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NATIONAL ERASMUS+ OFFICE IN KAZAKHSTAN

CAPACITY BUILDING IN HIGHER EDUCATION PROJECTS IN KAZAKHSTAN

REVIEW

ALMATY, 2021

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Introduction

Erasmus+ has a special place among higher education initiatives supported by international organizations. The programme is the successor to the Erasmus programme, which started in the 1980s as a mobility programme for European university students, with only 3,200 students in its first year; in a little over 30 years it developed into a flagship programme with almost 300,000 university students participating annually. The programme has expanded to include both university and technical college students, youth exchange programmes, volunteer and teacher exchange in all areas of education, training, youth policy and sports. For 30 years, the programme has provided an opportunity, especially for young people, to gain new experience and broaden their horizons through mobilities abroad.

Since then, Erasmus has proved to be the only programme aimed at promoting international cooperation in all these areas, especially in higher education.

The international dimension of the Programme began in 1991. Universities outside Europe were given the opportunity to participate in its activities. Kazakh universities have been participating in it for 25 years, since 1995. Initially, these were four stages of Tempus (1995-2013) evolving into Erasmus+ (2014-2020) with 137 Tempus and CBHE Erasmus+ projects involving universities in the Republic of Kazakhstan.

The Erasmus+ programme of the European Union supports projects, partnerships, activities and mobility in education, training, youth development and sports. The Programme has provided funding for the development of cooperation in all these areas, both among European countries and between European and Partner countries worldwide.

The Programme headquartered in Brussels is implemented by the European Education and Culture Executive Agency (EACEA) and National Agencies (NA) in Programme Countries . Funding is allocated on the basis of the results of the annual Calls for Proposal.

In total, over 16 billion euros have been allocated to the programme for the period 2014 - 2020, including financing:

- *Over 1,000 Capacity Building in Higher Education (CBHE) projects,*
- *Development of more than 300 new Erasmus Mundus Joint Master Degrees (EM JMD)*
- *Over 30,000 scholarships to students and university staff for Master degree programmes,*
- *270,000 individual scholarships to support International Credit Mobility (ICM) between*
- *universities in Partner and Programme countries,*
- *Support for 1,500 Jean Monnet projects.*

Kazakh universities are completing the current phase of the Programme with good results – both in terms of the number and quality of CBHE and ICM projects as well as in broadening the geographical coverage with universities in all 17 regions of Kazakhstan now participating in Erasmus+ projects.

Kazakh universities are actively involved in all four components of the international dimension of the Programme. 54 universities and 44 organizations and enterprises in Kazakhstan are involved in 61 CBHE projects. The total amount of funding for these projects is over €54 million.

4 Kazakh universities were the pioneers in Central Asia to become coordinators of 6 CBHE projects. This is Narxoz University (1 project), Kazakh National al-Farabi University (2 projects), Karaganda Medical University (2 projects), Kazakh Seifullin Agro-Technical University (1 project), South-Kazakhstan Auezov University (1 project).

Introduction

54 Kazakh HEIs benefitted from the 61 projects selected during the E+ (2015 – 2020). These have also involved over 170 partners from 29 Programme and 16 Partner countries.

The figures are speaking for themselves:

- *56 new curricula and 562 new disciplines designed*
- *226 existing curricula and 451 disciplines, including MOOCs updated*
- *214 courses, including professional development of specialists (LLL courses) developed*
- *7937 students enrolled in new /updated curricula*
- *3377 academic staff trained in the framework of the project and as follow up over 10800 staff benefitted from cascade training and refresher courses*
- *2364 business representatives trained*
- *110 Centres/laboratories/offices established*
- *151 International agreements and 477 agreements with stakeholders signed*
- *In the framework of 939 ICM projects, 3,374 students and staff of Kazakh higher education institutions were given the opportunity to study, teach/upgrade qualification in the universities in Europe and host 1,671 representatives of European HEIs.*
- *224 Kazakh citizens received EMJMD scholarships.*
- *9 universities in Kazakhstan have implemented 10 Jean Monnet projects.*

The impact of CBHE projects is visible at the individual, institutional and national levels. CBHE projects have become catalysts for change at the level of the national higher education system, promoting quality assurance and accreditation, autonomy in university management, development of entrepreneurial skills, distance and blended learning, «Green policy», greater integration of higher education and the corporate sector, increased capacity of higher nursing education, adaptation of the education system to the digital generation, convergence of higher and technical and vocational education, internationalization of universities and many other aspects.

Several educational programmes of Kazakh higher education institutions are harmonized with European ones;

New structural units and services have been created that meet the requirements of internationalization, student-oriented learning and sustainable development;

Project participants have enhanced professional and universal competencies, and a pool of experts has been prepared at the institutional and national levels, with advanced methodologies and the ability to participate in educational reforms at the national and interregional levels on a wide range of issues:

- *water resource management,*
- *cybersecurity,*
- *space research,*
- *microelectronics,*
- *quality assurance,*
- *evidence-based medicine,*
- *development of entrepreneurship and leadership,*
- *land protection and restoration,*
- *precision agriculture and many others;*

No need to say that the mentioned achievements would have been impossible without the support of EU partner institutions.

Introduction

The present Impact Study aims:

To contribute to further increasing the visibility of the Erasmus+ programme

Analyse key factors that ensure the impact and sustainability of the project results

Highlight success stories and outline key challenges

Help new project participants to build on the lessons learned in the next phase of the Programme.

The publication presents the results and impact of 38 CBHE projects, as well as the findings from the projects monitoring. The review is structured in 8 sections, describing projects according to the commonality of their purpose and main subject matter. Accordingly, the length of the sections varies from one/two to several of the projects presented in the sections.

General recommendations are presented in Section «Challenges and Recommendations».

We believe that the experience presented and the results of the projects will be of interest to a wide audience and useful to:

New project teams,

Programme designers from Programme and Partner countries

National and international agencies,

Representatives of universities, scientific organizations, enterprises, students.

FOREWORD

This year marks the 25th anniversary of Kazakhstan becoming a member of European Union Tempus and Erasmus+ programmes. We highly appreciate the cooperation with the European Union in the area of higher education.

The Capacity Building for Higher Education, International Credit Mobility, Jean Monnet, Marie Sklodovska-Curie Actions have been an excellent incentive for academic staff and researchers to work jointly with European colleagues, improving their professional and personal skills.

Capacity Building in Higher Education projects offer an opportunity not only to strengthen the partnership between Kazakhstan's higher education institutions and the well-known universities in Europe, but also to modernize the content of education, having a positive impact on the development of Kazakhstani higher education system.

Kazakhstan is a leader among Central Asian countries in participating in Erasmus+ projects. Undoubtedly, the National Erasmus+ Office in Kazakhstan has played a significant role in the coordination of projects throughout these years.

We are confident that the traditions of Erasmus+ will continue in the new phase of the European Union Programme, and Kazakh universities will continue their successful cooperation with their European counterparts.

Askhat Aimagambetov
Minister of Education and Science
of the the Republic of Kazakhstan

FOREWORD

The education sector is one of the main priority areas of cooperation between the European Union and Kazakhstan. The European Union supports the cooperation between universities in Europe and Kazakhstan within the framework of the Erasmus+ Programme which is widely considered as one of the most successful European Union funded programme. Erasmus+ offers several opportunities for higher education institutions. It invests in projects to modernise the education systems through the development of innovative academic curricula, didactic approaches and teaching materials and it also fosters student and academic staff mobility and knowledge exchange.

Kazakhstan has the highest number of capacity building projects in the region: 61 projects have been launched since 2015 involving 54 Higher Education Institutions and 44 other organisations in Kazakhstan. Such projects involve also over 100 project partners coming from 20 different countries in Europe and beyond. The total funding for these projects exceeds 50 million euros. Additionally, over 15 million euros in grants for academic mobility between Kazakhstani and European institutions allowed more than 5,000 students and academic staff to study or teach in the partner university abroad. Moreover, about 230 students from Kazakhstan have received the highly competitive Erasmus Mundus scholarships to complete the prestigious Joint Master Degrees in European universities. Another opportunity which the Erasmus+ programme offers to Higher Education Institutions is the Jean Monnet programme which aims to develop and support the European Union studies worldwide. To date, several universities in Kazakhstan run 10 Jean Monnet projects with a total budget of 260,000 euros. Some Kazakhstani institutions went further beyond the usual international component of the programme and joined the European projects of Strategic partnerships and Youth.

This year, Kazakhstan celebrates its 10-year anniversary in the Bologna process and 25 years within the Tempus programme, which became then Erasmus+ in 2014.

Looking back, I am glad to acknowledge the considerable work and significant accomplishments of Kazakhstani Higher Education Institutions in their integration process within the European Higher Education Area. And I am very proud that the Erasmus+ programme of the European Union has greatly contributed to the achievement of these results, as this report shows.

I am confident that such precious collaboration between European Union's and Kazakhstani Higher education institutions may continue and may be even more successful in the years to come. And I wish the beneficiaries and stakeholders of the programme all success in implementing the future projects and ensuring sustainable and concrete results.

Sven-Olov Carlsson,
the Head of the ***EU Delegation***
to the Republic of Kazakhstan

FOREWORD

In 2015, United Nations Member States adopted 17 Sustainable Development Goals (SDGs). Higher education is one of the priorities of SDG 4 that by 2030 all women and men should have equal access to affordable and quality vocational and higher education, including university education. In achieving this ambitious goal, the internationalization of higher education is becoming increasingly important.

The Parliament of the Republic of Kazakhstan, by ratifying international agreements and translating the Sustainable Development Goals (SDGs) of Kazakhstan into binding national law, plays a decisive role in positive changes. As a representative of the people and as a platform for multilateral dialogue, Parliament promotes accountable systems and mechanisms, including higher education, to ensure the sustainable development of Kazakhstan.

The most important trend in recent decades has been the powerful processes of globalization and integration that have taken hold of the economy, business and social life. With the development of these processes, it is becoming increasingly clear that the national higher education system cannot develop outside global trends and needs to strengthen the international component and internationalization. Kazakhstan is striving to align its higher education system with that of the European Higher Education Area, in accordance with the principles of the Bologna Process, the introduction of a three-level structure of degrees, an independent system of quality assurance, National Qualification Framework. The creation of equal conditions and barrier-free access for students with special educational needs and the expansion of distance education technologies are also priorities.

These and many other issues of concern for higher education in the country are reflected in the content of the European Union Erasmus+ Programme projects, which have been implemented by Kazakh higher education institutions in the last few years under the coordination of the Erasmus+ National Office in Kazakhstan. As can be seen from the project content review, all studies, despite their thematic and target diversity, are aimed at producing results leading to positive changes in higher education, leading to their further long-term development and sustainability. Most of the projects have been successfully implemented in this complex mission. I hope that this substantive publication will make the results of the projects more accessible to universities that have not participated in them but are ready for innovation and continuous development.

Akylbek Kurishbayev
Member of the Senate of the Parliament of the Republic of Kazakhstan

FOREWORD | *25 years of creative journey*

A quarter of a century has passed since Kazakh higher education institutions were involved in EU projects: the origins began with Tempus projects in 1995, and now - Erasmus +.

In this, in historical terms, a short time more and more Kazakh universities take part in both Capacity Building in Higher Education and International Credit Mobility projects. Today, it is with pride we note that universities from all regions of the country are involved in these projects. And we note their enormous impact in all regions and at the country level.

As a result of its participation in projects, Kazakhstani higher education system, getting involved in the world and European trends in higher education, is acquiring features and is following the priorities of international trends. This certainly has an impact on the internationalization of higher education. Indeed, since the beginning of the new century, the processes of globalization and internationalization have shaped the development of modern higher education, enabling it to adapt to the new conditions by adjusting the values of the university community.

Kazakh higher education is developing as an open system. Through the participation in Erasmus+ projects such Bologna process tools as quality assurance and accreditation system, qualification framework, autonomy of universities, credit-based technology and many more have been implemented in our national higher education system. Impact at the national level increases not only the competitiveness of the national higher education system, but also the sustainability of projects.

The participation of Kazakh higher education institutions strengthens the internationalization of higher education through the introduction of a foreign component in educational programmes, implementation of double-diploma programmes, modernization and development of new BA, Master and PhD programmes, new teaching and learning methods, increasing the competence of universities in various branches of the economy and social life in the context of programmes and courses, establishing institutional systems of quality assurance, strengthening integration of higher education and corporate sector. The projects also have an impact on the development of communication culture in a new language and cultural environment.

Impact at the individual level is also important - language skills of students, academic staff and education managers, their ability to work as a team, to compare national priorities with world trends are formed.

Access of Kazakh students to Erasmus+ International Credit Mobility projects gives them unprecedented experience of life, learning and communication in a multicultural environment. Indeed, the ICM projects shape the basis of respect and diversity of choice, recognition of the cultural values of other countries against the background of national flavour, and the creation of a multicultural space.

The participation of Kazakh higher education institutions in the European Union projects undoubtedly contributes to a positive transformation of the Kazakhstani higher education system, helps improving Kazakhstan's position on the world market for educational services.

Serik Omirbayev,
The First Vice-Rector of Astana IT-University,
Chairperson of the HEREs Steering Committee

Executive summary

The highest level of any project result is its impact. This is what is ultimately expected from the project; these are beneficial changes that are relevant not only to the project participants and the target group, but to institutions and to the system as a whole - in our case, the higher education sector (HE).

Impact assessment involves identifying and understanding the results of the work done and assessing their value. Why is such an analysis needed? It is obvious that each project ends with a fairly detailed account of its key results, achievements, benefits and disadvantages.

However, in continuously reviewing the experience of different types of projects in many countries, experts in modern project management have included the evaluation of the project impact as an integral component. It is this assessment and related findings that enable project coordinators, programme managers, focal points, beneficiaries, partners, financial donors and other project/programme stakeholders to learn from the experience gained and to improve future work in this area. It is this evaluation that shows how sustainable the project results are, how the actions taken have affected the key challenges, whether (and what?) changes in the situation of the beneficiaries, the target group and the project stakeholders identified in its main objective and objectives have occurred.

Since the impact of a project can only be judged, with some exceptions, some time after the completion of the project , the evaluation review is not part of the main project report, but is usually prepared additionally.

20 out of 61 CBHE projects implemented in the frame of Erasmus+ in Kazakhstan in 2015-2018 (approximately 30%) have been completed by now; most of them, or 70%, are at the stage of completion. Coordinators and experts of some of these projects have also conducted an interim review of the results of their work with a view to assessing their impact and sustainability, as proposed by the National Erasmus+ Office in Kazakhstan.

Erasmus+ Capacity Building in Higher Education projects aim to meet the challenges of supporting modernization, innovation and accessibility of HE; improving the quality of HE and its responsiveness to the needs of the labour market and society; ensuring equal access to HE; promoting cooperation between the EU and Partner countries, etc.

The very importance of CBHE projects lies in enhancing the capacity of individuals and entities involved in higher education and interested in its continuous development and improvement. The main objects of influence of the Joint Projects, depending on their theme and objectives, are:

1) participants (students, staff, managers, researchers),

2) structural subdivisions of the institution (faculties, departments, laboratories and other units,

3) universities as holistic systems, their processes and conditions (educational, managerial, information, technical), strategy and policy,

4) relations with the world of labour.

In contrast to Joint Projects the Structural Projects are intended to have an impact on the higher education system as a whole and on the promotion of reforms at the regional or national level in Partner Countries. The participation of national bodies (Ministry of Education and Science) is a prerequisite for the implementation of Structural Projects. They are divided into two categories of activities:

1) Modernization of Policy and Management of HE Systems and

2) Strengthening of links between the higher education system and the wider economic and social environment.

Executive summary

In other words, the impact of project results is expected at several levels: individual, institutional/system-wide, and national, inextricably linked.

Analysis of reports on the impact of CBHE projects in Kazakhstan implemented in 2015 – 2020, has shown that the most obvious, significant positive changes have occurred at the individual level.

A convincing example is the project «Transition to University Autonomy in Kazakhstan» (TRUNAK), which has had a positive impact on the professional, personal and general cultural development of all its participants, including top managers, administrative and teaching staff, university students, project team members.

Working in the project, in interaction with European colleagues they became more aware of the current situation, problems and potential advantages of autonomy of Kazakh universities, used the opportunity to choose and study the best national and foreign experience in university governance.

They have significantly improved information literacy skills and shown willingness to change under the conditions of autonomy, enhanced management competencies, working in a coherent and clear manner in the project teams, including: persuasion and argumentation, preparing and making presentations, public speeches, focus on results, time management, use of feedback, delegation of authority, etc.

They also Improved cross-cutting skills in critical, systemic, creative thinking; developed skills in the development of normative documentation reflecting responsibility-sharing, harmonization of functions, transparency of results and processes, control mechanisms, etc.

The level of proficiency in English has been significantly improved, including skills in the translation of terminology in education management, business communication, presentation design, booklet development, design of stands and roll-ups, infographics. Project managers became more knowledgeable about the financial management of the project, the organization of missions abroad and ensuring the participants' work efficiency .

Four Kazakh universities participated in the project "Accessibility and harmonization of higher education in Central Asia through modernization and improvement of the curriculum" (ACADEMICA). Kazakh participants - teachers (124 persons), who studied at the trainings and seminars at universities in Europe and Asia, have learned new professional experience and many cross-cutting personal skills , necessary for a career in the coming decades.

Among the professional competences are the basics of media literacy, media education and distance learning relevant for inclusion in the global digital educational space, including experience of audio and video accompaniment of educational materials, creating short and concise presentations, monitoring teaching activities through online questionnaires, reflexing through microblogging on mypage.ru, development of check-sheets through www.rubistar4teachers.org, recording podcasts and conducting webinars, etc.

Under the influence of the projects, the teaching resources of teachers who have mastered and applied a variety of active teaching approaches have been radically updated. Thus, the participants of the project «Development of Transregional Information Literacy for Lifelong Learning and Knowledge Economy» (DIREKT) in their teaching practice emphasize student-centered learning, development of student autonomy, apply methods of problem solving and situation analysis. In their classes, students independently solve problems, find answers to questions and formulate their own questions, discuss, explain, argue, make conclusions. There is also co-education, where everyone works in small groups, analyzing problem situations that are as close to reality as possible. Equally successful is the use of the project method to develop students' research skills, as well as brainstorming technology to improve students' cognitive operations.

Executive summary

In fact, all projects had a positive impact on the development of foreign (mostly English) languages not only during the project activities, but also after the completion of projects in various foreign language training courses, in other international projects, in the preparation of training materials, etc. As a result, many participants from the basic level of «beginners» have risen to the level of professional language skills.

A good example of such progress in this sense is the project «Training Against Medical Error» (TAME), which provided to the participants and, thanks to them, to other professors of medical universities of the cities of Nur-Sultan and Karaganda - the opportunity to master the English language professionally. This has increased their motivation to share their experience with their colleagues and students, to continue to participate in the preparation and implementation of new projects, in foreign internships and study visits.

All participants in the project "Towards incoming International University Communities" (WELCOME) also appreciate not only the clear progress in English language proficiency, but also the reduction of the psychological barrier in working with foreign colleagues, which was of great importance in practical application of strategic and marketing methodologies to enhance academic exchange and promote international mobility of students, professors and researchers coming to Kazakh universities.

The development of language competences facilitated the transition of the participants of project "Enhancing University Teaching on Thermal Power Systems for Cleaner Environment with Parallel Improvements in PhD Skills Development (ASIAXIS)" and many of their colleagues to provide training in English. As a result of the project "Development of Two Cycle Innovative Curricula in Microelectronic Engineering (DOCMEN)", English-language study groups also were introduced in the participating universities in such highly relevant field of study as rocket-space technology with specific terminology in the field of micro- and nano-electronics. It is important to note that the integration of foreign languages into the business communication of project participants has contributed not only to their professional development, but also to the preparation of students for International Credit Mobility projects.

The list of new skills and competencies of project participants and of their colleagues can be continued, but the purpose of this review is not to reflect the number of newly acquired skills and personal qualities of staff. The main significance of the new competences lies in their efficient and skilful practical application in the teaching process, in the LLL advanced courses of university colleagues, in other activities.

The successful and productive teams of Kazakhstani partner universities are laying a solid foundation for positive institutional changes.

This category of innovation includes such types of university work as quality assurance of the educational process, development and modernization of curricula and programmes, introduction of modern teaching methods, improvement of the management and functioning of universities, updating the content and management structure, educational facilities and other components. Further we'll briefly show how the results of the projects have influenced the above-mentioned aspects of the universities.

Quality is reflected in one way or another in all projects, but 5 are directly and thematically relevant to addressing the problem in different contexts.

