# The Model of Two-Degree Education Based on Various Master's Programs

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*Abstract*

*The article describes the experience of creating original international Russian-Kazakh model of two-degree master's education based on the development and implementation of combined educational programs on the basis of two different, but close profile educational programs: the Russian master's program Information technologies in education, field code 44.04.01 Pedagogical education and the Kazakh master's program Information systems, field code 6M070300 Technical sciences and technologies. Academic disciplines contents are listed, mutually qualifying to students of parallel programs. Based on the analysis of the first implementation experience of two-degree education programs, it is concluded on the feasibility of this model of two-degree master's education and covered on organizational and financial-economic aspects of this approach implementation through the involvement of advanced distance educational technologies.*

*Keywords: network education, master's degree, two-degree education model, combined education programs.*

## 1. Introduction

Information and communicative technologies (ICT) are one of the factors, mostly affecting the establishment of XXI century's society. *Any individual, wherever he is, should have access to the advantages of global information society and no one may be excluded* (Okinawa Charter on Global Information Society, 2000). ICT much affect the humanitarian sphere, including education. Modern education trends are expressed by distance learning and e-learning.

Distance learning and e-learning strategy is getting more and more popular especially in higher education. The analysis of that issue for the recent 50 years shows that in XXI century's communications, review and recognition of theory is required for restructure of e-learning, along with new arguments for joint dialogue and discussion of learning process parties (Ravenscroft, 2001). In higher education, in question are the relevant issues on virtual learning media as well as realization, management and support of the service for users, accessibility and usability discussed within legal framework (Catherall, 2004).

In the global practice, currently various forms of virtual academic mobility of students using ICT are intensively developed by various educational institutions including those from foreign countries which contributes to quality and selectivity of education and also to multicultural exchange (Tereseviciene, Volungeviciene, & Dauksiene, 2011). As an example of such mobility, Zurich University project should be mentioned. It unites 16 universities all over the world including Russian state humanitarian university (Hoffman, 2009). The project is engaged in new methods of knowledge

transfer, overcomes the specifics of multicultural and interdisciplinary educational context and takes the relevant teaching issues to a new level. Meantime, the analysis of recent years' trends in European e-learning shows that physical academic mobility begins to fall behind virtual academic mobility of students and teachers which means simultaneous growth of Internet technologies in education (Teichler, 2012). The above means that the issues of accessibility and usability for students are the most important in organizing network education as a form of education in a few educational institutions.

*Theoretical Foundations (hypothesis).* The above processes and directions of research are getting active development in the Russian Federation (RF) and Republic of Kazakhstan (RK), being neighbor countries in the Commonwealth of independent states (CIS). Based on the two-degree education experience, we suggested that in some situations it will be more comfortable and profitable for students to receive faster education and gain more stability upon receipt of two various profile diplomas, namely: a) concentration of student's interests to labor market of neighbor countries using the same language (Russian) kept as communication and practice language; b) use of virtual mobility instead of physical mobility creates the conditions more comfortable for students during education process, causing no damage to multicultural unity in close neighbor countries; c) use of e-learning technologies will make education more accessible and dynamic; d) creating two-degree educational program *on various profiles*.

## 2. Method

The main idea of our method is in choosing two master's degree programs (EP-X and EP-Y), to a great extent coinciding in most disciplines. The best prerequisite for model's realization may be advanced maximal possible approach of educational programs EP-X and EP-Y, i.e., building their modifications EP-X* and EP-Y* – both based on detecting *really matching disciplines* and *disciplines admitted identical* to educational purposes. That may be shown on a scheme (Fig. 1): University-1 student doing EP-X* intends to do EP-Y* of University-2, while a student of University-2 doing EP-Y* intends to simultaneously do EP-X* of University-1. Meantime, each of them plans to finally get two degrees – University-1 and University-2.
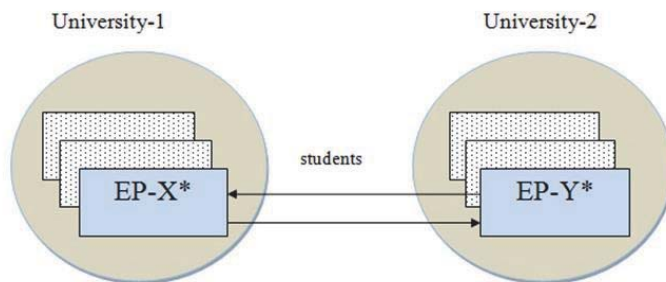


**Figure 1.** Two-degree education model realization based on various master's programs.

We suggest that the creation of the above conditions on education for students interested in two-degree education makes education easier for a wider range of education which in future will create the best opportunities in the labor market for graduates.

