-oriented profiles to prepare graduates for different types of professional activities, especially in engineering. Thus, master studies are not considered anymore as a preparatory step to PhD studies. Master programmes are acknowledged to be programmes reflecting university's scientific traditions and academic policy. New standards allow developing interdisciplinary master programmes integrating knowledge from a number of co-fields of study. This is of special importance for innovations in engineering education that is required to grow-up "new generation of engineers" being able to create and deal with advanced technologies and knowledge.

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