Executive summary

The project "Implementing a Central Asian Centre for Teaching, Learning and Entrepreneurship" (CACTLE) views the quality of education in the context of interaction between HE, business and economy by strengthening relations between Central Asian universities and enterprises in order to stimulate entrepreneurial ability. The Kazakh participants in the project are the Eurasian Gumilev National University (ENU), Karaganda Economical University Kazpotrebsouyz (KEUK) and NARXOZ University along with many positive achievements of an individual character , have made a significant impact on the universities as a whole.

First of all, it is the creation of CACTLE Centres; development of the cross-industry universal study programme «Entrepreneurship and business development» for undergraduate students; improvement of the quality of teaching disciplines in the area of entrepreneurship; creation of conditions for practice-oriented education based on strengthening interaction of universities with business community. 53 bachelor students, enrolled in the «Entrepreneurship» discipline, had an opportunity to create and to implement own start-up projects.

The students involved in this course were able to participate in international hackathons, national competitions and Olympiads, in which over 20 young people were awarded prizes and diplomas.

Thanks to the project, mutually beneficial relations between universities and employers and other interested parties are not only markedly strengthened, but also sustained through the conclusion of contracts, including internship and work placement for students and graduates, training of specialists of enterprises, exchange of practical information, etc.

In Karaganda oblast, 30 specialists of companies participated on a fee-paying basis in training on «Business management and taxation» organized by KEUK, which subsequently helped to the sustainable development of the CACTLE Centre at the university. Other external stakeholders from large companies have also expressed their willingness to support the sustainability of the results of the project through signed agreements. The universities have been able to offer regular refresher courses, which contributed to enhancing entrepreneurial skills of students, teachers and entrepreneurs.

The name of the project «Implementation of the system of quality assurance of education through cooperation University-Business-State in universities» (EDUQAS) speaks for itself. In other words, the task of ensuring the quality of education has been accomplished through the establishment of appropriate structures (units) in partner universities and the development of standards for their effective functioning. Among the standards is the regular internal audit of the university's academic departments, which is prescribed by the new Internal Quality Control Manual and the analysis of results. The new structures and quality standards have become an important link of all internal quality assurance subsystems at different levels at universities in Kazakhstan. According to internal monitoring data, these measures have helped to improve the situation in key areas of their work: education, management, information and research.

"Sustainable Agriculture and Rural Development" (SARUD) project with its aim to develop and implement Master programme (in line with project topic) in three Kazakh universities for training specialists in sustainable agriculture and rural development...» seems to be of little relevance to the subject. Nevertheless, the project has a direct relation to the quality of higher education, as it provides a good example of a systemic approach to the development of an educational programme. The project reflects several mandatory steps that guarantee the integrity of the programme content and delivery technology. These include: training curriculum designers, conducting a labour market situational analysis and questioning

employers and trainees, identifying learning outcomes/competencies, developing and piloting the programme, and providing the curriculum with appropriate methodological and information support, creating a knowledge platform and network on sustainable agriculture and rural development integrated with international and regional thematic and case studies, review of the results of the testing and approval of the programme.

The programme is designed to train creative professionals with flexible thinking, capable of processing complex information and making responsible decisions. The curriculum is formed in such a way that it is attractive not only to graduates of different fields (agronomists, economists, sociologists, environmentalists), but also to people with practical work experience, both in agricultural enterprises and in public administration institutions, including regional agricultural administrations/akimats.

The teaching and methodological documentation on the above-mentioned programme (Study Plan for the entire period of study, Work Plan, Modules, Catalogue of Elective Disciplines, Sillabus of Disciplines (units), methodological Guide) has been fully developed, all documents were externally peer reviewed. Prior to the development of the SARUD curriculum, the scientific and pedagogical Master degree programmes in Kazakh partner universities in the specialties «Economics» and «Agronomy» were not of interdisciplinary nature. The new programme has mandatory interdisciplinary content, as does the content of each discipline of the programme. The staff members were comprehensively trained on internships and seminars in EU partner universities on designing the modules to the Master programme. It is no accident that the SARUD programme received positive reviews from representatives of the world of labour, development agencies, academic community already at the stage of its formation and after its completion. The programme consists of 120 ECTS, of which 90 ECTS are newly developed in the project. The evaluation system developed and incorporated into the disciplines' syllabi. Modern teaching methods (brainstorming, group work, case-study, visualization, business and role-play games, immersion method, interviews, expert analysis, etc.) are fully in line with the new content of the "Sustainable Agriculture and Rural Development" programme.

There is no point in detailing the approaches of the remaining projects on quality assurance, as they are not fundamentally different from those described above. Thus, the main result of the project «Enhancing Capacities in Implementation of Institutional Quality Assurance Systems and Typology Using Bologna Process Principles» (IQAT) is the development and implementation of the Internal Control Regulation of the Quality Assurance System in the form proposed by the project (with minor variations in the name of the document in participating HEIs) and in their typology. As project impact the universities use U-Mapping as a modern and effective tool for evaluating institutional performance.

As follows from the title «Integrated Approach to STEM Teacher Trainingn» (STEM) , at first glance, the project aims at a definite and narrowly-specified goal, only remotely related to improving the quality of HE - through training of STEM teachers in partner universities in accordance with the Bologna regulations and the needs of the Kazakh education system. However, though the project has not yet been completed, it has already had a positive impact on the quality of the educational process in the three participating universities of Kazakhstan by keeping pace with the world trends in higher education. STEM-Centres have been created and Master's Degree Programme developed based on international education standards, which contributes to the integration of the higher education system of Kazakhstan into modern world processes of natural science education development. In the academic year 2020-2021, the admission of students to this programme began based on the grants allocated by the Ministry, which also ensures the sustainability of the results of the project.

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The example of the 5 projects shows what innovations and new tools Erasmus+ CBHE projects offer for the sustainable development of higher education institutions towards ensuring the quality of their activities. The main tools for achieving this objective are related to the following changes:

- *Development of a modern regulatory and legal framework for the functioning of the quality assurance system, integrating both the best national and foreign experience of HE;*
- *Strengthening mutually beneficial and stable relations between universities and enterprises in a wide range of areas of activities, including the joint development of programmes and other training documents, conducting theoretical and practical sessions for trainees, improving the skills of representatives of both sides and stimulating entrepreneurial ability of all participants, including invited specialists;*
- *Establishment of structural subdivisions in HEIs and development of standards (guidelines) for their effective functioning;*
- *Systemic approach to designing new educational programmes that meet the needs of learners and employers and are in line with the current world trends in HE development;*
- *Preparing academic staff at a fundamentally new methodological and technical level - teachers who are ready to apply modern interactive technologies and the ICT arsenal.*

More than 20 Erasmus+ CBHE projects implemented in Kazakhstan in 2015-2020 are devoted to the development and modernization of curricula and educational programmes in conjunction with the introduction of modern teaching methods. Since there are relatively many such projects and their results are very diverse and, in terms of impact and sustainability, effective, we will present a few successful and typical projects.

Project "Development of Services for Persons with Disabilities" (DECIDE)

Objective: To establish a comprehensive and sustainable training programme for university professors, government officials, policymakers and NGOs in Partner Countries that will contribute to the realization of the right of persons with special needs to have access to education, to participate in the everyday life of society and to combat discrimination by raising awareness and recognition in the society in accordance with the Bologna Process and the UN Convention on the Rights of Persons with Disabilities.

Interim results (project not yet completed): Advanced training courses for academic staff are organized by project participants on the basis of the DECIDE curriculum based on the European experience. The 8 DECIDE modules were developed and implemented in a pilot mode during 2 semesters in the frame of training programme «Meeting physical and sensory needs of persons with disabilities". An educational platform has been created for interested individuals and organizations (educational institutions, teachers, administrative staff, NGOs, foundations, etc.) on the subject of the project.

Impact and sustainability:

Increased attention and awareness of the subject and content of the project by the management of the participating institutions, staff and students. The issue of modernizing inclusive education, taking into account the experience of European universities, has been included as a priority in the strategies of participating universities.

In Kostanay Baytursynov Regional University (KRU), the «Comprehensive programme of development of inclusion up to 2025» has been adopted. Two new topics are integrated into the work programmes of the disciplines «Psychological-pedagogical support of students with special educational needs» and «Social-psychological integration of persons with special needs».

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The Centre for Psychology and Inclusive Education of the University organizes refresher courses on this topic for staff.

At the Kazakh national al-Farabi university (KazNU) by order of the Rector "Inclusive Education Centre" established under the leadership of the Vice-Chancellor for academic work. The University's Plan of Action foresees the integration of Inclusive Education in the Master's Degree programme and a Barrier-Free Environment for People with disabilities is being developed. The development of specialized training modules, training of staff and the establishment of appropriate structures are a set of necessary measures that will sustain the impact of the project over the long term.

Project: "Training against medical error" (TAME)

Objective: Development and introduction of innovative pedagogy methods for students in safe environment that is close to the needs of real clinical practice in order to prevent medical errors.

Project results:

- *Modified curricula on «General medicine» by modules: Childhood diseases (4th year of study); General medical practice (5th year of study).*
- *Six adapted virtual paediatric cases in Kazakh and Russian introduced.*
- *6 own virtual cases with medical errors in the Kazakh and Russian languages created and implemented in each Kazakh partner universities.*
- *The quality of the cases was assessed: internally by staff of the Department of Childhood Illnesses, General Medical Practice and General Medicine and 6th course interns, externally by Dr. D. Round, University of Saint-George, London and academic staff of Astana Medical University (AMU).*
- *Trainings for staff conducted on D-PBL learning (Decision-making problem-based learning) and developing medical errors: external - 4, of them online - 1, internal - 4.*
- *20 tutors of Karaganda medical university, 12 tutors of Astana medical university trained to teach using the new educational technology; 12 teachers are trained to adapt and create clinical cases with medical errors on the basis of a virtual patient using the OpenLab platform.*
- *A unified base of linear and branched cases of the TAME consortium has been created. There are 122 cases, of which 25 cases developed by Kazakh partners in Kazakh and Russian.*

Impact and sustainability: Previously in educational programmes of medical universities of Kazakhstan and in other Partner Countries there was no module/course on teaching prevention of medical errors. As part of the expansion of academic freedom of higher education institutions during the implementation of the TAME project, a unique chance appeared to modify the existing curriculum on «General Medicine» at the Bachelor level, introducing 2 modules "Prevention of Medical Errors" 2 ECTS each for paediatricians and general medical practitioners (GMP).

The module design envisages active involvement of learners in the process of clinical decision-making based on the analysis of a specific case of a «virtual patient» with medical errors included. The introduction of the new module allowed for a change in the approach to the delivery of training and the development of specialized clinical learning materials using e-learning. Thanks to the experience gained, the universities' staff are prepared for the transition to distance learning, including in clinical disciplines using e-learning elements and materials developed within the framework of the project, based on the «virtual patient».

Executive summary

Teachers were actively involved in all stages of research and are now actively applying their research skills to their work. Innovation in higher education is not intuitive, but evidence-based. The project has trained 32 certified tutors (another 20 are planned for the 2020-21 academic year) who are fully familiar with both the method of adapting and creating clinical cases with medical errors on the basis of a virtual patient using the OpenLab platform, and the method of teaching on the new educational technology.

Students took an active part in the TAME project. Based on the findings of the project, TAME students demonstrated better empathy skills, better medical interviewing skills, and ability to deal with medical errors.

The participation of HEIs in the TAME project has changed the general approaches to managing internal business processes. At present Karaganda Medical University (KMU) adapts project management to practically all strategic activities. Astana Medical University (AMU) introduced D-PBL technology into the internship programme to improve the training of graduates in terms of prevention and avoidance of medical errors in future practical activities. The D-PBL VP cases are included in the curriculum on a regular basis, and every year new groups of students are trained in a modified programme using this methodology.

With the support of the Ministry of Health of the Republic of Kazakhstan, the Centre for Transfer of Educational Technologies was established, which was later transformed into the Centre for Simulation and Educational Technologies to disseminate the experience gained in the Erasmus+ projects, including to medical institutions of the Republic of Kazakhstan. The «Basic/advanced course for trainers of medical education institutions on the organization and conduct of "Problem-based learning with the use of virtual patients" for teachers from other medical universities and colleges of RK has been developed and implemented. Since the end of the project more than 120 people were trained on this course from 16 medical HEIs and colleges.

The Asia-Pacific Biomedical Teachers' Association (headquartered in Singapore) was interested in the experience of remote education using virtual patients and invited to present it on the webinar "Adapting to sudden shocks in Medical Education: Tips, Tools and Tricks" 30.04.2020.

All developed situations have been translated into the languages of instruction used in the partner universities of the consortium and merged into a common platform. All partners can use these situations for undergraduate studies, also for internships and resident students. The results of the project proved to be in demand by universities in both Kazakhstan and colleagues from Central Asia.

Project "Bachelor's and professional Master's programme in the development, administration, management and protection of computer systems and networks in enterprises" (LMPI)

Objectives: To contribute to the security of computer systems and networks in enterprises of Partner countries through professionalization of university curricula in the administration, management, development, protection of computer systems and networks in accordance with the Bologna process and using a competence approach; creation of bachelor and Master's degrees in computer and network security and a new modular training throughout life that meets the needs of specialists.

Results:

A Bachelor degree programme in computer systems and network administration and a Master degree programme in professional administration and management, specializing in the security of computer systems and corporate networks, have been developed.

Executive summary

A modular system of advanced training in the same field of education has been developed and 50 specialists trained in each country.

339 students completed their first year of study in two new degree programmes (252 Bachelors and 87 Masters).

Job opportunities for graduates improved.

Two new courses created for enterprise specialists on the development and protection of computer networks and information technologies according to their needs.

Centres of Excellence established in each participating university.

Impact and sustainability:

The programmes for the creation, administration, management and protection of computer systems and networks in accordance with the Bologna Process and the European Qualification Framework (EQF) developed and successfully assessed internally and peer reviewed by qualified external experts.

Methodology of curricula development with the involvement of stakeholders has changed - 600 representatives of enterprises, bachelor and Master students were interviewed to identify labour market needs.

The programmes are included in the Register of educational programmes of the MES RK as new curricula.

Teachers learned how to use project-based learning methods in a team. For example, the form of final control of Java discipline learning - programming (1st year of study, Bachelor degree) became a group project. Previously, no such forms were used for students of the 1st - 2nd course. This type of control gave students the opportunity to create their own project from the beginning to the end, to develop team skills in project management.

Information security training courses have been organized for computer science teachers. They further brought the ideas of the project to schoolchildren, explained the harmful use of various websites, and raised the interest of schoolchildren in the field of computer security. Trained teachers took steps to ensure the safety of local Schoolnet systems.

Sustainability Plan was developed to ensure the viability of the project results in the long term (6 years, with an annual revision and updating of the plan).

The University Centres of Excellence are provided with a full-time staff unit.

Project: «Enhancing Innovation Competences and Entrepreneurial Skills in Engineering Education» (InnoCENS).

Objective: Enhancing innovation competences and entrepreneurial skills in engineering education through university-business cooperation in order to support creation of new enterprises, new jobs and economic growth in the Partner Countries.

Results: The Centre for Innovation and Entrepreneurship opened in 2018 at the Kazakh partner universities and are providing counselling and mentoring for staff, students and enterprise partners on entrepreneurship, innovation pedagogy and assessment of innovation competences .

Impact and sustainability:

Students learned to plan business projects, which in three years increased to 200.

Executive summary

Twenty-two team applications were submitted to the University Student Innovation Business Ideas Competition, organized by project participants in 2019. The winning team presented their work at the international competition in Valencia.

The new disciplines "Innovative systems" and "Entrepreneurship for engineers" were developed and implemented in the frame of all programmes of technical and technological specialties of the university.

Students studying the discipline «Entrepreneurship for Engineers» have learned team work skills, developing business ideas and implementing them in practice, applying the Kanvas business model, presentation in the Pitch format.

The content of the new disciplines taught in the project is skilfully supported by student-oriented teaching technologies (methods of situation analysis, projects, use of virtual means).

In 2020 students developed projects on the production of new goods, tourism services, mobile applications. The Wool Toy Project was proposed by employers to be implemented in the Taraz factory.

Relationships with entrepreneurs have strengthened – they are actively involved in discussing students' business projects, provide internships, willingly recruit them during the internship and upon completing the course.

The experience gained in the project is being disseminated in other universities in Kazakhstan.

Project: «Development of Two Cycle Innovative Curricula in Microelectronic Engineering» (DOCMEN)

Objective: Modernize and internationalize the HE in microelectronics in the targeted universities through innovation of two cycle curricula in line with the new developments in the area, the labour market demand and according to the Bologna Process.

Results:

Two-cycle innovative programme in microelectronics engineering in the specialty "Space Technology" introduced.

Model of interaction between universities, enterprises and other social institutions in the field of microelectronics engineering created.

Teaching materials and refresher courses to strengthen the capacities of the partners' sectoral enterprises modernized.

Impact and sustainability:

Programmes modernized in accordance with the Bologna Process requirements, integrated in the regular university curricula and are delivered. In the future the universities are planning to develop and implement a double-diploma programme with EU partner universities.

Methodology of teaching subjects has changed: interactive blackboards, chips and motherboards are used in the relevant disciplines to visualize the images.

The project has helped to improve the job opportunities of graduates who have studied the new programme - they work in specialized areas in large companies (Garysh Sapary, Baiterek JSC, Galam JSC, etc.)

Executive summary

Relations with enterprises have become closer. The ENU team on the basis of the MicSO office, which operates for the dissemination of knowledge in the field of micro- and nano-electronics, organized refresher courses: «Theory of spacecraft movement control», «Space Technologies of Remote Sensing of the Earth as aid to business», «Bases of design of aircraft of light and ultralight classes». Prior to the project, no such topics had been offered to specialists in enterprises, staff and students.

Project: «Development of Interdisciplinary Master programme on Computational Linguistics at Central Asian Universities» (CLASS)

Objective: Development of a Master curriculum in computational linguistics for students with linguistics and computational science background, and to enrich universities'capabilities to enhance access to higher education with blended learning.

Results:

Analysis of programmes on computational linguistics of the EU and the competences acquired by graduates on computational linguistics carried out;

The project initiated the development of a new course of study in interdisciplinary Master programme on «Computational linguistics» based on international experience and employers' needs. To implement it, advanced training of academic staff organized at universities in the EU.

A course on syntactic, morphological and semantic structures of Kazakh and English languages in the Research Institute «Artificial Intelligence» designed.

Conditions for the development of distance education have been significantly improved. Kazakh and Uzbek partners have developed courses using blended learning technology, which is potentially the basis for distance-learning Internet courses (e-learning, open online courses).

A Master programme in computational linguistics developed with the transformation of EU best practices based on the principles of the Bologna Process, taking into account the Standards and Guidelines for Quality Assurance in the EHEA (ESG).

Impact and sustainability:

The project has had a positive impact on the development of close contacts between teachers working in different faculties - philology, world languages and information technology.

There is a willingness on the part of the academic staff to develop integrated curricula on information technology and linguistics.

Coordinated development of competences of learners is carried out in the framework of the named Master programme on «Computational linguistics» and «Computer linguistics».

Graduates of the programme are wanted in the companies developing linguistic software (speech recognition programmes, automatic text processing, machine translation), take part in the creation of electronic dictionaries, directories, encyclopedias, Internet sites, including in Kazakh.

Project: «New and Innovative Courses for Precision Agriculture » (NICOPA)

Objective: Modernize curricula in precision agriculture using new technologies: Geographic Information System (GIS), Big data, Remote sensing.

Executive summary

Results:

An analytical review of existing training programmes in precision agriculture (PA) carried out, strengths and weaknesses identified. New, practice-oriented, two-cycle PA curricula and programmes developed, tested and accredited in accordance with the requirements of the Bologna Process.

New modules developed, including innovative educational technologies and learning tools.

A new PAL Laboratory (Precision Agriculture Laboratory) and a virtual PA class are in operation using Sounding Data provided by PASO Office (Precision Agriculture Service Office).

Impact and sustainability:

Modernized programme «Precision Agriculture» developed taking into account the experience of European universities and the requirements of employers. The principles of modularity, interdisciplinarity, systemic approach, competence-based are applied in the development of the programme.

All disciplines are grouped into modules 1) general and 2) specialization module, which includes all disciplines and courses aimed at developing the professional competences envisaged in the programme. For example, «Remote sensing and application of PA and environment», «Management and decision making in precision agriculture», etc. Innovative courses are practice-oriented and impart skills in the creative application of related knowledge.

The sustainability and relevance of the new programme is ensured by its continuous updating in accordance with the requirements of employers and trainees.