## 3. Results

An important condition which needs to be accounted for in development of joint interstate educational programs is the need to make them compliant with the current regulations of the Russian Federation (RF) and Republic of Kazakhstan (RK) and governmental requirements to master's degree education. Those cover the rules of matriculation and academic process organization as well as the form and status of diplomas issued. It is obvious that parties to agreement should ensure the compliance of joint activities with the regulatory provisions. Each party guarantees availability of legal opportunities for execution of the liabilities assumed, staff allocation, permissions and other conditions in connection with legal educational activity. For that reason we will begin brief analysis and comparison of the current regulations of RF and RK in education.

In Russia, education based on various educational institutions cooperation was called *network form of education* (should not be mixed up with Internet education). The regulatory basis of network form is Act *On education in the Russian Federation* where the basic provisions governing the development of that form of education were declared: *Network form of realization of educational programs ensures the opportunity for doing educational program by students using the resources of several organizations including foreign and using resources of other organizations when required* (Federal Act *On education in the Russian Federation*, 2012). As we see, network education in the said sense is not directly similar to Internet education, although electronic distance technologies are not excluded. Network form of educational programs realization is exercised via contracts between organizations and for realization of network form by several educational organizations they jointly develop and approve educational programs.

In Republic of Kazakhstan, network education, i.e., education based on cooperation of various educational institutions (although *network education* term is not used in Republic of Kazakhstan's documents) is also set by Act of Republic of Kazakhstan *On education* which introduces *academic mobility* defined as transfer of students or teachers/researchers for teaching or doing research for a certain academic period or year to another higher educational institution (domestic or foreign) with transfer of credits (done educational programs) in his/her educational institution or for continuing education in other higher education institution (Act of Republic of Kazakhstan *On education*, 2007). Meantime the procedure for realization of educational programs on the international level is governed by that act as follows: *educational institutions in compliance with their specifics of work may establish direct links with foreign educational, scientific and cultural institutions, international organizations and foundations, conclude bilateral/multilateral contracts on cooperation, take part in international exchange programs for students, master degree students, postdoctoral students, teaching and scientific staff, enter into international governmental organizations (associations) in education.*

Today it is fully clear that the basic principles of network education like openness, democracy, individual study opportunity regardless from the residence place, adaptation to any network party, compliance of learning, multiple forms of learning, extra educational resources, modern educational technologies, mobility may not be realized fully without use of distance education via Internet. Use of those methods in the Russian Federation and Republic of Kazakhstan is governed by the regulations adopted according to national Acts on education, namely: *Procedure for application by educational institutions of electronic learning, distance educational technologies in realization of educational programs* (RF) (Order of Ministry of education and science of Russia dated January 9, 2014, No. 2) and *Rules of academic process organization on distance education technologies* (RK) (Resolution of the Government of Republic of Kazakhstan dated January 19, 2012, No. 112) in which distance educational technologies (DET) are considered as a way of education via indirect (distance) or not fully indirect interaction of student and teacher. Understanding that not all online education issues in RF and RK are finally settled now (including distance education service quality, full cycle online education, etc.) we assume that in future network education DET will keep their significance.

The second level educational programs – master's degree – are of great importance in developing educational systems of both Russia and Kazakhstan. In that connection, of special interest and importance in network master's education a new form of network education is improving – *two-degree education*. Students may within the same academic time receive two diplomas: one of own university and the other – of partner university. The sense of two-degree educational programs is that students finish part of their courses in their university and the other part in partner university with transfer of credits in both.