Project: «SMARTCITY: Innovative Approach towards a Master Programme on SMART Cities Technologies» (SMRCITY)

Objective: Improve contacts between citizens and government by implementing Smart City technologies based on developing double-degree Master programmes.

Results:

Double-degree Master programme with European universities (Greece) developed and implemented;

Two Competence Centres on Smart technologies (hosted by Kazakh al-Farabi national university and Eurasian Gumilev national university) established;

Advanced training courses for specialists on Smart technologies developed and organized;

Methodology of designing and implementing double-degree programmes with EU universities developed and disseminated among HEIs in Kazakhstan.

Impact and sustainability:

Double-degree (120 ECTS) Master programmes with European universities - «7M06107 Mathematical and computer modeling» (KazNU) and «7M01514-Smartcity-technologies» (ENU) - developed and piloted.

Training-methodological packages on the disciplines included in the programme are consistent with European technologies.

More than 50 KazNU and ENU teachers have introduced ICT-related smart technology elements into their disciplines.

The project is ongoing, but the results of the project have already been incorporated into university development strategies as long-term objectives.

Executive summary

Impact of the project on management is visible in the enhanced international and innovative capacity of universities as a result of developing a double-degree Master course on Smart City Technology.

The results of the project help to ensure the quality of external mobility and increase the number of English-language teaching programmes.

This brief overview of 8 out of 22 projects related to the development of educational programmes, training-methodological packages and study plans, based on the experience of European universities, makes it possible to draw several important conclusions:

• In modernizing higher education Kazakhstan is ensuring the quality of both the content and the teaching-learning process. In other words, the programmes are meeting the needs of the country, economy and the consumers of services. The Review has shown what innovations in the development of new curricula and programmes make them relevant and effective: thorough and comprehensive study of the best practices of European universities and their adaptation to the context of Kazakhstan.

• The needs of the economic sector are studied and regularly analysed. Which in turn results in strengthening cooperation with employers in various forms.

• A competence-based approach to ensuring the quality of programmes through detailed formulating and reflecting Learning outcomes in the programmes (courses, disciplines, programmes.

• The design of the programmes is based on the integration of their content and the corresponding learning technology (a range of modern, student-oriented teaching methods and tools (situation analysis, project methods, flipped classroom, blended learning, multi-purpose use of ICT resources and many others).

• It is clear that such integration can only be achieved by highly professional teachers and tutors, based on the careful and comprehensive preparation of staff during and after the project activity, when refresher courses are organized for teachers and enterprise specialists not directly involved in the projects.

Taken together, these factors have a long-term positive impact on the quality of education in higher education institutions and, through them, on the HE system in Kazakhstan.

In the following section 10 Structural projects, related to the renewal of the content and management structure of higher educational institutions, are presented. These projects are intended to have an impact on the HE system as a whole and on the promotion of reforms at the national or regional level in Partner Countries. Following the principle from «specific to common», we will describe several projects and make general conclusions related to all projects of this type. Information on the projects not included in the final review is available on their websites .

The project «Transition to University Autonomy in Kazakhstan (TRUNAK) we have already referred to analyzing its significant impact on individual members and the team. No less indepth and visible was its impact at the university management level and on the HE system.

• In-depth analysis of the state of autonomy of Kazakh higher education institutions carried out.

• Report "Transition to university autonomy in Kazakhstan" based on the study on university autonomy using the "University Autonomy Scorecard" tool carried out jointly with the EUA for the first time in a country outside Europe with suggestions and recommendations for university governance model (including structured guidance for the reform process).

Executive summary

• As a result of meetings in Lublin, Lund and Atyrau recommendations to improving the regulatory framework governing the activity of higher educational institutions in Kazakhstan, in particular the National Code of Quality of higher education and other documents drawn up for inclusion in the new Health Code (specific for medical universities) and in the by-laws of the Ministry of Education and Science of the Republic of Kazakhstan, regulating the functioning of the country's higher education system formulated; So far not all proposals have yet been accepted by the line ministries, so the work of the team continues.

• Model of University Autonomy with recommendations at the system-wide and institutional levels in a graphic and descriptive form, with a list of necessary changes to the normative and legal acts in the area of HE to further enhance the autonomy of universities developed;

• The model has been put into practice at the institutional level in the partner universities resulting in the four main directions affecting the university as a system:

1) Decentralization of strategic management,

2) Promotion of financial sustainability,

3) Expansion of authority for admission and graduation,

4) Capacity building of staff.

The impact is also visible in the changes in the strategic management of the institution, increased sense of commitment and belonging to the management process of the entire academic community of the institution and engagement of students in university management.

In the project «Enhancement of Higher Edcation and Corporate Sectors Integration in Accordance with New Social Environment» (ENINEDU) the accent is on the business environment.

In the opinion of the team, the improvement of cooperation between universities and the corporate sector is leading to the change in innovative entrepreneurship and employability of graduates.

To achieve the goal over 30 teachers were trained in European partner universities.

Centre for Entrepreneurship and Innovation (CEP) was established hosted by KazNU Higher School of Economics and Business and Alumni Office at ENU.

«System Standard of Practice of Cooperation of Higher Education Institutions and Business Sector», «Collection of Methodological Instructions...» to the mentioned document developed.

Web portal «Youth and Career» set up. The creation of the portal and the possibility for the graduates of regional universities to join it contribute to reducing youth unemployment in the country. Currently, there are 3,500 registered students of KazNU final courses and 220 companies using the portal.

However, central to the project was a big analytical work , based on which the algorithm of interaction with representatives of business environment was updated;

A number of interdisciplinary programmes and courses developed. Among them in «Finance» and «Marketing» at the level of Bachelor and Master degrees jointly with the Department of Information Technologies, a new Master «Electronic Commerce» course in «Marketing», «Financial Management and Big Data» in «Finance», experimental programme «Business and Business Economics», etc. developed.

The effective combination of analytical, educational, methodological and structural components in this project has had a strong impact not only on the participating universities, but on the whole policy of relations between HE and the business sector.

Executive summary

Objective of the project «Promoting Internationalization of Research through Establishment and Operationalization of Cycle 3 Quality Assurance System in Line with the EU Integration Agenda» (C3QA) – to contribute to the establishment of a knowledge-based society through the launch and operationalization of a robust quality assurance system for internationalization of Cycle 3 programmes.

To achieve the objective the project team concentrated on the following:

- *Recommendations for the improvement of the programmes of cycle 3 elaborated and submitted to the Ministry of Education and Science of RK;*
- *Based on the recommendations amendments to the normative and legislative acts that regulate postgraduate education developed.*
- *Seven important changes to the Standard Rules on Admission to Studies in Educational Organizations, the State Compulsory Postgraduate Education Standard and the Model Regulations on the Dissertation Council made.*
- *These changes have brought the quality of doctoral studies closer to the current European standards, which has a positive impact on the global competitiveness of Kazakh PhD students.*
- *Standards and Criteria for Specialized (Curricula) Accreditation of Doctoral Education Programmes developed and approved (2018). The document is based on the Salzburg Principles for Accreditation of Doctoral Programmes, European Standards and Guidelines for Quality Assurance (ESG), Standards and Criteria for Specialized Accreditation (IQAA), RK Strategy in Postgraduate Education.*

Among the novelties:

- *The concept of «research proposal» was added to the State Standards, which enabled them to better plan their research and, at the early stages of the research, to receive meaningful feedback from the scientific adviser.*
- *Also, the standards now prescribe the requirements for scientific advisers of doctoral theses, which significantly improved the quality of scientific guidance, thus the content of dissertations.*
- *Doctoral candidates must now provide international certificates of proficiency in a foreign language in accordance with European standards.*
- *Thanks to the C3QA project, doctoral students have their own office, equipped with computers, projectors, printers purchased from the project fund. In this office they work and conduct seminars that positively influence the quality of their preparation.*

The project «Lifelong Learning for Sustainable Development» (SUSDEV) aims at strengthening the role of higher education institutions in ensuring sustainable development of industry and society, supporting national «Green policy» in Partner countries and promoting «Green culture» through lifelong learning.

- *46 teachers from universities in Kazakhstan were trained in EU partner HEIs.*
- *The skills and competencies acquired in the project enabled them to develop 3 modules, 13 disciplines and 5 programmes of refresher courses in three areas: Ecology, Food Industry and Land Management.*
- *The project contributed to promoting internationalization of higher education institutions through the conclusion of memorandums and agreements on academic mobility between Kazakh, Russian and European partners.*
- *Development Strategies of the Kazakh partner Institutions were revised – they include paragraphs on the sustainable development of universities.*

Executive summary

• Creation of Green Training Centres, as structural subdivisions, have impacted the development of «Green culture». The Centres are implementing their tasks in line with the policy reform - promotion of «lifelong learning» and development of supra-occupational universal competences. The Training Centre «Green skills» at Kazakh Seifullin agrotechnical university (KATU) hosted by the department "Forest resources and forestry", offers short-term training programmes (courses) in the following areas: Forestry; Greening human settlements; Ensuring biodiversity conservation; Sustainable (rational) use of natural resources; Ecology; Environmental economics (Green economy); Human influence on the environment, etc.

• The Green Centre for Lifelong Learning for Sustainable Development of Kostanai Baytursynov Regional University (KRU) over the period of 2019-2020 has organized a diversity of activities to disseminate information on and promote the development of Green skills, Green jobs and regional best practices in this area. The KRU «Green» oriented distance courses developed are available for students of other HEIs on the Moodle platform.

• Atyrau Dosmukhamedov University on the basis of the Training Centre for teaching sustainable development, has organized over 15 seminars for various target groups. The students inspired by the "Greening" ideas have set up eco-club "Green Way" whose members are actively promoting their university as a "Green Campus'".

• Applications have been submitted for the inclusion of Green Centres of Kazakhstan in the international network of Green Centres, Japan.

SUSDEV has a significant influence also on the educational policy of Kazakhstan, namely, on training staff with «Green skills» in higher education institutions of the country; the results of the project provide substantial support to stakeholders.

Partner universities are participating in the international "Green Metric" rating. Thus, the environmental behaviour of universities is changing.

The sustainability of the results of the project is ensured through the distance courses that have become an integral part of the educational processes in higher education institutions.

All educational resources and acquired competencies are aimed at developing the students' «Green skills» via new teaching methods (debates, work in the laboratory of renewable sources), evaluation methods (review of scientific articles and Internet sources, essays, self-evaluation).

The development of distance-learning versions of new and updated courses in partner universities has led to a diversification of forms of study. Instead of 1 form of education (full-time) 3 forms of education (full-time, blended, distance) are now possible. This contributes to the sustainability of the project in the post-project period by broadening the base of applicants (university entrants).

The above-mentioned 4 Structural projects have shown different practical approaches to the very topical problems of modern Kazakhstan:

• Autonomy of higher educational institutions;

• Improvement of Cycle 3 programmes;

• Development of entrepreneurial skills of future engineers of various types of production, enhancing the role of cooperation between higher education and business;

• Strengthening the effectiveness of national development strategies, as well as in addressing environmental issues.

The projects propose the following measures as the main strategies to address these problems:

Executive summary

Based on the Model for University Autonomy and through updating the normative and legislative acts in higher education to create real conditions for the introduction of the Model in higher education institutions in Kazakhstan (TRUNAK project);

2) Internationalization of programmes, development of standards and criteria for the accreditation of PhD programmes through interregional cooperation (C3QA);

3) Carrying out a wide-ranging analytical study, based on the conclusions of which to develop a modern and efficient algorithm of interaction with representatives of business environment (ENINEDU);

4) Fostering Green culture and environmental behaviour of learners through a set of interrelated measures, including special training centres, new curricula and programmes, disciplines and modules, distance learning, teaching methods (SUSDEV).

The impact and sustainability of the results of these briefly outlined project strategies are ensured by the application of modern project technologies: analysis, modelling, organizational structure. Though the projects are of different types, have different objectives and results, there are several common important factors that contribute to their relevance, quality, impact and sustainability.

• Quality training of participants in all implemented projects not only in modern professional, methodological knowledge and competences, but also on a set of universal skills, allowing to successfully and painlessly «fit» in the rapidly changing internal and external environment of modern higher education. Comprehensive training of project participants - reliable guarantor that new knowledge and skills would be imparted to students and colleagues «on shop» - academic, administrative staff and employees of different branches of higher education institutions.

• A possibility of achieving the results in a motivated interaction between the three sectors - education, corporate and social. Since it is the latter two that form the demand and requirements for higher education, they are indicators and measures of quality (and quantity,- that is not insignificant!) of training specialists.

• High-quality modern educational programmes, appropriate teaching and methodological complexes, facilities, educational technologies and the newest electronic means - ICT.

• Introduction of innovations, thanks to the internationalization of HE, the use of Bologna tools and quality standards, the best experience of European universities through the expansion and strengthening of international cooperation, academic and student mobility.

In unity, the above-mentioned factors provide a sound basis for more fundamental, including structural and innovative changes, that are relevant not only to higher education institutions but also to the entire system of higher education in Kazakhstan, thus for the entire social and economic development of the country.

Accessibility and harmonization of higher education in Central Asia through curriculum modernization and development (561553-JP-2015-BG - ACADEMICA)

Objective: *To modernize and improve the educational process at the HEIs in the Partner Countries by developing a trans-national co-operation system including universities and organizations from the EU and from countries in Central Asia (CA) with a purpose of curricula upgrade, scientific cooperation and knowledge transfer;*

The modernization of the disciplines in the framework of educational programmes of technical, engineering and pedagogical specialities of higher educational institutions of Kazakhstan was carried out on the basis of virtual educational environment (VLE) with the use of a special programme «E-course ACADEMICA», consisting of 6 modules. A total of 56 disciplines have been modernized in 11 educational programmes in 4 universities. The level of modernization of disciplines ranged from 10% to 50%. For example, ICT disciplines and a foreign professional language, which is a mandatory component and has a standard programme, have been updated by 10%; disciplines of choice: by 30% in the first project year and by 50% in the second year. The programme «Computing and Software» has included new BA courses: E-Graduate Concept, Learning Management System, Custom Open versus LMS, Massive Course, E- Learning and Social Networking; for «Information Systems» specialty - such disciplines as Human-Computer Interaction and Communication, Computer networks. At Master level for specialty «Management» a new discipline «Quantitative methods for management» has been developed.

Kokshetau Ualikhanov Regional University (KokRU) teachers have updated several disciplines in engineering and technical programmes. At BA level in «Mining» - «Electric Engineering of Mining Companies», «Construction of Mining Enterprises», «Rock Physics»; In “Life Safety and Environmental Protection» - «Basis of Radiation Safety», «Metrology, standardization, certification», «Air pollution protection», «Plumbing production», «Emergency protection» with a number of credits per discipline varying from 5 to 7 ECTS.

The new and updated programmes were offered to 990 students of courses 2 and 3. At Master level in “Management” a new discipline «Quantitative methods for management» was developed.

All modules are placed in a virtual classroom, accompanied by audio material and technological tools.

In the first phase of the experiment a group of selected lecturers learned to develop the «E-COURSE ACADEMICA». The second phase consisted in practical application of acquired knowledge and skills, modernization of the programme, development of teaching materials and changes in the teaching-learning methodlogy. Along with traditional teaching and evaluation methods such new approaches as surveys, explanatory demonstration, collaboration, e-learning methods, exposition methods, collaborative methods and other modern pedagogical tools were used.

A specificity of the «ACADEMICA” project is in the continuous/cascading learning: the members of the consortium trained within the framework of the project organized training of staff of technical and engineering specialities of universities of Kazakhstan, followed by training of Master and undergraduate students.

Kazakh teachers (124 people) having had «E-Forum ACADEMICA» training, acquired new transversal and professional competences and skills (media literacy, media education), developed online educational materials and open educational resources using WEB 2.0 tools. (social services and networks). They have learned to use new training materials, flexible technologies that can be adapted to any discipline and course. The virtual educational environment created in the project allowed to communicate with all interested participants on the online platform, to see emerging problems in learning «E-course ACADEMICA» and to receive extended feedback: teachers and students of higher education institutions of Kazakhstan, Uzbekistan and Turkmenistan had the opportunity to exchange their achievements in chat rooms.

All upgraded courses are located on the AIS platforms «PLATONUS», «TAMOS», «MOODLE», as well as on the educational platform of the «ACADEMICA» web-site which is supported by Burgas Free University, Bulgaria - the project coordinator.

The main indicator of the efficiency of the modernized programme is employability of the graduates. For example, in the KokRU department «Information systems and computer engineering» the employment rate of graduates increased from 66% in the 2016-2017 academic year to 93% in 2017-2018 and in the Master programme made up 100%. The employment rate of the ACADEMICA project graduates made up 100%.

Teachers and students continue to develop their digital competencies using open educational resources, many have completed advanced courses recommended by European partners and received certificates.

The introduction of newly developed and modernized programmes, the acquisition of new skills by teachers, the demand of graduates in the labour market are the main evidence of the achievement of the project objective, its impact and sustainability.

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APPLIED CURRICULA IN SPACE EXPLORATION AND INTELLIGENT ROBOTIC SYSTEMS (573545-JP-2016 - APPLE)

Objective: *To ensure that the targeted universities can offer new applied curricula in space exploration and intelligent robotic system in line with the modern development in the area, the market demand according to the Bologna principles and EU-2020 strategy.*

The fields of space technics and technology, robotics and mechatronics are relatively new and dynamically developing industries for Kazakhstan. The project is of particular relevance to the country, as training for the industry is still an acute problem. The space industry works closely with all universities that provide training for the sector.

The main result of the project was the development and introduction of educational programmes in close cooperation with employers. Thus, in KazNU - new educational programmes «Robotic systems» at bachelor (2019), Master (2019) and PhD levels (2020), modernized programmes in «Space Technology and Technology», «Mechanics»; in ENU modernized programme «Space Technology» for bachelor and Master levels developed. It is planned to launch a new programme in «Space Robotics and Mechatronics» (2021).

New programmes in «Robotics and Mechatronics», «Space Engineering» (2019) and modernised programme in «Space Technology and Technology» have been introduced in KazNRTU at bachelor level.

The project has resulted in enhanced cooperation with enterprises. The project team made the best possible effort to meet the needs and demands of the industry in training specialists, jointly discussing and formulating the results of the training, defining the list of disciplines that will make up the basis of the programmes. Currently there is a huge amount of satellite data collected in the sector, but there are no enough specialists who could analyze it. Therefore, as suggested by the representatives of the Astrophysical Fesenkov Institute in the frame of the «Space Technology and Technology» PhD programme (KazNU) a new discipline «Data Processing and Analysis» has been introduced.

Employers give their expert opinions on the programmes developed, are involved in lectures and supervision of Master and PhD theses. The leading scientists from the National Centre for Space Research and Technology, the Institute of Space Technics and Technology, the Institute of Ionosphere and Astrophysical Fesenkov Institute are supervisors of Master and PhD students of KazNU, AUES and KazNRTU. Specialists of enterprises based in Nur-Sultan are involved in co-tutoring of EMU PhD candidates' thesis.

Employers' organizations are also providing the base for practical internship of students. JSC «Republican Centre of space communication «Akkol», Galam, JSC «Kazakstan Garysh Sapari», Centre of high-precision geodesy, Garysh ecology, JSC «Bayterek» host industrial practice of students of all four HEIs involved.

In turn, employers are interested in training their specialists in universities. In KazNU employees of enterprises are involved in Master and PhD studies. Among them – along with the mentioned above is a new partner - Military Engineering Institute of Radioelectronics and Communications. A total of 15 Master students and 11 PhD candidates are currently studying at KazNU at the request of their organizations.

More than 20 teachers from all four Kazakh partner HEIs were trained in the frame of the project. The training programme was aimed at introducing new data in the fields of space technology and technology, space robotics and intelligent robotic systems. In addition, the Technical University of Berlin organized Summer schools on space topics since 2010 for undergraduate and Master students. Over the course of the project, more than 100 additional students were trained in English-language subjects in Spring and Summer schools, Master classes, including such topics as: Review of Satellite Systems; Introduction on STK; Celestial Mechanics and Space Dynamics; Satellite Subsystems; System Verification; Fundamentals of Ground Data Processing; Attitude and control system for nanosatellite; Design nanosatellites methodology; Design mechatronic modules for space applications; Global Sustainable Innovations for space technologies by creative design thinking with TRIZ. They have also acquired various software skills in orbital modelling, satellite data processing, FPGA design, TRIZ application, etc.

Teachers and students have acquired knowledge in the design and development of micro- and nano-class spacecrafts as well as robotic systems. For example, ECAD design automation, VHDL/FPGA embedded systems, ARM Cortex, DSP digital signal processing, Automation system Raspberry P and C programming were a part of the programme.

New approaches were introduced to design, develop and model electronic circuits on modern software products and to manufacture electronic circuit boards on modern equipment. At the Sorbonne University, members of the project team were trained in the design and development of satellites and robotic systems, as well as spacecraft orbit modelling. One such tool is the IDM-View programme used by the National Centre for Space Research of France (CNES).

Participation in the project has thus enabled the staff of Kazakh universities to enhance their professional competence as well as their English proficiency.

Kazakh partners are planning to develop and implement double-degree Master programmes: KazNU – on «Space Technology» and «Robotic Systems» together with AGH Scientific and Technical University (Krakow, Poland); ENU – Master programme on «Space Technology» with Samara State University. There is an agreement on a joint programme between KazNRTU with the Saint-Petersburg National Research University of Information Technologies, Mechanics and Optics, and double-degree Master programme with the Faculty of Sciences and Engineering of the Sorbonne University (Paris, France) on «Robotics and Mechatronics».

This, in turn, encourages teachers to increase their English language skills. Currently, over 15 teachers of KazNU and KazNRTU are studying English at IELTS level 6.0 or TOEFL, IBT 80 level supported by the World Bank programme;

The project has also had a significant impact in strengthening communication with employers. In order to work more closely and in a coordinated manner with employers, universities open departments at enterprises. KazNU opened a branch of the Department of Mechanics at the Institute of Space Technology and Technology, as well as in «AES Machinery Engineering Group» (MEG) - the largest engineering company for development, production, design and technical support for full-fledged military and special purpose training equipment. Students and masters of the department specializing in «Robotics Systems» are engaged in production practice at this enterprise. Director on Development Dr. Syrghalieva A.A. teaches the disciplines «Virtual Engineering», «Autonomous Navigation (on land)», «Autonomous Navigation (on water, on air)» for the Master students in the frame of «Robotics» programme.

ENU has created a branch of the Department on the basis of JSC «Kazakstan Garysh Sapari», AUES - at the Institute of Space Technics and Technology.

Employers are regularly involved in joint research. Thus, KazNRTU together with JSC «BF Intelligence» with its co-financing became the winner of the competition from JSC «Science Foundation» on commercialization of results of scientific and (or) scientific-technical activity (2018) with the project «Portable cardiovasculator».

In the framework of the project, TETRO offices and ROBOLAB laboratories were established in all APPLE member universities.

Students of KazNU, KazNRTU, AUES and ENU along with national also take an active part in international championships in robotics. KazNU students took part in the 3rd Inter-University Championship «Young Professionals (World Skills Russia) in the section «Design and Development of Spacecraft» in November 2019 in Moscow, Russia. In February 2019 the KazNU team won the second place in the republican qualifying round of the International Championship in Robotics «IITU ROBOCON 2019». Students of KazNRTU with the project «Portable Cardioanalizer» won the 1st place at the XXI International Conference of Young Specialists on Micro/Nanotechnology and Electronic Devices (EDM2019). AUES students in March 2020 participated in the international competition «Roboman», Istanbul, Turkey.

The Robolab Laboratory developed special devices for medical masks and transparent primary protection masks made of PLA plastic and made them on a 3D printer for protection against COVID-19.

The courses developed are in demand not only by students but also by space industry specialists. ENU on the basis of TETRO office has organised professional development courses for enterprise specialists on «Theory of space traffic control», «Space technologies of remote sensing of the Earth as aid to business», «Bases of design of aircraft of light and superlight classes».

The project has also had a significant impact on the teaching technologies applied by teachers after participating in seminars and master- classes at leading European universities. In particular, the number of practical exercises using up-to-date software packages and modern equipment increased, examinations in the form of design work in some practice-oriented disciplines introduced, case-studies are more frequently used, project-based method of learning is applied.

Zaure Rakisheva,
Head of the Department of Mechanics,
Al-Farabi Kazakh National University

Enhancing University Teaching in Thermal Power Systems for Cleaner Environment with Parallel Improvements in PhD Skills Development (585849-JP-2017-UK - ASIAXIS)

Objective: *The deep modernisation of existing syllabus in advanced ICE technology, improving quality of education and teaching, which includes enhancing existing and application of new learning and teaching tools, methodologies and pedagogical approaches.*

On the basis of training seminars organized by EU partner universities, the Kazakhstani team have improved their skills and competencies, necessary to modernize the content of the modules on the project subject matter and to introduce them professionally in the teaching process of their universities. Participants learned to develop new methods for defining and measuring learning outcomes and testing, and to use interactive and practical learning methods in the implementation of new modules. Targeted training has also contributed to the adoption of modern methods and tools for the development of teaching and methodological documentation for the upgraded modules. Teachers learned to apply distance learning technologies and dual training methods, more skilfully and actively use AIS platforms Platonus and Moodle, ways to interact with enterprises in the frame of dual learning. The workshops were attended by 12 project trainers, including 8 from KATU and 4 from PSU. The members of the project have learned to effectively implement their own information needs - to find, evaluate and use the relevant information needed to modernize the modules and organization of lectures and practical sessions. Skills in measuring learning through ICT have also been improved, including using Kahoot, Socrative, etc.

The acquisition of the necessary knowledge and competencies enabled the project participants to develop or update the content of the 6 training modules (disciplines) at the bachelor and Master levels, taking into account the specificities of the universities.

The KATU team updated the content of the disciplines «Equipment for deep processing of raw materials and production of biofuels» at bachelor level (10 ECTS); «Basis of deep processing of plant raw materials and production of biofuels» (10 ECTS) and «Design of enterprises on processing plant raw materials and production of biofuels» (8 ECTS). At Master level - «Methods of analysis of products of deep processing of plant raw materials and biofuels» (7 ECTS), «Prospective technologies of deep processing of plant raw materials and production of biofuels» (8 ECTS), «Technical systems for the production of products of deep processing of plant raw materials and biofuels» (5 ECTS).

At the Pavlodar Torajgyrov University (PU) at bachelor level - «Automotive and tractor engines», «Use of CAD-systems in the design of internal combustion engines (ICE)», «Design and calculation of ICE». At Master level - «Alternative fuels for ICE», «Pollution and engine control», «Process modelling in ICE».

Research linked to the project theme is being carried out: PhD thesis «Development of biofuel production technology on the basis of microbiological synthesis, Master thesis «Substantiation of carbon-containing waste hydrolysis parameters in hydrogen production», as well as over 10 diploma projects and works.

The content of the developed/updated programmes is based on a preliminary examination of the needs of enterprises and an accurate identification of learning outcomes. The introduction of modernized modules, lectures and laboratory exercises into the teaching process was accompanied by the use of modern teaching aids (laboratories, equipment, devices in addition to textbooks and teaching aids - video films, multimedia, virtual classrooms, various demonstration materials and electronic learning tools).

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

In order to provide practical and action-oriented training of specialists, new mechanisms have been established to regulate the process of learning under dual learning, including the schedule of classes in the enterprises, establishment of branches of the department on the basis of enterprises, coordination of examination procedure with the employers. All materials are available for both face-to-face format of training and online, and are available on Platonus AIS platforms - https:/plat/s.onukazatu.kz/, MOODLE - https:/agr/cskz.kz/). For students by correspondence - through ZOOM, Web Cisco platforms.

The development and introduction of new programmes has resulted in strengthening cooperation between higher educational institutions and enterprises. The innovations introduced in the project towards improving the content and teaching-learning methodology have proved to be very effective. The project also contributed to synergy with international organizations. As an example, the British Consulate and the US Consulate UNICEN have recognized this area in competitions at the national and international levels. The project «Building Educational and Research Potential on Renewable Resources and Use in Kazakhstan» has been approved and will be implemented jointly with Michigan State University (USA) in 2020 - 2021.

The current project network includes EU countries (partner universities became members of the editorial board of the magazine «Science and Technology of Kazakhstan»), involves universities of other regions, industrial companies, national bodies. The project helped to establish and strengthen relations with foreign and national leading specialists in the field of thermal power systems (TES), exchange of experience with enterprises of the branch. During the project, meetings to share best practice were organized between Kazakh universities and the Beijing University of Technology and the Harbin University of Engineering (PRC); Moscow Bauman State Technical University, and Southern-Urals State University (Russia). Despite the long distances, we have been able to visit partner HEIs, get familiarized with training facilities, research centres, as well as to conclude contracts for joint activities (on training scientific and pedagogical staff, on scientific advice, on conducting online seminars and conferences on the theme of the project), including the introduction and testing of the proposed laboratory models.

Employment opportunities for graduates have increased, due to better knowledge and competences on modern thermal power technologies at the national and international levels.

In the academic 2018-2019 year 188 graduates (152 bachelors and 36 Master students) completed the course on «Food Product Technology». The average employment rate of graduates was 85.6%. The high rating assigned to the programme at the national level (NAAR), the image and recognition of the higher education institutions among enterprises through dual training have made it possible to improve communication with the leading enterprises of the industry and get high rating of MES RK and of consumers of services.

Kairat Bekbaev,
Senior Lecturer, Department of Food and Processing Technology, KATU named after S. Seifullin

Development of the Interdisciplinary Master Proramme on Computational Linguistics at Central Asian Universities (585845-JP-2017-ES - CLASS)

Objective: *Development of the Master programme curriculum and to enrich KZ and UZ universities' capabilities to enhance access to higher education with blended learning in computational linguistics Master programme for students with linguistics and computational science background.*

In accordance with this goal, a modular Master programme in computational linguistics (120 ECTS) has been developed based on the content analysis of computer linguistics programmes of the European Union, Kazakhstan and Russia.

In developing the programme, the team relied on the results of a survey of potential employers to identify their training needs in computational linguistics.

The approved curriculum consists of 5 modules including mandatory and elective disciplines: National Module (mandatory component according to the state standard (19 ECTS); Research Module (28 ECTS); Natural Language Processing Module including applications (25 ECTS); Applied Linguistics Module (24 ECTS); Computational Technology Module (24 ECTS).

The modular design of the curriculum enables the implementation of the Master degree programme, taking into account the specificities and capabilities of each partner, as well as the organization of intra-country academic mobility.

The training provided by the project focused on the development of professional English linguistics competencies for teaching, and on the development of skills to work with a wide variety of specialized software (CLAWS, USAS, CQPWeb, The Sketch Engine, with Web 2.0 tools (Moodle platform) for the use of blended learning technologies, which contributed to a better understanding of pedagogic frameworks and practical application of online learning.

Project participants appreciate the results of the training. English-speaking specialists have deepened their theoretical knowledge of syntactics, morphology and English semantics. This knowledge is needed by computational linguists to develop natural language processing tools.

Professor F.F. Mayer, Head of Strategy, Accreditation and Rating Department, Kostanai Baitursynov University, emphasizes: "The development of an interdisciplinary Master programme in computational linguistics at Central Asian universities is certainly a promising and very interesting direction. Digital linguistics is already widely used in Internet search engines, but there is still insufficiently developed aspect is its implementation in the language pairs «English - Kazakh» and «Russian - Kazakh». Moreover, there is no systematic Master course in this area. The training provided by the project has improved the quality of teaching of the Master programme".

ENU Professor A.A. Sharipbai and Assistant Professor R.S. Niyazova note:

"The CLASS project brings together scientists working on computational linguistics using the example of Turkic languages. There are over 50 publications indexed in Scopus and Web of Science on computational linguistics. The development of courses using blended learning technology will become the basis for Internet-based learning (e-learning, open online courses)."

Masters in the first year of study (2019-2020 academic year) note a significant increase in the learning opportunities they have received in connection with the new education programme. These are the following:

- Interdisciplinarity of the educational programme;
- The possibility of academic mobility and learning in a new academic environment and new approaches to the learning process;
- Development of Web 2.0-based learning skills (Moodle platform)
- Development of skills to work with online text and language analysis tools (Praat, WordNet, Modern English Corp);
- Autonomy for training and research;
- Internships in partner universities in the framework of the «Computational linguistics» programme.

The graduates have acquired not only research skills (planning, analysis, data processing, etc.), but also improved personal qualities (independent and systemic thinking, creative scientific search, culture of oral and written communication, public speaking skills, business etiquette, etc.).

- Increased motivation for research activities – ENU Master students participate in the monthly seminar «Computer linguistics» at the research institute «Artificial Intelligence», in Round tables and seminars on scientific topics on the area of research.
- The educational programme is unique. Prior to the project, training on «Computational linguistics» was carried out in KazNU and ENU, and focused on the information-technical component, while in KRU such a programme did not exist, only selected research activities were implemented. The interdisciplinary Master degree programme «Computational Linguistics» is based on international experience and addresses the needs of potential employers.
- The project helped to promote the development of close contacts between teachers working in different faculties: The Department of General linguistics and European Languages and the Department of Information Technology. The teachers of these departments, previously unfamiliar with each other, jointly planned the content of the curricula, learned to develop integrated curricula in a balanced way in two areas: information technology and linguistics.

In the course of developing the programme, quality assurance in education in accordance with the principles of the Bologna process and ESG recommendations has been implemented, links with research and innovation ensured. The Master programme was approved by the decision of the Scientific Council of universities and included in the Register of educational programmes of the Ministry of Education of RK.

The programme proved to be highly relevant and demanded. The project team developed a refresher programme for specialists of interested companies: "Alem Research", "Translators Group", JSC “Sapa software”, JSC “City Soft.Net”, JSC "GrandLux", translation agency "Metaphora", Department for the Development of Languages under the Akimat of Kostanai Oblast, JSC «National Company «Kazakstan Temir Joly», Research Institute «Artificial Intelligence», Research laboratory «National Laboratory Astana», Institute of Information and Technology in Computational Linguistics. Well-known international brands in this field: MEMSOURCE and WORDFAST also demonstrated interest to the programme. Negotiations are under way to develop a joint programme by involving university partners.

The study showed that employability potential of specialists completing the programme is promising. They will be able to create computer systems that automatically implement important linguistic functions: speech recognition, automatic translation of texts, search of keywords in text, which is used not only at the level of the education system, but also in all sectors of the country's economy. More than 50 employers in Kazakhstan have expressed interest in inviting Master graduates to work in their enterprises and organizations.

We are confident that the project has made a significant contribution to the implementation of the State Programme «Digital Kazakhstan», especially in terms of training scientific and pedagogical staff in the field of digital linguistics, artificial intelligence, machine learning, big data areas.

Ualsher Tukeev,
Dean of the Faculty of Information Technology,
Al-Farabi Kazakh National University

Development of Two-Cycle Innovative Curricula in Microelectronic Engineering (561627-JP-2015-PL - DOCMEN)

The name of the project specifies not only its main goal, but also the means of achieving it - through the development and introduction of a two-level innovation programme in microelectronics engineering in the educational process of the «Space Technology» specialty.

The programme was preceded by the training of university participants in the European partner universities in the field of nano- and microelectronics, modern methodology of curricula design, use of modern telecommunication means for effective communication.

As a result of international internships at leading European universities, Kazakh participants acquired the necessary theoretical knowledge and practical competence on the above-mentioned issues. For example, participation in the project has contributed to the development of new skills such as high-level CAD Altium Designer cards. The CAD data speed up the process of developing cards and reduce the amount of time. An important additional learning effect has been the significant increase in the level of language training, which has enabled effective communication and business relations with various categories of nano- and microelectronics: engineers, IT specialists, stakeholders, civil servants, etc. Thanks to the project, multilingual groups have emerged in universities. Thus, the assistant professor of the department and a member of the team Professor A.E. Ashurov conducts classes in polylingual groups in the discipline of Ballistics in rocket and space technology, and professor of the Department of Space Technique and Technology D. S. Yergaliyeva has studied terminology and applied the skills of translation of texts in the field of micro- and nano-electronics.

The laboratory equipment and software provided by the project are used not only by students, but also by teachers. A team member A.S. Zhumabaeva prepared and defended a thesis in Russia at the Department of «Radio Equipment Design and Production» of Penza State University in specialities «Information measurement and control systems» and «System analysis, management and information processing (in technology and technologies) based on the use of that equipment.

The knowledge and experience gained in the project helped team members to design and implement a two-level microelectronics engineering programme in accordance with the Bologna process requirements. The programme was externally evaluated, approved and introduced into the educational process of the specialty «Space Technology». It should be noted that employers take part not only in the evaluation of the programmes, but also in the whole range of measures to improve the educational process of the specialty of «Space Technichs and Technology», including, inter alia, the design of educational programmes; participation in surveys to determine learning outcomes taking into account the latest achievements of micro- and nano-electronics; formulating requirements for competences of specialists in these spheres, organization of education and practical work in the branches of the department in the enterprise; harmonisation of catalogues of elective disciplines, teaching and methodological documentation, materials of new and modernized courses; definition of the titles of course and diploma works; participation in examination commissions, including graduation ones. It is a kind of holistic model of cooperation between universities and enterprises with an equal interest in training high-quality and up-to-date specialists in the space sector.

The introduction of the new programme has changed the way in which subjects are taught: interactive whiteboards, microchips and motherboards are used for illustrative examples in the relevant disciplines. In ENU on the basis of the «Space Technology» Department there is a unit to provide support, disseminate the project findings and promote services in the field of microelectronics (MicSO),to facilitate expansion of the university's ties with industrial and academic partners. At that office, the project participants organized advanced training courses on the following topics: Spacecraft Traffic Control Theory, Space Technologies for Remote Sensing of the Earth (ERS) as assistance to business, Basic design of aircrafts of light and ultralight classes. In addition to the MicSO office, a modern MicLAB laboratory has been set up in the field of micro- and nano-electronics. The research results help to modernize and introduce new programmes and courses.

After the implementation of the project, graduates of partner HEIs work in specialized areas, many of them are invited to work in major companies, such as JSC "Garysh Sapari", JSC "Bayterek", JSC "Galam", etc. The demand for micro-electronics innovative programme graduates in the labour market is evidence of its quality and sustainability prospects.

Alexey Savostin,
Associate Professor, Department of Energy and Radio Electronics, North Kazakhstan University named after M. Kozybaev

Establishment of Computing Centres and Curriculum Development in Mathematical Engineering Master Programme (561574-JP-2015 - ECCUM)

Objective: *To strengthen academic capacity of experts on mathematical engineering in Central Asia via the development and implementation of interdisciplinary Master programme «Mathematical Engineering» through collaboration with all stakeholders for enhancing the scientific potential on Mathematical engineering and professional development of in-service specialists.*

One of the main components of the project is the quality training of the participants. The main result of the training was the mastery of knowledge and competences in the application of Matlab and ComsolMultiphysics software by the teachers of IITU and KRU. The study of these programmes enabled them to develop the skills of simulating processes of computational hydro-gas dynamics for architectural aerodynamics problems, for the preparation of initial data, namely, for calculating wind-load aerodynamic coefficients, never practiced in a university before. Using the solutions available in the Matlab software complex, which provides a large set of necessary modules for solving Mathematical Engineering problems, staff and students used them in the area most relevant to Kazakhstan: Modelling of seismic events and analysis of their effects on man-made structures. These tasks were carried out by the trainees of the IUIT Master course in the frame of the ECCUM project at the Institute of Seismology and other organizations in Almaty.

The acquired skills in using the Comsol Multiphisics programme allowed teachers and students to model the processes taking place in the ground bases and their interaction with artificial structures. The process and results of this work have been summarized by the students and teachers in their thesis studies. The participants noted that the training provided by the project also gave an insight into such a new and promising area as mathematical engineering and computer modelling. In the course of the project, they established closer contacts with EU colleagues specializing in this field. Working in the project has taught them to define more precisely learning outcomes for each course, apply the technology of the student-centred learning, as well as Task-based methodology, which enabled them to develop greater autonomy among students in solving modelling problems.

As a result of using the Mathlab software students acquired a wide range of professional skills demanded by employers. In scientific and technical terms, this programme provides the necessary tools to both practical engineers and theoretical researchers. In the construction sector, for example, graduates were able to perform various complex calculations and labour-intensive modelling procedures. The use of the computation system is also applicable in the banking sphere. In addition, Mathlab allows the use of an interactive approach in the learning process, students can visually familiarize themselves with the product of their activities. Comsol software helps students to develop the skills needed in computer modelling, thereby providing more job opportunities for graduates. Through this programme, students learned simulating physical processes skills that are needed in various sectors of the production sector. Studying the software, they had an opportunity to visualize simulated physical processes, to broaden the horizons of students and to develop the skills of non-standard thinking, which makes them more competitive in employment.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

The development of innovative interdisciplinary educational programme «Mathematical Engineering» was an equally important outcome of the project. As a result of the discussion and analysis of various options, needs and requirements of employers (14 companies participated in the survey), a common education programme was developed.