As global practice shows, in most implementation variants two-degree education is built on educational programs of the same profile. In that case, a graduate student receives diplomas virtually on the same specialty with the only difference that they are issued by various partner universities, as a rule, from various countries. We opine that of special attractiveness for students is the variant when two-degree educational programs allow for diplomas of *different profile*. Being deliberately built in mutually compliant educational programs of various profile, they allow for the receipt by students of two different profile diplomas during parallel education. That gives extra stability in the labor market, giving graduates the best opportunities to choose a job both in home country and abroad.

Now we will see the basic ideas and current results of practical experience of two-degree education in cooperation of Omsk state pedagogical University (OmSPU, Russia, Omsk), Eurasian national University ENU, Republic of Kazakhstan, Astana) and North Kazakhstan state university (NKSU, Republic of Kazakhstan, Petropavlovsk) in compliance with agreed parallel training of masters with two diplomas – engineering/technical and pedagogical profiles.

As a result of the analysis of concrete educational situation in ENU, NKSU and OmSPU, the basics for two-degree model building were chosen as follows: educational master's program of OmSPU coded 44.04.01 *Pedagogical education*, profile *Information technologies in education*, and educational master's program of ENU and NKSU coded 6M070300 *Technical sciences and technologies*, profile *Information systems*.

Below there are brief abstracts of disciplines of general scientific and professional cycles mutually credited in the

implementation of two-diploma education, respectively in OmSPU, ENU and NKSU.

The purpose of disciplines from OmSPU's educational program *Pedagogical education*, profile *Information technologies in education* is to ensure establishment of informational and communicative competency as part of professional competency of future masters in education accounting for their profile and specifics of future professional activity in education. First of all, those are disciplines of general scientific and professional cycles. We stress that the below abstracts of disciplines' programs are taken from Russian university's academic plan.

*Course Contemporary problems of science and education.* Organization of scientific research in Russia. Information science as a scientific area. Contemporary problems of education. Contemporary problems of education informatization.

*Course Methodology and methods of scientific research.* Methodology and philosophy of scientific research. Methodology of scientific pedagogical research. Methods of scientific pedagogical research. Preparing master's thesis.

*Course Information technologies in professional activity.* Basics of information technologies. End user's information technologies and informatization of education. Polyfunctional integrated packages for scientific research tasks solution. Pedagogical software and its application areas. Distance educational technologies in pedagogical professional activity.

*Course Legal and regulation aspects of distance education.* Establishment of DE regulations at the initial stage of educational informatization in Russia (1995–2005). Global trends of distance education. Contemporary stage of distance education regulations and open education development in Russia.

*Course Tutor's activity basics.* Prerequisites of establishment and specifics of distance education medium. Tutor in distance education system. Tutorship as a professional activity. Basic kinds of tutorship. Tutor's methods of working with students in DET.

The purpose of the current ENU's and NKSU's educational programs *Technical sciences and technologies*, profile *Information systems* is to ensure establishment of professional competency of future engineering and technical masters accounting for the specifics of future professional activity. First of all, there are professional cycle disciplines.

*Course Foreign language (professional).* The purpose of this unit is deep study of terminology within the topic. Scientific article translation skills (from Russian to a foreign language, from a foreign language to Russian), discussion skills on global issues of our country's and foreign information systems. Learning material is aimed to ensure command by future specialists of professionally oriented foreign language skills and professional communication in a foreign language in various spheres, accounting for needs, interests and personal specifics of students.

*Course Theoretical basics of information processes.* The unit covers: contemporary models for analysis of theoretical basics of information processes, models and algorithms of data analysis, data coding. Use of modern data analysis means, computer modeling and finding dependencies in data, computation experiments skills.

*Course Architecture of information systems.* The unit covers: Architecture of information systems, basic terms. Classification of IS by areas of use, organization methods, scale of implementation. Core software components. IS development stages.

*Course Methods and means of information systems development.* Methodology and technologies of information systems design, structural approach to information systems design, means for support of software life cycle, technologies for implementation and characteristics of CASE.

*Course Instrumental means of information systems.* Instrumental means, basic terms. Instrumental means of information systems design stage. Instrumental means of information systems development stage.