The teaching methodology focuses on the development of practical skills and abilities for solving problems of mathematical and computer modelling. Therefore, one of the main training methods implemented with Matlab and ComsolMultiphysics was study and solution of the cases. The Computing Centre offers good conditions for making computation. Before the project, the training was more theory-oriented, with a basic mathematical component. The newly designed educational programme introduced a practice-oriented, intensive application of Matlab, ComsolMultiphysics software.

The programme contains new precise and approximate methods of solving current production problems, including incorrect problems, as more demanded in modern engineering. The joint teaching of the University of Santiago de Compostela and IITU professors has led to the modernization of the process of addressing and solving multidimensional problems of evolutionary equations, which are modelled by COMSOL Multiphysics and Mathlab .

The ECCUM project stimulated the revision of elective courses, therefore in the Work Plan for 2018 in addition to the courses approved by the consortium, 6 new electives were introduced. The «Mathematical Engineering» programme is supported by the necessary teaching and methodological documentation, including curriculum, catalogue of elective disciplines, educational and methodological complexes of disciplines, and 3 modules, which are represented by 6 basic and core disciplines . 30% of the Master course are taught in English.

Equipped Computing Centres have been set up in all partner universities in Kazakhstan. The project created a platform for interaction between universities and other stakeholders (universities, companies, researchers) with uploaded research results, courses, tested training materials for courses (disciplines) . The content of the courses has also become a good complementary material in the preparation of Master and PhD theses.

The sustainability of project results is ensured by:

- Institutional support and enrolment of new students ;
- International accreditation of the programme;
- Development and implementation of refresher programme on the use of MATHLAB and COMSOL for interested representatives of enterprises;
- The use of the Computing Centre for practical engineering computing tasks and software training (4 have already taken place), training activities for Master students ;
- Productive interaction with enterprises: students are engaged in internship in the companies concerned, using their equipment and resources.

Employment rate of graduates of the new programme made up 100%.

Overall, the project has contributed to the following positive effects:

- Access to hands-on experience of EU teachers, methods of cooperation with students in action;
- Interaction of project teams, exchange of experience, teaching materials and other information between partner institutions via the platform;
- Capacity building of teachers of the Information Technology Department;
- Increased opportunity to participate in scientific activities;
- Improvement of the quality of education and motivation of students based on the use of material and technical equipment
- Enhanced scientific activity of staff based on the use of the software purchased;
- Development of international and in-country partnership

between academic staff and universities.

Fedor Mayer,
Director of the Department of academic policy,
Kostanay Regional University named after A. Baitursynov

Engineering Educators Pedagogical Training (598506-JP-2018 -ENTER)

Objective: *To create a novel multicultural and international approach for formal post-graduate professional and pedagogical education for engineering educators, focused on low cost and convenience, thus strongly based on E-Learning technologies, whenever feasible, and designed with the objective of being internationally recognized and accredited.*

Today, various forms of formal education exist in Kazakhstan. For example, a person who has completed a professional Master degree programme is admitted to pedagogical activity after completing an additional programme in the pedagogical field (at least 30 ECTS) and obtaining a corresponding certificate. The form of the certificate is independently determined by the higher education institution and recognized by other HEIs. When a holder of professional Master degree diploma joins PhD studies he/she will have to go through an additional programme of pedagogical post-higher education.

A new approach to formal education, in the form of long-term programmes or short-term courses, developed within the framework of the project, will enable learners to obtain a national, international or other type of certificate upon successful completion; recognized in Kazakhstan as having legally established rights to engage in pedagogical activities, to hold a higher post in the service hierarchy, to enter higher-ranking educational institutions, etc.

In line with the stated goal, the project has developed three-level programmes (iPET1, iPET2 and iPET3) for teachers of engineering specialties with a variable set of modules. Their specificity is the orientation towards advanced training of engineering teachers and the retraining of technical and engineering graduates to acquire the right to teach. The principle of customization makes it possible to tailor the educational process and the requirements of specific users, individualize the curricula and methodology for their implementation.

- iPET-1 (2 ECTS) is a short-term programme with a University Qualification Certificate. This type of programme targets young teachers. The content of the programme enables trainees to acquire professional competencies, psychological and pedagogical knowledge and technologies for effective pedagogical activities;
- iPET-2 (8 ECTS) is a training programme with the issue of a Certificate recognized at the national level. The content of this type of programmes is based on the general principles of the development of engineering education and the qualification requirements for university teachers in accordance with the growing information flow, innovation processes, introduction of new technologies making professional activity more complicated;
- iPET-3 (20 ECTS) – design and implementation of the internationally accredited Certificate programme. The content of this type of programmes is designed to meet individual needs of trainees for professional development, in accordance with international and national professional standards defining the qualification requirements for engineering teachers.

The content of all iPET programmes is based on the analysis of the economic, social, information and technical prerequisites affecting the training of engineering teachers, as well as on the requirements of national professional standards. All developed content and design of the programmes are based on the best EU practices; the experience of European partners is used in the training of experts and coaches; the volume of all training courses is measured in ECTS. The networking principle of learning will ensure equal access to iPET programmes for people with different capabilities.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

The project team has developed syllabi, curricula, content of training modules, learning outcomes for all iPET programmes, procedures and standards for their accreditation and recognition by third parties. Experts have been trained to accredit programmes, trainers - to conduct pilot training sessions, and innovative educational materials have been collected and shared. All developed educational materials have undergone a double-check and approved by the Academic council of the university. All materials are developed in two formats - offline and online.

The project started in November 2018. To date, the project has trained 23 teachers and staff, and work is continuing to disseminate the knowledge and skills acquired among colleagues from other faculties, including through the Department of staff development.

The project participants have had practical experience in the development of educational programmes tailored to the needs of the learners, taking into account learning outcomes, their evaluation and application of new educational technologies in the teaching process, including through distance learning. The training modules were developed in multi-country micro-groups, which facilitated sharing of experiences, identification of best practices and their use in their professional activities. Based on the research conducted, the team members proposed the most appropriate forms of further training of engineering teachers for various organizations in the South and Central Kazakhstan regions, identified key competences of the engineering teacher, as well as deficiencies in the competences of young engineering graduates. Members of the team compiled a list of learning outcomes of the engineering programmes, identified the most needed disciplines to be included in the programmes. Kazakh participants have had the experience of organizing and conducting international seminars and training courses, including online, using a variety of methods to increase the professional interest of participants. Online communication forms and channels used in the projects have contributed to improving information competences of Kazakh team members. All working sessions are conducted in English, which has a positive impact on the participants' professional communication skills.

The establishment of an international network for further training of engineering teachers will enable universities in Kazakhstan, the Russian Federation and Europe to recognize the results of the full cycle of internationally accredited programmes; which would allow to award international certificate «Engineering Teacher». Accordingly, the syllabi developed within the framework of the project are subjected to a thorough examination of their compliance with the requirements of the European system of engineering education and their ability to achieve international competences, defined for IGIP (International Society for Engineering Pedagogy) engineers.

The implementation of the programmes by higher educational institutions of Kazakhstan is a new direction. We are confident that they would make a new foundation of teaching and methodological content for Kazakhstani training and retraining programmes. We see further development of the project in the promotion of the university as a regional centre for pedagogical training in engineering specialties.

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Development and Implementation of the Master Programme “Green Logistics Management”: Advancing Trans-Eurasian Accessibility Through Sustainable Logistics Management and ICT Infrastructure (561937-JP-2015 - LogOn-U)

Objective: *To improve the transport sector and accessibility in Kazakhstan, Russia and Europe by bringing academic content in Partner universities in Logistics Management to the EU standards and according to Bologna process, development and implementation of Master Programme "Green Logistics Management”, creation of sustainable inter-university educational platform to ensure provision of logistical competences.*

The achievement of the objective required, on the one hand, a renewal of the management competences in the field of logistics of the project participants themselves, and, on the other hand, modernization of the training programmes in this field on the basis of European standards. In this context, an important part of the project was devoted to enhancing competences of teachers in three logically related areas: general and specialized managerial knowledge and skills, European standards, including the relevant provisions of the Bologna documents on the subject of the project, theory and methodology of designing programmes.

In increasing the methodological capacity of teachers partners from EU universities in the course of training events paid special attention to the improvement of both professional «hard» skills based on game and project methods, and «soft» universal skills - through the development of emotional intelligence, the ability to work in a team, analysis of situations, time management, etc. Kazakh teachers were familiarized with innovative practices in logistics management, application of new training technologies using the software purchased from the project budget, have improved the quality of delivering lectures, organizing seminars and practical exercises.

Cooperation with business environment has been intensified. The level of proficiency in English has increased, as English language courses were made for students and teachers since the start of the project.

The project has brought about a significant change in teaching methodology. In business cycle disciplines, academic staff is using more actively student-oriented, project-based learning. Instead of traditional examinations the students are asked to implement a project on optimizing organizational structure of management, carry out business-projects with estimation of social and economic impact. Such approach has resulted in enhancing economic thinking of students, developing youth entrepreneurship through economic disciplines.

The Major-Minor model is implemented at the bachelor level, providing individual trajectories for students with flexible adjustment to the labor market needs, fostering applied and research competences.

All undergraduate programmes have components aimed at developing students' entrepreneurial skills, data processing skills, including with Big data, and the use of modern Special IBM SPSS Statistics Standard software, Special Logistics SWincl. GeoInfoSW: MapInfo Professional 15.0 also purchased in the frame of the project. Working with these programmes the students were able to work with modern software products that are used be specialists of big enterprises. This considerably shortens the adaptation period of graduates at the enterprise.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

Thorough and versatile training of teachers enabled them to develop and introduce 6 disciplines (in total 30 ECTS) that are offered as an educational trajectory in the frame of educational programme «Logistics Management»: “Management: Transport Logistics” (5 ECTS) programme, Storage facility (5 ECTS), Information provision of logistics infrastructure management (5 ECTS), Modern management analysis (5 ECTS), Informaiton technologies in logistics (4 ECTS), Transport-storage logistics (5 ECTS);

Jointly with the employers of the region and taking into account the recommendations of experts, a competence-based model of a graduate was developed, which led to designing a new modular Master programme, which includes a block of basic and specialized disciplines.

3 governmental grants for Master studies were allocated by the Ministry of education and science of RK.

In the process of developing and implementing the new interdisciplinary Master programme opportunities for cooperation with industry have increased., Along with traditional agreements with large enterprises, close links with business have resulted in the development of start-up projects in the field of transport, renewable energy, «green» agriculture, orders for research projects funded by National Chamber of Entrepreneurs «Atameken» (up to 3 million tenge) and others. Agreement on cooperation in the frame of implementing the dual system of education has been concluded between the Chamber of Entrepreneurs of Kostanay region, between JSC «SaryArka AutoProm» and Rudny industrial institute (RII). A marketing unit has been set up, which has changed the format of university cooperation with employers and graduates. A joint engineering centre in Kostanai with «Kamaz» company JSC «SaryArka AvtoProm» was set up for training specialists for machine-building sector of Kazakhstan.

Expert councils on assessing and accreditation of practical skills of students was established with the support of JSC "SSGPO" and JSC «SaryArkaAutoProm». The latter is considered to be a serious advancement in cooperation with enterprises and the document provided by the Councils has a good value when students are applying for a job, as recognition of the skills and competence gained by the young specialists. More than 85 RII students have already been awarded accreditation for practical skills. Employment of graduates made up 100%.

The experience gained in the project and international links have made it possible to change attitudes towards internationalization and international projects, both among staff and university administration, led to a change in the mission and vision of the university, in the development of a new university strategy oriented to globalization and internationalization.

Andrey Koval,
Head of the Department of Science and Postgraduate Education, Kostanay Regional University named after A. Baitursynov

Development of a Bologna-based Master Curriculum in Resource Efficient Production Logistics (585967-JP-2017 - PRODLOG)

Objective: *Development and implementation of a Bologna-based Master curriculum in Resource Efficient Production Logistics.*

In accordance with the project objective, the team developed an innovative Master programme on «Resource efficient production in Logistics» (120 ECTS) based on the needs survey and analysis of the existing legal and regulatory framework. The programme is in line with the principles and tools of the Bologna Process, such as internationalization, a barrier-free academic environment, gender equality, and is included in the Register of Educational Programmes of the

Unified Higher Education Management System. A variety of factors have been taken into account in the design - learning time, flexibility of the curriculum for employees, use of the Moodle virtual learning environment for distance learning, etc. International accreditation is envisaged in all universities following the launch of the programme.

The proposed programme de facto is innovative, as there has been no previous training of specialists in resource-efficient production logistics in the CIS area.

Several stages of internal and external quality assurance were organized in the course of developing the modules. Training modules aimed at developing specific competencies (both professional and overarching) have been identified. Among them: "Logistics System Planning", "Business Process Management in Logistics", "Information Technology in Logistics", "Internal Logistics and Planning", "Audit and Optimization of Intrasystems", "Automation of Design and Simulation of Logistic Processes", "Higher School Psychology and Pedagogy", "History of Science and Organization of Research" with a total of over 60 ECTS. The Innovative Programme is taught in two languages. 9 Master students are currently taking the course at the Kazakh-German University (KGU).

The programme was discussed in detail at the working meetings in Magdeburg and Clermont-Ferrand by all project participants. Modules relevant to each individual university, as well as variative and common for all participating universities were identified to ensure that academic mobility of staff and learners is possible. For example, KGU and MADI share such modules as "Internal Logistics and Planning", "Audit and Optimization of Intralogistics Systems", which gives students the opportunity to spend a period of study at a partner university.

The programme was designed jointly with representatives of companies concerned. Numerous meetings and discussions were organized with representatives of JSC «Vesta», JSC «TransAL», JSC «Gebrüder Weiss», JSC «Kazakh Temir Joly» - the biggest national railway company, the KNU Education and Methodological Board. Taking into account their recommendations the disciplines «Controlling in Logistics», «Ergonomics and Lean Production», «Marketing» were introduced.

The final version of the programme was discussed and approved by the KGU Academic Council in June, 24, 2019. International accreditation of the programme is planned for 2023.

Capacity building of the project team was also paid special attention. In the course of the project, the participants were thoroughly acquainted with the theory and practice of designing educational programmes and methodology of teaching.

As a result of training seminars and internship combining theory and practical exercises the project team learned how to use business games on supply chain management in classes to simulate the «whip effect», develop routes and schedule delivery of goods, organization of supplies of raw materials and components for production, etc. Master students apply simulation techniques on the AnyLogic platform during their course work and in preparing Master's theses.

Given that academic staff was not previously focused on the specificity of the work environment, acquaintance with the methodology of the learning process has allowed to apply the new knowledge in the practice of teaching at the university level.

The KGU leadership offered English language courses for team members, which helped to improve English proficiency, reduce language barriers and ensure their productive and confident participation as consortium members.

Masters and professors were given the opportunity to participate in scientific events at partner universities. Just to name a few: joint organization of the international Summer University «Digitalization in Business and Engineering: Central Asia and Germany in comparison» in August 2019 hosted by KNU, participation of all partners in the annual Log Forum, internships of the KNU Master students in «Logistics» in MADI and the University of Sigma-Clermont.

As part of the staff development activities advanced training courses were held on teaching methods (business games in frugal production) and on the content of certain disciplines (simulations on the AnyLogic platform). As a result, behavioural (project coordination, administrative work experience, teamwork, result-oriented approach), technical (simulation skills), academic (experience in developing a competency matrix for learners, developing work programmes, using business games in learning), language skills (preparing presentations in English) were developed.

The project helped to enhance international cooperation and academic mobility of students and staff, improve English language proficiency, learn and use new methods of training in logistics. Negotiations are currently under way on academic mobility and double-degree programme with EU and Russian university partners.

Agreements on cooperation in the field of research, internships and academic mobility of students and teachers with SIGMA Clermont, Volga State Water Transport University and Moscow Motor Vehicle University, Road State Technical University (MADI), Kyrgyz Razzakov State Technical University and Kyrgyz National Skryabin Agrarian University were signed. In February 2020, Kazakh Master students completed their scientific internship at the Moscow Automobile and Road State Technical University.

In preparing and implementing the Master programme the team took into account the main directions of the State strategy for the development of industrialization, digitization and improvement of transport and logistics infrastructure. The project team is ready to provide training in the context of multilingual education in cooperation with EU partner universities.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

At the national level, the project contributes to bridging the infrastructure and educational gap by developing logistics competences in Partner countries. The virtual reality laboratories and game laboratories established on the basis of Kazakh universities make it possible to increase the practical orientation of teaching and to strengthen cooperation with enterprises. As part of the work of ProdLog centres, KGU organizes training for business representatives.

For example, in May 2019 the team of Kazakh-German university offered a refresher course for JSC “Gebrüder Weiss” in four modules selected by the company employees from the courses offered.

Courses are planned based on blended learning technology and MOODLE platform, which is very important in the transition to online learning.

Zhandos Kegenbekov,
Dean of the Faculty of Engineering and Information Technology, Kazakh-German University

Innovative Approach Towards a Master Programme on Smart Cities Technologies (598317-JP-2018 - SMARTCITY)

Objective: *To support for the training of a new generation of multidisciplinary engineers in SmartCity technologies through the development of a double-degree programme with a European university and the internationalization of university curricula in the Partners countries in accordance with the Bologna Principles; improvement of the quality of education, introduction of innovative content and teaching methods.*

«SmartCity» — is a concept of urban development, allowing to safely integrate many solutions in the field of mathematical modelling of technological systems, information and communication technologies, Internet of things (IoT) for the management of city assets. The goal of the «SmartCity Concept» adopted in Kazakhstan is to improve the quality of life of urban community and increase efficiency of urban services through the introduction of ICT in urban infrastructure. According to this concept, significant GDP effects are expected from SmartCity projects, thus there is a need for training in this field.

In line with the main objective of the project, the team has developed two new Master degree programmes jointly with the International Hellenic University (IHU, Thessaloniki, Greece), which are implemented in English:

«7M06107 - Mathematical and computer modelling» (2019 - KazNU); «7M01514 - Smartcity-technologies» (2019 - ENU).

The team started the development of the programme with a survey of employers directly connected with the implementation of smart technologies: JSC «BI Digital», «Astana Innovation», JSC «Kazinvest», Astana International Airport, JSC “Kazmunaigas”, JSC «Ernaiza Group», JSC «TLC 200 Almaty», JSC «AlmatySolution», JSC «Unified National Pension Fund of the Republic of Kazakhstan».

The survey helped to identify the needs of the market for Smart City technology specialists, define the programme’s objective and identify learning outcomes. Employers noted the importance of the skills of future professionals in information security and wireless network technologies. As a result, such disciplines as «Wireless communications and network» and «Information Systems Security» were included in the curriculum. The courses were adapted to the implementation procedures of a similar programme at the International Hellenic University. Such innovative disciplines as «Big data and cloud computing», «Internet of Things», «Data mining» became part of the educational programme.

As a result, cooperation with enterprises has been strengthened. The content of programmes was studied and evaluated by the representatives of «Astana Innovation» company, who noted good employability potential of graduates and the interest to participate in implementing the concept in their activity in the frame of the programme «Safe City». The comments made as follows: mandatory teaching of one discipline once a year by company representatives and mandatory on-the-job practice.

«Astana Innovations» acts as a partner in providing a base of professional practice. This solution will help to consolidate theoretical and practical knowledge in the frame of the «7M01514 - Smart City-Technologies» programme as well as to improve practical skills, ensure effiecient preparation of students for future professional activities. A contract on cooperation signed with the company «Astana Innovation» stipulates that 1 employee of the company would conduct optional courses free of charge on Saturdays for Master and PhD students of the faculty.

The project participants were able to familiarize themselves in detail with the process of developing educational programmes through internships at universities in Germany, Greece, Bulgaria and Latvia.

The innovative content of the programme involves also that innovative learning methods are introduced as well. During the internships, the programme designers were introduced to the methodology of blended learning, which involves not only combining traditional and online forms of learning, but also «blending» the technology of traditional lectures with the inclusion of a practical component during the presentation of materials. The training of participants on remote technologies at Chemnitz Technical University (Chemnitz University of Technology, Germany) was very relevant in the context of the coronavirus pandemic. During March-May 2020, the platform and the technologies presented were used for remote training of 38 employees of al-Farabi KazNU, which was very helpful in the circumstances of online learning under the COVID-19.

The new programme (120 ECTS) was launched in 2019 with 16 students enrolled. As part of the implementation of the double-degree programme in 2019 3 Master students from KazNU and 5 from ENU spent a period of study (60 ECTS) at the International Hellenic University (IHU), Greece. After passing all exams, getting the IELTS language certificate with 6.5 points and successfully defending the Master thesis, students receive the diploma of the European university in addition to the diploma of their university. The interest demonstrated by bachelor students and their parents to the programme shows that the programme would be demanded.

The introduction of the SMRCITY project has also made it possible to extend the experience of designing double-degree programmes to other departments of Kazakh partner universities. Based on the model, 2 departments of the Mechanical and Mathematical Faculty of KazNU in 2020-2021 academic year launched 2 double-degree programmes with universities in France and Russia. The approach has motivated other structural subdivisions of KazNU and ENU to conclude agreements with European universities and to develop double-degree programmes in other areas as well.

The design of the programme was supported by the development of 6 manuals on the disciplines: «Web-programming», «Computer networks», «Oracle SQL», «Internet of Things», «ICT management», «Development of mobile application». It is noteworthy that the manuals provide methodological guidance for each laboratory activity, illustrate the data analysis processes, and provide instructions for the use of the software needed to achieve learning outcomes. The project has created a single hybrid digital space, where all project training materials needed for the implementation of the programme are uploaded.

University leadership at both HEIs recognizing the importance of training specialists in this field strongly supports the project developments and the establishment of Smart Cities' dimension in the universities. The project has not yet been completed, but university development strategies are already being revised to incorporate some of the project's smart technology deliverables as strategic objectives.

The project's activities contribute to the realization of the objectives of internationalization, external and internal mobility, and an increase in the number of English-language teaching programmes.

The sustainability of the project results is achieved by opening Competence Centres in KazNU and ENU. The KazNU Competence Centre also hosts the IT-Academy and Centre of Robotic Research. To support the activities a staff unit was allocated and Head of the Centre nominated.

Having learned about the project, administration of the organization in charge of implementing the project 'Smart city Akkol in Kazakhstan' were interested to cooperate and offered job placement opportunities for the graduates of the programme. They also gave valuable recommendations for creating conditions for learning smart technologies.

Eurasian Gumilev national university established close cooperation with JSC «Astana Innovations», which acts as an integrator of innovative ecosystem, consolidating the efforts of city authorities, scientific and business community. The company «Astana Innovations» carries out activities developing innovative ecosystem of Nur-Sultan city to solve urban technological problems by engaging young developers.

This project has had a great impact on the level of individual team members. Participants noted that prior to the project there was no clear understanding of the technologies to be used to implement smart systems in cities. The project contributed to the emergence of start-up projects based on the use of smart-technologies: «Clever table for student», «Clever glove», «Clever urn», «Prototype of smart house», «Smart-water garden» and others. Many colleagues have included digital education in smart technology as an integral part of digital education. KazNU Master students of Mechanical and Mathematical Faculty, having learned about the SMRCITY project, were inspired to develop elements suitable for implementation in Smart Cities. From inexpensive elements purchased with sponsorship funds, a group of 7 undergraduate and Master students under the supervision of Dr. B. Sagitzhanov, a participant of the SMRCITY project, pilot tested their own invention - Control lighting in 2 offices - in the building of the faculty, have installed «smart» rosettes, allowing to save electricity. This research group managed to create a prototype of «smart glove» and to win the 1st place in the competition of student research projects conducted in KazNU.

KazNU teacher B. Sagitzhanov on his own initiative has also assembled a team of students who now are creating prototypes of Smart City elements and participate in scientific competitions.

Karuna Oksana, Coordinator of SmartCity project at KazNU, introduced elements of distance education technologies as part of an internship at the Mechanical and Mathematical Faculty of Chemnitz University of Technology, which allowed staff and students to adapt easily to distance education during quarantine.

The distance learning platforms developed under this project have inspired more than two dozen teachers to develop mass online courses for Kazakhstani students. The development of these courses has already been included in the plans of universities (KazNU and ENU) for designing distance education technologies.

The project defined a favourable environment for professional development of staff. In turn, teamwork implies complementarity and cross-fertilization of knowledge and skills, which is readily welcomed by the members of the project. Due to the fact that the project involves Master students taking the «Smartcity» programme their involvement in the project is an excellent starting ground for them to develop professional skills. Cascade training has also played an important role as an effective means of sharing the accumulated experience.

"I think that throughout the project period, the team has developed an inextricable connection, where each member of the team provides support to the colleague, thus, we not only share material, but also experience. In our team there are specialists of different level».

«Of course, not only do we share our experience with Master and PhD students, but we also discover something new that encourages us to move forward».

"For me, as a Master, on the one hand, participation in the project is a new horizon that I need to conquer. Here I learn teamwork. I am pleased that my voice has been heard in the debate on one or another of the objectives".

"You feel a great responsibility. The result of the project depends on the participation of each of its participants, when everyone with pleasure shares the information and experience with colleagues».

Below are several examples on how elements of smart-technologies are applied in ENU classe.

Dr. Zakirova A.B. in teaching the «IoT» discipline used practical work on programming «Smart House». Dr. Ermaganbetov M.A. used data processing in teaching the discipline «Data mining». Assistant Professor Alzhanov A.K. in the «ICT management» discipline used elements of «Smart city» in practical exercises.

As part of cascade training the KazNU and ENU colleagues who have benefitted from staff development activities at EU partner institutions organized follow-up at home universities – over 150 staff members were trained on the introduction of smart technologies, distance learning, use of special platforms for distance learning, etc. This was particularly helpful under the quarantine when the majority of education institutions had to move to online and distance education.

Karuna Oksana took part in a number of fora on sustainable urban development, «Green Economy», presenting the results of SMRCITY project. A collective monograph reflecting her reports has been published.

Thanks to the project, many teachers have improved their English language skills; their motivation to prepare and implement scientific projects financed by MES RK, participate in internships and refresher courses has enhanced.

The SMRCITY project has resulted in spin-off effects:

- Agreement was reached on the development of double-degree programmes with the Riga University of Technology (Latvia) and the Chemnitz University of Technology (Germany) with KazNU.
- KazNU administration has arranged invitation for academic staff of Saratov University and Riga University - participants of the SmartSity project – for delivering training for Master students.
- 2 Start-Ups have been launched using IT and robotic technologies.

The KazNU team released a monograph «Smart Cities on the Silk Road: International Experience in Sustainable Urban Development» in Russian and English (expected to be included in the BD Scopus).

Oksana Karuna,
Deputy Head of the Department of Mathematical and Computer Modelling for Scientific and Innovative Activities and International Relations, Al-Farabi Kazakh National University

Establishment of Centres for competence and Employability Development (561603-JP-2015 - COMPLETE)

Aims and objectives:

- To reinforce employability development in compliance with Bologna process requirements;

- To establish Centres for Competence and Employability Development (CCEDs);

- To implement workshops and courses to different target groups and stakeholders;

- To promote CCEDs in Common Education Space of the Russian Federation and the Republic of Kazkahstan.

In order to achieve the goal, the team has developed a series of courses (modules) taking into account the specificities of the participating universities and employers' needs.

For example, Shakarim University has designed 5 independent short courses/disciplines, which were integrated into the Bachelor and Master's programme. Among them:

"Legal provisions for entrepreneurial activity" (12 hours, in Kazakh);

"Emotional intelligence" (18 hours, in Kazakh and Russian);

"Business ethics / Business communication ethics (5 ECTS/36 hours - in Kazakh and Russian);

"Project management (5 ECTS/36 hours, English and Russian); "Effective communication" (5 ECTS/36 hours, in Russian).

In the frame of further training programmes, all the above five courses are implemented as non-formal education programmes (in total 138 hours). The target audience: Bachelor and Master students (as electives), academic staff, company employees.

In the frame of Bachelor programme the university has introduced 3 new disciplines. These are - Project Management (5 ECTS) and Effective Communication (5 ECTS) integrated in the curricula of «Management»; State and Local Government, Business Ethics / Ethics of Business Communication (5 ECTS) integrated in the curriculum of «Business, Management and Law». Total amount - 15 ECTS.

At Master level 2 new disciplines were implemented: Project Management (5 ECTS), Effective Communications (5 ECTS), integrated in the Master curricula of «Management», «State and local administration». The content of the course and the results of the training correspond to NQF level 7. Total amount - 10 ECTS.

Within the frame of further training programmes, all the above five courses are also implemented as non-formal education programmes with fewer hours of contact. Entrepreneurship (12 hours); Emotional Intelligence (18 hours); Business Ethics / Ethics of Business Communication (36 hours); Project Management (36 hours); Effective Communication (36 hours). Target audience: Bachelor degree students, Master students, academic staff and company employees (138 hours).

More than 500 undergraduate and postgraduate students (including Master degree students from other universities as part of their academic internship) have attended these courses.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

All courses and programmes were developed taking into account the opinions and requests of stakeholders and potential users of educational services. A variety of tools were used for this purpose (questionnaires, interviews of students and employers, self-assessment checklists of competency levels, a job-seeker's guide for graduates, electronic resources for creating a graduate profile, etc.).

The analysis showed that the courses and programmes of soft skills development are most in demand. This explains the choice of course content and subjects.

For example, KEUK and Narxoz University have introduced major changes in the curriculum introducing disciplines aimed at developing soft skills. The course «Effective job placement, including such modules as «Career orientation», «Self-promotion: CV and motivation letter», «Self-presentation», «Workplace adaptation» has become particularly popular in all higher education institutions.

More than 200 teachers have been trained in flipped-classrom techniques, mediation, facilitation, project-based teaching method to help students develop flexible skills.

Another significant result has been the establishment of Competence and Employability Development Centres (CCEDs) in all Kazakh partner universities. Their main purpose is:

- Promote better preparation of students for work through the development of skills and competences, their employability potential;
- Ensure effective interaction of the university with employers, coordination of the activities of faculties and departments in transforming and developing activities aimed at developing skills and competences required in the labour market.

As a result of coordinated efforts, cooperation with external steakholders has improved.

Shakarim University has established close links with the Chamber of Entrepreneurs of East Kazakhstan Oblast, Branch of the Chamber of Entrepreneurs of East-Kazakhstan oblast in Semey, Akimat of East-Kazakhstan oblast and Akimat of Semey, a number of other enterprises. This made it possible to engage representatives of these companies in designing and upgrading programmes on Business Administration, Management, Economy, State and local administration.

Based on the request of entrepreneurs and employees of the companies «Semey Cement Plant», JSC «Karazhyra», JSC «TMT Consulting», JSC «CISO» Kazakh partner universities prepared and conducted seminars on "International Trade", "Entrepreneurship and Innovation Management", "Making investment decisions" hosted by enterprises. Individual enterprises supported financially a variety of other joint activities.

The KEUK noted a change in the attitude of the business environment towards the university. The social partners of KEUK (JSC «Ephesus Karaganda», JSC «Arselormittal», JSC «Eurasian Copper») are actively involved in the competitive selection of applicants on the university's grounds (psychological trainings, business games, interviews, cases and exercises). Visibility of the university has increased among small and medium enterprises who have been present on the market for 5-10 years and are interested in recruiting graduates.

There is a clear motivation on the part of the social partners to take refresher courses organized by KEUK. The university is conducting labour market analysis on a systemic basis to identify the needs of enterprises, including themes of refresher courses. Social partners initiate and actively participate in open events held by the university (off-line and online Job Fairs, online webinars, master classes oriented to professional interests of companies). There is a trend towards the involvement of the business community in the educational process, in the conclusion of research agreements, organization of professional competitions, etc.

The CCED Centre under the Narxoz University has organized over 60 master classes for students in career guidance, resume writing, preparing to interviews and stress interviews, creating a career portfolio, personalized branding via social media, etc. 487 students have attended weekly career trainings. Winter schools were organized for staff with over 100 participants. Outreach training was also conducted for Career Centres of other universities, including neighbouring countries (Uzbekistan, Tajikistan, Russia, Georgia).

As a result of the project, the participants gained experience of working in international team. In particular, teachers at Shakarim University note the improvement of team members' skills in several areas: research methodology, teaching methods, design of educational programmes, improvement of language competences. In research, teachers have made more use of questionnaires and automated data-processing programmes, adjusting teaching methods according to the results of the survey. Among them, course modules based on feedback questionnaires conducted by the trainees themselves have been introduced. The development of language competences has made it possible to have access to and use global resources of the United Nations, World Bank, World Economic Forum, other organizations in the original language for research and teaching.

As a result of students' involvement in seminars and trainings, the number of student projects, start-up ideas and business projects presented at international, national and regional competitions increased by 29% (2017-2020).

In KEUK there is an increase of entrepreneurial activity of students supported by Technological Business-Incubator (TBI) «Coworking-centre «Dostyk». The resident students of TBI «Coworking-centre «Dostyk» participate in the competitions of start-up projects, hackathons, start-up weekends and win the prize places. On September 24, 2019 students Bulekbaeva J. and Myrzatayev B. participated in the Hackathon «IT-WEEK.KZ 2019». As part of the team they won the first prize. They developed the ‘Clean City’ mobile application, which allows users to send photos and geolocation of unauthorized landfills to the agency responsible for cleaning the city.

On the basis of TBI «Coworking-centre «Dostyk» students got the opportunity to realize their start-up projects. As a result of training, about 30% of graduates start their own businesses. Among them Sakenova G.A. (IE «Sakenova Trade»); Shkabaro A.Y. (IE «Shkabaro»), Tapin D.N. director of LLP «Express Consult», Uramaeva D.E. director of LLP “Grand Evaluation”, B. Myrzatayev who started LLP «Young student» and is now successfully developing his business.

For such interested students the Centre organizes courses and trainings on Business Planning and Commercialization, Project Management and Innovative Management. As an example of successful projects can be named «QAZYNA» project (intellectual game on developing financial literacy, Project «Action ECO Box»), which are already implemented and whose experience was presented at various competitions.

Saltanat Mulikova,
Professor of the Department of Social Work and the Assembly of People of Kazakhstan, Karaganda Economic University Kazpotrebsoyuz

Promoting Internationalization of Research through Establishment and Operationalization of Cycle 3 Quality Assurance System in line with the European Integration Agenda (574273-SP-2016-AM - C3QA)

Objectives: *To contribute to the establishment of a knowledge-based society in Partner countries through the launch and operationalization of a robust quality assurance system for internationalization of Cycle 3 programmes.*

The present Structural Project has had a major impact at the national and institutional levels.

The impact of the project at the national level is evident through the implementation of recommendations to improve the programmes of cycle 3, developed by the team on the basis of interviews with a wide range of interested parties: doctoral students, representatives of Kazakh universities, analysis of national legislation. The recommendations were discussed at the national level and submitted to the Ministry of Education and Science.

In general, as a result of the C3QA project, a number of changes were made to 3 legislative and regulatory documents of the MES RK:

- Model Rules for Admission to Education
- The State General Compulsory Post-Graduate Education Standard
- Model Provisions for the Dissertation Board.

The Model Regulations on Admission to Education Institutions, which regulate educational programmes for postgraduate education, have changed the procedure for admission to and holding of entrance examinations for doctoral studies. Applicants for doctoral studies must provide international certificates of proficiency in a foreign language in accordance with European competence (standards) in a foreign language (English: TOEFL ITP - at least 460, TOEFL IBT - at least 560, IELTS - at least 4.5).

In order to improve the quality of doctoral research, the concept of «research proposal» was added to the State General Standard for Postgraduate Education. This has enabled them to better plan their research and, in its early stages, to receive substantive feedback from the scientific supervisor.

The State General Compulsory Post-Graduate Education Standard has also made provision for the content of the DBA education programme to be developed taking into account the peculiarities and principles of the Kazakh business and management, the study of international business and foreign management experience. The list of subjects of the higher education component and the elective component is determined independently by the higher education institution in accordance with the requests of employers and the labour market, which allows students to study the subjects most relevant to their specialty and to reduce the extra burden on students.

The important contribution of the project was also made by the paragraphs dealing with the final certification only in the form of the defence of a thesis, the amendment of the Model Regulations on the Dissertation Council, according to which all costs related to the activities of the Dissertation Board, are covered by the university where the dissertation board works, which relieves significant financial burden of doctoral students.

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

The main result of the project was the development and approval (2018) of Standards and Criteria for Specialized (Programme) Accreditation of Doctoral programmes. The document was created taking into account the Salzburg Principles of Accreditation of Doctoral Programmes, European Standards and Guidelines (ESG), Standards and Criteria for Specialized Accreditation (IQAA), RK Strategy in Postgraduate Education.

The standards now prescribe requirements for the scientific supervisors of doctoral dissertations, which has significantly improved the quality of scientific guidance, thereby improving the content of dissertations. Doctoral candidates must now provide international certificates of proficiency in a foreign language in accordance with European standards. Mastery of doctoral research competences, confidence in foreign languages allows them to participate more effectively in competitions and to win grants for scientific research financed by MES RK or foreign scientific foundations. The study and introduction of European experience in the implementation of PhD programmes has considerably improved the content of doctoral programmes and the quality of doctoral studies in higher education institutions.

The Doctoral Accreditation Standards contain a block of criteria for admission to doctoral studies, including criteria for the research potential of doctoral students. This will make it possible to select people who have already taken certain steps in scientific research and who have the necessary scientific experience and publications for doctoral studies. In turn, it will help to solve the problem of defending doctoral dissertations within the given period of study.

Doctoral accreditation standards include a requirement to minimise the number of specialized disciplines taught and the number of mandatory classroom sessions, and to focus more on the methodology of the study, as the main time should be devoted to research and experimental work.

On the basis of the results of the project and its recommendations for the improvement of the programmes of cycle 3, about 10 changes were made in the normative-legal acts of the Ministry of Education of the Republic of Kazakhstan regulating doctoral studies .

These changes significantly brought the process of preparing doctoral students in Kazakhstan closer to European quality standards, which has a positive impact on the global competitiveness of Kazakh PhD students.

As a result of the introduction of recommendations in the implementation of PhD curricula, the content of doctoral programmes of Kazakh higher educational institutions has been considerably improved. In South-Kazakhstan Auezov University (SKU) under the programme «Chemical Technology of Inorganic Substances» and «Chemical Technology of Organic Substances» the reduction of the total number of courses read and introduction of relevant disciplines contributed to the development of flexible and professional skills, research, methodological and entrepreneurial competences needed by doctoral students to carry out scientific research and prepare high-quality scientific articles for publication in peer-reviewed foreign journals.

Under «Chemical technology of inorganic substances» the number of disciplines decreased from 6 to 5, new disciplines were introduced: «Management of scientific projects», «Optimization of chemical-technological processes», «Methodology of scientific research». In the programme «Chemical Technology of Organic Substances» the number of disciplines also decreased from 6 to 5, new disciplines «Strategic Management», «Commercialization of scientific developments. Basic fundraising» were introduced.

Standards and criteria for specialized (programme) accreditation of doctoral education curricula is another result obtained in the framework of the C3QA project. In contrast to the standards and criteria for specialized accreditation of the first- and second-cycle programmes (bachelor's and Master degree programmes), this document focuses on the research orientation of the doctoral education programme, on the development of independence, flexibility and originality of doctoral research thinking, academic integrity and ethics in research, creation of an appropriate research infrastructure and environment for young scientists. A great deal of attention is paid to the level of professional training and the English language of applicants for doctoral studies, the quality and compliance of staff with the requirements for the management of theses and their research work, as well as the availability and periodic updating of laboratory bases and other infrastructure necessary for conducting experiments and research of doctoral students.

Within the framework of the project, pilot accreditation of the programmes of the three participating higher education institutions was carried out, which generally confirmed the relevance and content of the Standards for Accreditation of Doctoral Programmes.

Another important result of the project - Narikbaev Kazakh university of law and SKU developed the Manual on Internal Quality Assurance in Doctoral Studies. The development and adoption of the Manual allowed for the implementation of its own institutional approach (as described in the policy on the Internal Doctoral Quality Assurance System) to the realization of doctoral theses in the university with emphasis on quality assurance of scientific training and improvement of the quality of doctoral theses. The structure of the adopted documents follows the Standards and Guidelines (ESG) in the European Higher Education Area. The guide is based on both normative documents of the Republic of Kazakhstan and internal documents of the higher education institutions, including the Rules of Academic Integrity, and on European documents: Salzburg Principles, Salzburg Recommendations II, Principles of Innovative Doctoral Education. The introduction of this document is aimed at harmonizing the system of internal quality assurance in doctoral education with European standards.

The content of the document covers the whole period of doctoral studies: admission to doctoral studies, period of study, scientific consultations, reports of doctoral students, defense of doctoral theses.

The developed document is an obligatory guide for officials and staff involved in the organization and realization of educational programmes of universities, and it is part of the documentation system of quality management of the university.

Two additional tools have been developed:

1) Methodological recommendations on the organization of doctoral and research work of postgraduate students (2017, 32 p.);

2) Methodological recommendations on the defence of candidate dissertations (2017, 40 p.).