*Course Automation of information business processes.* Systems approach in corporate processes automation. Formats of electronic documents turnover, business modeling, business processes control languages, tasks and instruments of business processes, approaches to description of business processes.

*Course Infrastructure of information systems.* Corporate information system notion. Main concepts on CIS. Architecture and logical structure of CIS. Physical and software structure of CIS. Specifics of modern IT in CIS. Core units of CIS.

*Course Methods for design of information protection systems.* Violator models. Classification of violators. Basic provisions of security policy and safety model. Classes of information security models. Standards for governing regulations on information security. Indicators and classes of security of hardware and automated systems. Categories of requirements and standards for information security means. Password systems of information protection. Encryption system notion. Verification methods. Access control. Correct operation of automated systems. Information security systems design. Control over integrity of information resources. Information security standards. Incidents control.

*Course Intellectual information systems.* Main terms on AI. Subjective area of intellectual information systems. Psychological aspects of AI. Representation and output of knowledge. AI systems architecture. Search tasks. Informal procedures. Logical programming, data structure, syntax, semantics of Prolog.

*Course Cloud computations and technologies.* Basic information on emergence, development and use of cloud computation technologies. Cloud models: private cloud, public cloud, hybrid cloud, social cloud. Main models of cloud services: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), other cloud services (XaaS). Review of solutions of the key vendors – Microsoft, Amazon, Google. Main advantages/disadvantages of cloud computation models and relevant solutions. Economy of cloud computations. Development of Web applications for clouds, transfer of existing applications. Programming techniques, system administration of cloud applications. Virtualization technology. Transactional Web applications, installation of virtual servers for their support. Issues in connection with security, scaling, opening, reserve copying in the cloud infrastructure context. Advantages of cloud infrastructure in scaling applications. Specifics of emergency restoration in clouds.

Each of the above groups of disciplines from educational programs of OmSPU, ENU and NKSU is subject to credits transfer in the parallel program if they are passed successfully and acknowledged by duly issued academic certificates (transcripts). Meantime, the volume of disciplines subject to credits transfer in hours from educational programs of ENU and NKSU, according to Kazakhstan's credits (1 credit is 45 hours) should not be less than the volume of disciplines of OmSPU in hours according to credits of OmSPU (1 credit is 36 hours) and vice versa.

We note that the aggregate of the above disciplines subject to credits transfer does not make the full list of disciplines of the initial educational programs in ENU, NKSU and OmSPU. Besides them, there are some special disciplines in educational programs which were not included in that list and reflecting the profile specifics of those educational programs. The studying intensity of that special part of educational programs which falls out of mutual credits transfer system is about 20% of the total studying intensity of educational programs.

Master students are studying joint programs' disciplines via e-learning and distance educational technologies (DET). Incorporation of those courses in educational programs supported by full interactive content on educational Web portals of universities contributes to the solution of tasks on training masters in education for e-learning and DET implementation.

Final state attestation is passed by students according to the schedule in the universities which educational programs they do; for that purpose they need to be physically present in partner universities. After completing education in full and successful passing of final state attestation, the universities issue diplomas as follows:

ENU and NKSU – state diploma of Republic of Kazakhstan for master's program *Information systems in education*, field code 6M070300 *Technical sciences and technologies*;

OmSPU – state diploma of the Russian Federation for master's program *Information technologies in education*, field code 44.04.01 *Pedagogical education.*

The liability for issuing documents of two-degree educational programs acknowledging the compliance with the qualification requirements listed in annex is borne by ENU, NKSU and OmSPU respectively.

## 4. Conclusion

As we see, the above two-degree educational process based on joint programs has two-way symmetric nature. Meantime it is fully obvious that financial costs on realization of courses from the point of view of teaching volumes by partner universities' teachers are greatly reduced as a lot of disciplines is taught and attested by the other party.

The questionnaire of students showed that students of ENU and OmSPU in general positively assess the organizational basis of the above variant of two-degree education. Out of the questioned students, 90% told that choosing different profile two-degree educational programs is attractive from the point of view of future job finding, while 80% told that doing different two-degree educational programs with cross-disciplines does not cause overstudying.

## 5. Acknowledgment

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