SECTION 1. MODERNIZATION OF CURRICULA AND EDUCATIONAL PROGRAMMES

The project participants note the improvement of the quality of the university's research environment through the creation of a work area (office) for doctoral students, equipped with computers, projectors, printers purchased with the project budget, where they can work on their own research;

An additional effect of the project in KazUL was the receipt of a grant under the Jean Monnet Action «Privacy Protection: the European Union Perspective», which allows the doctor to work in the project as an assistant teacher and assistant researcher. It should be noted that the subject of the project coincides with the subject of the doctoral research, which allows the Doctoral students to concentrate on his/her research while at the same time having an additional source of funding.

Sholpan Kalanova,
President of IQAA,
Independent Agency of Accreditation and Rating

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

IMPLEMENTATION OF EDUCATION QUALITY ASSURANCE SYSTEM VIA COOPERATION OF UNIVERSITY-BUSINESS-GOVERNMENT IN HEIS (586109-SP-2017-RO - EDUQAS)

Objectives: *Improvement of education quality assurance system throught the development of efficient internal quality standards leading to better employability of students in Partner Countries' universities.*

Expected outcomes:

I. Quality Assurance Units established in partner universities, sets of standards for the work of the Quality Assurance Unit and a manual on internal quality control in higher education in Kazakhstan and Ukraine developed. As a result, improved management, education and research through the study and implementation of better EU university procedures and processes;

II. Developed partnership network of university-business-government through cooperation of quality assurance agencies, professors, researchers, students of EU universities;

To achieve the main expected result, "established quality assurance Centres (QAC) n partner universities and developed sets of standards for the quality assurance unit" the higher education institutions have decided to establish such structures in order to perform the following functions: a) to consolidate and analyze the information on the evaluation of the quality of the educational process, and to make appropriate recommendations; b) carry out internal audit of academic departments of universities; c) develop audit reports and make decisions. The new structure has become a link for internal quality assurance at different levels of university activity.

The Internal Quality Assurance System is complemented by a "Quality Guide" based on the best practices of European universities. The document includes sections on monitoring, measuring, analysing and evaluating the quality of the educational process. For the organization of monitoring, measurable indicators of the quality of the educational process are established, linked to quality objectives.

In addition to the QAC and the Guide, the Academic Councils have been established as important elements of the internal quality assurance system of universities to monitor the content of the programmes. In this way, the new model ensures the adoption of targeted and timely corrective measures in the event of shortcomings in the management, educational process, scientific research and other activities of universities. The Statute of the Academic Council, adopted in Kazakh University of Economics, Finance and International Trade (KazUEFiT), expanded the functions of their members and strengthened the position of employers. For example, more employers were involved in the «Information Systems» programme - general director of LLP «LINCOMPANY; on the «Design» programme – director of «M-Art» studio, in the «Marketing» programme - director of marketing agency «Optimalmix». Taking into account their recommendations, the content of the programmes is supplemented by the following disciplines: «Animation graphics», «Information architecture and usability», «SMM technologies», etc.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

In the participating universities, the new internal quality assurance structure makes it possible to respond adequately to the challenges in the HE, to contribute to fostering a quality culture at all its levels and to be open to the suggestions of graduates, students and employers. That is, to meet the modern demands of the labour market and to make necessary and justified changes.

Participation in the project has had a significant impact on the participants. At the individual level, the project has had a strong impact on the professional activities of the staff of the Quality Assurance, Monitoring and Planning Departments, the Registrar's Office, the Deans and other departments involved in the quality assurance process. Participation in trainings and business visits to European universities has brought up to date knowledge and skills related to flexible thinking and creativity, target-setting, decision-making, cooperation and teamwork, personal efficiency and self-organization, working towards a specific outcome. Language skills also have increased.

As we can see, these are basically universal skills and competences that ensure the development of personal and professional potential in various types of activities. In connection with the subject of the project, it was important to study the European experience in assessing the effectiveness of higher education institutions in the field of quality assurance. The training activities of an international expert, Professor of the University of Latvia Baiba Savrina at the Kazakh University of Economics, Finance and International Trade (KazUEFIT) in Nur-Sultan, helped to improve the performance indicators and criteria of teachers, to determine the internal possibilities of higher education institutions to improve the quality of the educational process. As a result of the meetings, changes were made to the objectives and quality policy of the universities.

To ensure interaction with the labour market in Kazakstan, Abylai Khan University created the «Office for Quality Assurance» for cooperation of researchers and enterprises, as well as for commercialization of individual research results similar to European universities. This collaboration includes stakeholders to improve the quality of programmes. For example, the pilot evaluation of the "Translation Case" programme received positive feedback from the expert team, which was reflected in one of the project's final products - "Guidelines on Involvement of Stakeholders in Higher Education Programmes of Kazakhstan and Ukraine".

The Office is a new form of collaboration with employers as part of the commercialization of university research results, and a number of cooperation agreements have been signed with partner organizations at the Office's initiative to date (Talgo-Tulpar LLP, Kazakhstan Translators Association, etc.). These agreements provide for cooperation with employers in the area of guidance, organization and implementation of the teaching-learning process, employment of graduates and their further career development, participation of employers in round tables, consultations and other meetings on practical training of students, curriculum development, teaching of special subjects, etc.

KazUEFIT also cooperates closely with enterprises, organizations and banks within the framework of dual education, since their specialists, as already mentioned, are members of the Academic Council of educational programmes, participate in the development and expertise of cirricula; The Department of Labour and Social Welfare takes active part in Job Fairs, where it is possible to select the best and creative graduates for internships and further employment.

The Departments also invite practitioners as Chairmen of the State Attestation Commissions, as well as for teaching specialized disciplines both within the university and in the university branches at enterprises and companies. A recent practice has been to identify themes of graduation works of students based on the needs of enterprises. in such cases the companies are providing documents certifying that the results of PhD and Master studies have been implemented in the hosting financial organization.

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ENHANCING CAPACITIES IN IMPLEMENTATION OF INSTITUTIONAL QUALITY ASSURANCE SYSTEMS AND TYPOLOGY USING BOLOGNA PROCESS PRINCIPLES (561685-JP-2015-CZ - IQAT)

Objectives: *To increase the capacity to implement the Bologna Process (BP) at the institutional level of higher education institutions (universities) in two partner countries of Central Asia (Kazakhstan, Uzbekistan); Focus on the internal quality assurance system (QA) and institutional typology.*

First of all, the project helped to deepen the knowledge of its participants about ESG (Standards and Recommendations on Quality Assurance in the European Higher Education Area), about the principles of the Bologna Process – the objectives relevant to higher education institutions in Kazakhstan.

In the course of the project, a survey of interested respondents – stakeholders - was to be carried out to elicit views on the quality of the provision of educational services in the participating institutions of higher education. For this purpose, the online survey of students, parents of students and employers, was carried out for the first time in practice. Educational programmes were monitored based on the indicators of external and internal quality assurance of education, using ESG standards. The analysis of the results of the questionnaires and the monitoring made it possible to carry out an objective self-assessment of the activities of higher educational institutions and to identify their main strengths and weaknesses in the provision of educational services. Moreover, these instruments have become permanent and effective institutional tools for improving the quality of education at universities. As a result of the analysis and taking into account the Bologna Process quality assurance principles, the project participants developed the Internal Quality Assurance System Regulation and submitted it for consideration to partner enterprises.

In Karaganda Technical University (KarTU) it is an innovative-educational consortium «Corporate University», which includes the largest industrial companies, scientific centres and scientific-production corporations. Since the representatives of the mentioned enterprises participate in the development of educational programmes according to the profile, familiarization with the Regulation has enabled them to scale up the cooperation in these areas to a new level of quality. The interests of employers are taken into account by analysing their satisfaction with educational programmes on the basis of the results of practical work, employment of graduates, the discussions at scientific and practical forums held at the university with the participation of representatives of enterprises, that is, engaging employers as consultants and experts.

The KarTU project's self-assessment report was brought to the attention of the rector and deans of faculties and taken into account in the evaluation of the activities of the University's structural subdivisions for 2017. Heads of structural subdivisions were introduced to ranking methods (U-map). The responsible specialists, on the basis of the new Regulation on Internal Quality Assurance System, developed key strategic documents of the University, in which the university policy and objectives of Quality Assurance were adjusted. Upon studying the results of the project, the university's management decided to establish a socio-psychological service whose activities are aimed at preserving and improving the health - saving atmosphere in the university, as well as improving the educational process in Karaganda technical university.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

One of the important components of the project – monitoring of students' and academic staff opinions - has become an integral part of the internal system of QA at the university, allowing to quickly respond to the suggestions and comments of students and academic staff.

In KATU the requirement on the development and implementation of curricula based on the use of research- and project-based methods of training, creating conditions for productive independent work of students in the "Regulations on the system of internal quality assurance of educational services... 2017", had a significant impact both on the development of educational programmes and on the modernization of educational facilities and technology. Following the recommendations of the Regulation..., the university management has intensified work on equipping educational research laboratories and auditoriums, while heads of departments are required to ensure that the equipment and classrooms are fit for delivering the educational programmes. The Department of Academic Affairs made amendments in the study plans of the Agronomy and other specialites that require practical training, and obliged the heads of the departments, when planning, to envisage that practical sessions are organized in the field campus, in greenhouses and at various production facilities wheever possible. At the same time, according to the methodology of such classes, no more than 10 people should participate in each practical work.

The university uses U-Mapping as a tool for assessing institutional activities, which was recommended and tested during the project. Thanks to the implementation of the project, interaction with agricultural employers who are directly involved in developing and revising programmes has become closer and more content-rich.

The Regulation on quality assurance developed with the participation of employers, prescribes regular updating of programmes by introducing new disciplines (modules), training courses taking into account the needs of stakeholders, use of innovative technologies and teaching methods, improving forms of interaction with business and professional communities, etc. The implementation of the Regulation allowed KATU in 2020 to win 2nd place in the national ranking of universities in Kazakhstan for the first time. Of the 120 educational programmes that took part in the NAAR ranking, 95 KATU programmes won prizes. Involvement of international professors and teachers in the educational process as recommended in the Regulation on Quality Assurance has also been taken into account in the revised "Strategy for Internationalization of KATU," included in the Programmes for the Development of KATU for 2020-2024.

The study and implementation in the practice of Kazakh universities of European standards of quality assurance, including principles of the Bologna process, analysis of the real situation in this area and creation of strategic document on their basis ("Regulation on interna l quality assurance system") allowed the project team not only to radically modernize this important university system, but also to improve other components of activities closely linked with each other - the educational process, university governance, staff development, provision of information and technical support, other aspects.

Nurlan Serikbayev,
Director of the Department of Academic Affairs,
Kazakh Agrotechnical University
named after S. Seifullin "

PAVING THE WAY TO INTERREGIONAL MOBILITY AND ENSURING RELEVANCE, QUALITY AND EQUITY OF ACCESS (574099-SP-2016 - PAWER)

Objectives: *Strengthening interregional integration and cooperation through the development of reliable joint tools to strengthen the international dimension of higher education systems and their compatibility between the four regions and the EHEA; support the modernization, accessibility and internationalization of 24 PC Universities from 8 countries belonging to 4 different regions.*

The peculiarity of the project is that the composition of its teams included not only teachers, but also administrative staff of universities, associated with the organization of mobility of academic staff and students and recognition of credits acquired in other universities, taking into account the ECTS system and local practice. Another distinguishing feature is the mandatory retraining by project participants in their universities of academic staff and other specialists implementing academic mobility agreements with partner universities from other countries. Another feature is the need to develop a common Procedure for International Cooperation, including the creation of a special module (software) to support the academic mobility of students.

For the implementation of these and other goals of the project (for example, the development/updating of a strategy for the internationalization of universities), participants must have appropriate competencies. To this end, European partner universities have conducted trainings, seminars and internships for members of the Partner Countries teams. The main result of the training was their knowledge of the ECTS system, the procedure for recognition and transfer of credits in participating countries. Subsequently, retraining was carried out at universities by trained participants for staff of the Registrar office, the department of international cooperation, and centre of international rating on all mentioned above aspects. In addition, the acquired knowledge and competencies were used in the development of strategic and internal regulatory documents of universities governing international relations.

Thus, the KazNARU developed the Internationalization Strategy, Procedures for International Cooperation, Regulation on Academic Mobility and updated Academic Policy of the University. Targets and indicators of direct results were refined. New indicators were introduced in the system of university goals: enhancing the level of scientific research to the world level; improving the competitiveness of agricultural education; creation of new educational programmes according to the EU standards; increasing the number of developed double- diploma programmes. Integrated interdisciplinary programmes were developed: Agronomy, Biotechnology, Computing and Software Training, Ecology and Technology of Processing Industries.

Thanks to the project, team spirit and team approach to solving problems related to international educational and scientific projects and to the development of training programmes has been reinforced. Programmes in 4 specialties were harmonized between partner universities, as a result of which the internal academic mobility of students was implemented and expanded, in particular with regional partner universities, with which there was previously no close connection. The students demonstrated interest to studying at regional universities.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

At Kokshetau Regional University named after S. Ualikhanov (KokRU) the automated programme for calculating and monitoring academic mobility process purchased as part of the project significantly facilitated the work of staff of the department of academic mobility. This programme simplified the application process for students, recognition of prior study at another university. That is, from the moment the application is received from the student, the transcript and individual study plan of the student are automatically made available; the staff of the department have the opportunity to determine the timing of processing the departure documents and maintain regular communication with students.

Using this programme, the student is constantly connected with relevant staff – he/she can do it using only a computer without a mobile phone. In particular, during distance learningunder the pandemic period, this programme is very helpful, since all information about student's mobility is contained in electronic format. Internal mobility of students has also improved, for example, regional universities have not always been able to send students to study at national universities due to the non-compliance of curricula, inconsistencies in the study of disciplines by semester and differences in elective disciplines. Participation in the project provided such an opportunity; university employees were able to harmonize curricula and educational programmes, make them more flexible, revise elective disciplines for the following educational programmes: Agronomy, Biotechnology, Computing and Software Training, Ecology and Technology of Processing Industries. According to the students who benefitted from the study period, the automated programme facilitated the process of applying for and collecting the necessary documents, as well as the process of studying at national universities, which allowed them to save time and focus on the educational process.

The team took an active part in the development of the University Academic Mobility Regulation, the Internationalization Strategy and the University Academic Policy. In order to improve the academic mobility of students at the university, the above-mentioned documents include the items: academic mobility can be financed from the extra-budgetary funds of the university (from 2020 the university plans to implement a short-term (credit) Academic mobility programme at the expense of the university funds); transfer of credits for disciplines studied in hosting universities (including Kazakhstani HEIs), in agreement with the Chair is provided by coordinators at the faculty level.

The Division of International Cooperation is responsible for developing criteria for the mutual recognition of periods of study, a system for evaluating knowledge and the quality of educational services provided by the host institution and for dealing with issues of academic recognition. The Internationalization Strategy of the University includes new concepts - the mobility of educational programmes and international credit mobility.

Thanks to the project, the cooperation of the university with EU universities has been strengthened, and additional opportunities for promoting academic mobility have been created, which has made it possible to improve the educational programmes, scientific and pedagogical potential of staff, improve competitiveness in national and regional education markets. Currently according to the results of the rating of the National Chamber of Entrepreneurs «Atameken» «Agronomy» and «Biotechnology» programmes are in the 1st and 2nd places. According to the results of the international ARES-2019 rankings, the university ranked 17th among Kazakh universities.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

Project participants from InEU, thanks to the possibility of face-to-face meetings with representatives of international agencies and services, were able to establish new useful partnerships and sign agreements on academic mobility with many participating universities. Already in the process of implementing the project with these universities, student mobility was implemented with credits recognized based on the credit transfer procedure developed in the project. The university made changes to the Strategy for the Internationalization of the University for 2020-2025, updated the policy regarding the selection of academic partners for the implementation of the academic mobility programme.

Within the framework of the joint Summer School of InEU and the Siberian State University of Telecommunications and Informatics, organized in 2019, students and teachers of the Department of Information Technology increased their competence in the field of IT in the training course "Programming Android applications." The training course is aimed at gaining practical skills in developing commercial applications to mobile devices that may interest specific consumers (4 ECTS or 144 hours). 5 students and one teacher of InEU were trained.

Members of the KATU team organized retraining and carried out extensive work in this regard, including the preparation of presentation materials, practical tasks for the transfer of various assessment systems. Special attention was paid to the dissemination of acquired knowledge with the involvement of students, academic staff, university administration, methodological department, as well as the heads of the Centre of the Bologna Process and Academic mobility. During the trainings conducted by EU foreign partners, in particular, George Dufalos of Middlesex University, team members revised their approaches to teaching methods. They saw how a discussion, exchange of views, examples are given and found that easy relaxed communication with the audience was far more effective in the listener’s perception of the information. Having completed this experience, all team members tried to conduct the retraining at the same highly active and productive level; two teachers were able to hold a similar open session in front of the university's methodological commission to disseminate experience.

During the workshops, the participants learned how to correctly recalculate credits. Since until 2018 the transformation of the estimated equivalents was not carried out centrally, in this process the advisors, curators, heads of departments participated in the process. Students who have studied at a foreign university have presented their own opinion on the recognition of their credits at their home university. In the end it turned out, among them there are those who did not understand how their rating «well» at the recalculation became «satisfactory» or vice versa. The follow-up project has had a major impact in raising awareness among learners and academic staff of available knowledge assessment scales and transfer evaluation methodologies.

For most students it was interesting to know what formulae, ways of re-calculating credits are used in the world. The subsequent development of evaluation transfer guidelines facilitated the understanding of the Students’ Service Centre of the Department on academic affairs; students now returning from abroad as part of external academic mobility, do not have any difficulty in recalculating the credits. The results of the project (evaluation system) are included in the new Internationalization Strategy of KATU, which became an integral part of the University Development Programme for 2020-2024. The Strategy incorporates the tools of the EHEA, the development of Educational Programmes according to ISCED 2013 and taking into account the requirements of the real economy. The University has made proposals to the MES of the Republic of Kazakhstan for the revision of the normative documents, regulating the measurement of the labour intensity of the

educational process in terms of credits in accordance with the ECTS, developed within the framework of the PAWER project.

Improved knowledge of English by project team members contributed to the introduction of professional English language for bachelors of specialty «Crop Production», development of training complexes and writing of project applications for scientific projects in English.

In turn, students who studied professional English were able to take part in the competition of international programmes. So, the 3rd year student of the specialty Agronomy A. Abdeshova went through the competition, gaining a high score, and became the first applicant for training in the framework of the mobility programme. All team members acquired the skills of academic writing, scientific communication, analysis, structuring and generalization in the preparation of scientific and educational articles. At university's round table a representative of Bologna Process Centre noted that the results of PAWER project greatly facilitate the transfer of credits with student mobility; if earlier the tranfer of credits of students studying abroad was carried out approximately, that is, the assessment scale adopted in RK and in university where the student came from was compared, now, with the development of a methodological approach in which the assessment transfer scale is presented, this action is carried out easily and accurately.

The interested and productive participation of the Kazakh team in the project ensured the successful achievement of the goal and all the planned tasks: knowledge and competencies in the organization of mobility of academic staff and students, credit transfer techniques, the development of educational programme, etc., have significantly expanded. Thanks to retraining, this information has become available to academic staff and other university employees. Based on the acquired knowledge and experience, strategic documents of universities regulating international cooperation have been developed/updated. And, as a main consequence of the project impact, the level of academic interregional and internal mobility, that is, internationalization of key areas of activity of universities, has significantly increased.

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Research University

INTEGRATED APPROACH TO STEM TEACHER TRAINING (598367-JP-2018-SE - STEM)

Objectives: *STEM teacher training at partner universities in line with Bologna provisions and needs of Kazakh knowledge system.*

To achieve the goal, 3 main objectives are identified, aimed at (1) developing STEM Teacher Training Master programme based on an integrative approach (for primary school teachers and STEM teachers at the high school level and STEM teachers at universities); (2) establishment of regional STEM Resource centres providing consulting and training services; (3) training teachers in new pedagogical methods.

Trainings organized by European universities, meetings with partners contributed to capacity building, professional growth of teachers who took part in project. Joint discussion of plans, Skype meetings, distribution of project work and many other activities strengthened the team spirit, contributed to the improvement of project management, disciplined implementation of the work plan, and became a good practice for the development of time management skills. Teaching and learning materials, webinars, combined with the above actions in English, have significantly increased the level of knowledge of this language. Team members had the opportunity to acquire modern technical knowledge and competencies, including working with graphic editors when creating booklets, roll-ups, processing questionnaire results in Google Drive (collaboration in the "cloud," plotting, etc.). The main thing is that thanks to participation in the project, the scientific, professional and practical level of teachers of specialized departments related to STEM training has increased significantly. A new direction appeared in Master's and doctoral dissertation research papers on STEM education, including the training of teachers in natural sciences and computer science. The obtained scientific and practical knowledge and competencies helped to professionally competently develop the educational programme of 7M01525 - "STEM Education" in the direction "Training teachers in natural sciences." The introduction of the programme into the educational process of universities, the presence of trained teachers, the interest of the MES ensure its sustainability.

During the project interaction with other educational organizations increased. Discussions were held with teachers on the introduction of STEM education in secondary schools. Schools No. 5, 54, 56 and the Nazarbayev Intellectual Schools (NIS) in Nur-Sultan showed special interest. NIS teachers made a proposal to introduce the subject "Robotics" into the content of the educational programme, since in this school this subject is conducted with STEM elements.

In participant universities on Faculty of Information Technology a STEM centre was opened, the structure of which includes one auditorium and an office. The Department of ICT has a dissertation council; as already noted, under the impact of the project, the topic on the scientific and practical foundations of the introduction of STEM training in the educational process of universities introduced into the research topic.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

Partner universities have created a network of project participants to exchange experience and effective practice in the field of STEM education within the Republic of Kazakhstan, as well as with EU and Russian countries. One of the main issues discussed is the development of an educational programme and modules based on international educational standards. Online, with the participation of partner universities, a structure of the curricula was defined on Google document, envisaging academic mobility of students. The development of STEM Master's curricular, taking into account European standards, contributes to the integration of this programme into the international educational space.

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LIFELONG LEARNING FOR SUSTAINABLE DEVELOPMENT (574056-SP-2016-PL - SUSDEV)

Objectives: *Strengthening the role of higher educational institutions in ensuring the sustainable development of industry and society, supporting national «green policy» in Partner countries and promoting «green culture» through lifelong learning.*

The voluminous and specific objective of the project made it necessary to prepare its participants accordingly. It is not by chance that the project envisages various trainings, conferences, seminars, meetings so that project team members can acquire competences for development and implementation of new modules related to promotion of «green culture» through lifelong learning programmes. As a result of focused and well-informed training, participants improved their knowledge of the content and methodology of lifelong learning, the concept of sustainable development, digital competence , capacity for analysis, critical and independent thinking, decision-making; acquired «green skills , mastered online learning, modern pedagogical technologies (business games, project method, practice-oriented classes, use of open educational resources and platforms); knowledge and skills in preparation and implementation of work in Scrum teams; got acquainted with the European experience in modern technological environmental solutions . Significant improvements were made in language skills, project management skills, networking for partnering and dissemination of project results.

This serious theoretical, methodological and practical training resulted in the development of a total of 3 modules, 13 disciplines and 5 programmes of refresher courses in three areas: Ecology, Food Industry and Land Management. Distance courses have become an integral part of the teaching process in higher education institutions, all other educational resources and acquired competencies are used by teachers in practice: new courses, disciplines, modules are available online and have been introduced in higher education partner universities, thereby helping to develop the learners' «green skills". Teachers are skilled in applying new teaching and evaluation methods (debates, practical work in the laboratory of renewable sources, review of scientific articles and Internet sources, essays, self-evaluation.

In KazNaRU in the direction of «Land Management» the discipline «Ecological landscape setting of territories» for Master level (5 ECTS) was developed; In the direction of «Food industry» (Master level) - module «Green skills in food industry». The course «Green Skills in Food Industry» (5 ECTS) is designed for the bachelor of specialty «Food Technology» and for further qualification of specialists (36 contact hours). In the direction of «Ecology» for Master degree «Ecological industry of agricultural products» discipline was developed (5 ECTS). The graduates of these courses are employed and work according to their specialty. Overall, the programmes were updated by 10%.

In KATU in the framework of Master programme on «Ecology» a module «Bioresources management» has been introduced. External expertise on the educational module was carried out by the Kazakh Research Institute of Forestry and Agroforestry.

A course «Bioeconomics» for Bachelor level has been developed in WKATU in the same direction. In order to ensure the quality of results, a focus group worked during the development and testing of materials. As follow-up new competencies have been developed for the Ural College of Gas, Oil and Branch Technologies and the West Kazakhstan College of Engineering and Technology students in the frame of the course «Ecology and Sustainable Development», including the use of knowledge of basic biosphere and environmental management principles to reduce harmful effects on human health and the environment.

At KRU, the project allowed to update 4 Bachelor programmes: Ecology, Agronomy, Food Technology, Processing Technology. The curriculum includes new subjects: Green Skills in Agriculture (3 ECTS); Green Skills in Food Industry (3 ECTS). The content of the courses is based on the recommendations of 12 enterprises in the region. New courses were piloted in 2018-2019, 40 students trained. The training programme «Innovative technologies of production of products from vegetable raw materials» in food industry (5 ECTS) has been developed for Master degree. The course «Waste Management» (5 ECTS) has been modernized as an interdisciplinary course in Ecology. All courses are included in the Catalogue of Elective Subjects and the curricula of KRU specialities.

In addition to the above, in 2019-2020, distance courses were developed in “green” disciplines. In order to upgrade the skills of business professionals, three courses were designed: Green Skills (Food Industry), Sustainable Production (environmental protection, agronomy), Vegetable raw materials: products and waste (food industry) in line with their needs.

The TarU team developed modules in the direction of «Food Industry»: «Management of «Green Technologies» in food industry»: Safety and quality of raw materials it the framework of "Green culture"; Contamination of food raw materials and food products - for Master level; Development of "Green skills" in food and processing industry; Development of green skills in special technologies of processing industries – at bachelor level; In the frame of «Land management» - «ecological landscape approach for sustainable development of the territory» - (MSc); Regulatory support for sustainable development of the territory (Bachelor level); in «Ecology» - “Climate change and «green» economy” (BA); «The concept of sustainable development" (MSc); LLL course «Green skills in food production» (36 acad. hours) - for staff and industry specialists. A common module was created and approved for all project partners in the direction of «Land Management» - «Ecological-landscape approach for sustainable development of territories» for Master level.

At Atyrau Dosmukhambetov University undergraduate programmes include a new discipline «Methodology of teaching the fundamentals of sustainable development» in pre-school institutions and primary school”, for students - «Sustainability and corporate responsibility» and ECOMIND and ECOCITIZENSHIP guides. Employers actively participated in the development of the programmes, in particular in the pedagogical specialties - principals of schools and kindergartens; in the economic specialties - directors of enterprises. The proportion of updated educational programmes made up 7%. The development of distance-learning versions of new and updated courses in partner universities has led to a diversification of forms of study. In addition to face-to-face learning, two other forms of learning are now possible: blended learning and distance learning.

Changes occurred not only in the content, but also in the structure of HEIs - due to the creation of Green Training Centres as special units, whose activities are aimed at promoting «green culture». In universities they have their own names: in KATU - training centre "Green Skills"; in KRU - Green centre for lifelong learning in the interests of sustainable development;

in TarGU - «Green skills in food production»; in Atyrau Dosmukhamedov University - «Centre for Sustainable Development Throughout Life». Whatever they are called, their activities are in line with the policy of higher education reform in Kazakhstan aimed at promoting the concept of «lifelong learning» and the development of supra-occupational universal competences. Green skills and competencies, sustainable development and lifelong learning are integrated into university development strategies for the medium term.

The project has had an impact on the educational policy of Kazakhstan, on the training of staff with «green skills» in higher education institutions of the country, its results provide substantial training and methodological support to stakeholders. Thanks to the realization of the project, the partner universities intensified the work on creation and development of «Green Campuses» and participate in the international Green Metric rating. Thus, the environmental behaviour of participating universities and their interested colleagues from other universities is changing.

Good practice is the policy of the Atyrau Dosmukhamedov University leadership aimed at greening the campus and creating a favourable university ecosystem. In order to introduce environmental practices in higher education institutions, motion sensors have been installed to save energy; water saving - water taps with IR sensors; plastic and paper separators have been installed for separate garbage collection; Parking and bicycle lanes have been identified for the transition to eco-transport.

The introduction of the Green Management Framework has made it possible to evaluate and reduce the university's energy costs, to raise the culture of sustainable development and public awareness of eco-initiatives.

The project participants sent an official letter to the Ministry of Education and Science of the Republic of Kazakhstan for approval of the Recommendations on the Application of Green Policy in Higher Educational Institutions of the Republic of Kazakhstan based on the results of the SUSDEV project «Lifelong Learning for Sustainable Development» and to disseminate the lessons learned from the project at the national level.

KanatTireuov,
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KAZAKH UNIVERSITIES TO FOSTER QUALITY ASSURANCE PROCESSES IN TECHNOLOGY ENHANCED LEARNING (598377-2018-IT-SP-KUTEL)

Objectives: *To reinforce the role of higher education in Kazakhstan, promote reform and modernization of HE through the introduction of a national QA system for technology-enhanced learning (TEL), implementing accreditation standards, guidelines and procedures for QA of TEL courses and study programmes at a national/international level.*

In accordance with the objective, the team conducted an in-depth analysis of the situation in the participating universities. Based on this, a National Report (The Baseline Reference Framework for TEL Quality Assurance) describes the state of quality assurance processes in learning using new technologies in a broad context, including legislative aspects, Strategic goals, as well as the needs of Kazakh higher educational institutions and the existing framework of qualifications. The National Quality Assurance Report for Learning Using New Technologies also takes into account the requirements of the European Standards and the Guidelines for Quality Assurance in the European Area (ESG - Standards and guidelines for quality assurance in the European Higher Education Area). Unlike ESG, this Guide concentrates on one aspect of the system - internal quality assurance.

Along with the preparation of the National Report, the team developed recommendations for universities and national authorities for the implementation of TEL QAF KUTEL, Quality Management System within which KUTEL TEL QAF can be implemented in universities, as well as examples of good practices and methods for establishing a sound basis for a structured quality management system. The TEL QAF methodological guide on the procedure of introducing quality assurance standard in training using new technologies can be applied by all higher education institutions in Kazakhstan.

The KUTEL laboratories created in the frame of the project are widely used for recording online lectures and other learning tools to provide TEL education. In the course of training activities, the team members mastered new teaching methods and technologies, and developed new courses, such as the innovative course "Quality Assurance of Multimedia products", aimed at students with disabilities.

Great impact is observed at the individual level. The project helped to improve English language skills, to master the technology of video recording of lecture materials through the Adobe Presenter, their application to video recordings of educational courses and creation of video lectures on the subject taught.

Work in the project promotes the development of a sense of responsibility, the ability to work as a team, the expansion of knowledge in the field of ICT, materials processing and development, the ability to independently generate ideas, to select the mode of action attracting knowledge from different fields: independently find the necessary information in the information field of the problem; to propose hypotheses and establish causal relations.

Participants learned to self-assess and understand the results of their activities; to form critical and independent opinions about the subject under study; and to plan collectively and interact with partners in the micro-group in solving common problems; to be able to find and with tact correct errors in the work of other members of the group, to develop business communication skills.

With regard to the institutional impact of the project, participants note that the University's Quality Assurance Policy was revised based on ESG standards. It has contributed to an increase in the number of university students wishing to study in modern laboratories using innovative technologies. Equipment in the form of specific models as media station AREC, licensed programmes allow staff in the conditions of distance learning to conduct courses with live broadcasts on Moodle Universities, on Youtube, Socrative etc., thus providing maximum opportunities for learners to acquire the necessary knowledge.

Such courses as «Mainstreaming TEL quality criteria and principles in the Quality Framework for HE - challenges and barriers», «Defining and designing external quality assurance procedure as a driver for organizational development and cultural change», «Internal QA standards: policies and guidelines», «Learning Management System (LMS) quality evaluation framework» give impetus to the revision of approaches to ensuring and evaluating the quality of educational activities.

The documents «Baseline Kazakhstan TEL Quality Assurance Framework» and «Recommendations KUTEL Quality Assurance Framework) have made it possible to conduct a comprehensive assessment of the current state of the existing Quality Assurance System of the learning process with the expanded use of new technologies (TEL). And the developed KUTEL course has become an important resource in the context of the introduction of distance learning technologies.

The links with the non-academic sector have been strengthened. The memoranda signed within the framework of the project with the industrial enterprises of Mangistau region (JS «CASPI BITUM», JS «KazAzot», JS «MAEK-Kazatomprom») were further developed towards improving the quality of study programmes due to the expertise of enterprises.

As part of ensuring the quality of services for students, more frequent sociological studies are carried out at universities to examine students' and consumers' satisfaction with the quality of educational services.

You can see the progress of the project and its results on the project pages on the websites of higher education institutions, in social networks - Facebook, Instagram https://www.instagram.com/kutel_2018_2021 , Twitter (https://twitter.com/kutelproject), YVision https://yvision.kz/post/850404 and HORDE.Me https://horde.me/jayka2014/k-voprosu-o-vozmozhnostyah-i-kachestve-elektronnogo-obucheniya-iz-opyta-proekta-erasmus-_kutel.html.

The project has great potential for influencing university governance, especially in the field of remote and blended learning, by improving teachers' skills in the use of advanced technologies for creating audio-video courses and materials, and ensuring their quality.

The team views further development in promoting the results of the project at the level of the higher education system with the active involvement of representatives of the Ministry of Education and Science of the Republic of Kazakhstan.

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TRANSITION TO UNIVERSITY AUTONOMY IN KAZAKHSTAN (586205-SP-2017 - TRUNAK)

Objectives: *To provide a basis for consensus around a feasible model of university autonomy for Kazakhstan that can help to take decisions about what level of fiscal and academic autonomy is desirable.*

Expected outcomes of the project:

- Analytical report on the current state of autonomy in Kazakhstan;
- Establishment of a basic model of university autonomy, its pilot implementation;
- Constructive discussions between universities and ministries to introduce decentralized university management systems with greater autonomy;
- Establishment of a consulting group with experts in the implementation of the autonomy model.

In recent decades, there has been a major overhaul of the management of higher education worldwide, at both the systemic and institutional levels, with a view to giving it academic autonomy, dynamism, flexibility and efficiency, which are the factors of competitiveness. Today, the competition between universities, both within and between countries, has changed and acquired new content. «Academic globalisation» encourages universities to be more entrepreneurial and to take an active part in the struggle for students, the most successful teachers, to compete for research grants. In order for universities to respond adequately to the needs of the modern world in a competitive environment, they must have managerial and academic autonomy in their educational and research activities.

In this context, the relevance of the TRUNAK project is high. Significant and sustained impact has been achieved in university management processes, management strategies and to some extent in higher education.

• An in-depth analysis of the state of autonomy of Kazakh higher education institutions, conducted by a project group with recommendations conducted.

• Report "Transition to university autonomy in Kazakhstan" based on the above mentioned study on university autonomy using the "University Autonomy Scorecard" tool carried out jointly with the EUA for the first time in a country outside Europe with suggestions and recommendations for university governance model (including structured guidance for the reform process).

• For medical universities, the project team in Karaganda Medical University (KMU) jointly with Ministry of Health prepared its recommendations for inclusion in the new Health Code. The right of medical universities to exercise all forms of autonomy had been included in the new version and submitted to Parliament for further consideration.

• Specific amendments were initiated and made to the normative-legal acts of MES RK (12 acts). Among them:

1) Inclusion of the concept of university autonomy in the Law of Education.

2) A number of by-laws regulating academic activities of universities.

3) Recommendation that the State standard of education should have a framework nature, but not be prescriptive.

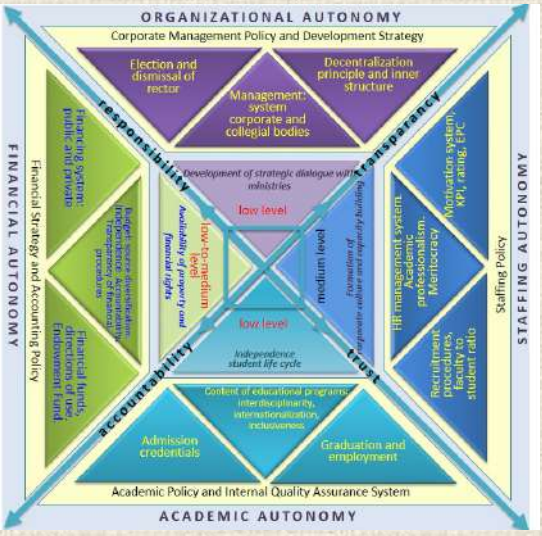
Unfortunately, the proposed changes regarding the exclusion from the Act of the requirements for the approval of the Ministry of Education and Culture (Ministry of Health) of candidates for the post of vice-rector and chief accountant (limiting independent appointments) and the requirements for the approval of the Ministry of Education and Culture (Ministry of Health) of Vice-Presidents and Heads were not taken into account.

Based on the outcome of training and study visits to the EU partner universities Model of university autonomy developed (Picture 1 below). The Autonomy Model contains recommendations at the system-wide and institutional levels and is presented in several options:

1) In graphic form, the model includes a description of changes at the system-wide and institutional level;

2) In the form of a detailed description of the necessary changes in the four areas of autonomy (organizational, staff, academic and financial) at the system-wide and institutional level;

3) In the form of a specific list of necessary legislative changes in the field of higher education in order to further increase the autonomy of universities (recommendations at the system-wide level).



Picture-1

The key values of the Model of University Autonomy are specific proposals for the development of university autonomy:

1. The principles of the university model are proclaimed: accountability, transparency, responsibility and trust.

2. An important principle of the model - transformation of the relations between MES and universities «from regulation to adjustment».

3. Expansion of the academic autonomy of universities – granting the right of admission on a fee-paying besis, the timing of enrolment, defining the threshold of the cost of fees, the choice of technology and the form of education (distance form), institutional licensing and accreditation of educational programmes. The establishment of an independent National Council for the Quality of Higher Education and the adoption of a National Quality Standard for Higher Education were recommended.

4. Increased organizational (managerial) autonomy through decentralized university management, the right to participate in the selection of the rector, determining his/her term of service and dismissal, form corporate governance bodies (Board of Directors, Advisory Board or Board of Trustees). In order to promote a dialogue between universities (the academic community) and the authorities (the Ministry of Education and Science), the role of the Rectors' Council should be strengthened, or an alternative institution - National Conference of Rectors - be established.

Along with the proposals that have been incorporated into the regulations and are to be implemented by all higher education institutions, there have been major changes in the strategic management of the institution, such as:

• Decentralization, introduction of horizontal management. For example, Karaganda Medical University has introduced internal school autonomy, with a budget allocation for each school.

● Development of new qualifications and requirements for the positions of academic staff.

● Transformation of the Scientific Council into a Senate at medical universities, which are composed of students, teachers and heads of structural units elected by the university collective.

● Universities are given the right to develop their own educational programmes and to determine the types and qualifications of academic staff.

● Medical institutions have been given the right to design one of the components of their entrance exam - a psychometric test aimed at identifying motivation and psychological readiness for entering the medical profession.

At the institutional level, in particular, in KMU and South-Kazakhstan Kozybayev University (SKU) the impact is visible in such key areas as

Improved strategic management (decentralization of authority and responsibility, increased transparency of strategic plan development, increased role of student self-governance in strategic management).

Promotion of financial sustainability (improvement of the internal financial distribution model, increased financial transparency, involvement of student bodies, etc.).

Expansion of autonomy in admission and graduation.

Increased human resources capacity (accountability for performance, introduction of horizontal management, competitive selection for the positions of deans and department directors).

Greater transparency in the formulation of the Strategic Plan through public discussion,

Strengthened role of student self-governance in the elaboration and discussion of the Strategic Plan through the inclusion of student representatives in the working group.

Horizontal approach was introduced in the activity of the Academic Committees (Statute of the Academic Committee). This has made the development of educational programmes more flexible and adaptable.

Delegation of authorities to a lower level (e.g., from recor to deputy-rectors, from deputy-rector to deans, etc.)

Strategic management of the Karaganda Economic University Kazpotrebsoyuz (KEUK) also has been changed resulting in a greater sense of commitment and belonging to the management process of the entire academic community of the university – from the development of educational programmes, profiles of staff (qualifications) and the requirements to the academic staff, involvement of students in the decision-making process.

Regretfully, not all of the proposals were accepted by the relevant ministry. The TRUNAK team is continuing their work on refining the model for university autonomy towards further improving the regulatory framework. One of the outcomes - the elaboration of a National Code on the quality of higher education which was presented to the Ministry.

Overall, the project has produced a positive impact on the capacity building of all participants, in particular top managers, staff, university teachers, working group members, etc. First of all, there is awareness of the current state and challenges in the field of university autonomy in Kazakhstan, an opportunity to choose the best experience in university governance, information readiness for changes in the conditions of autonomy, Team work skills: ability to persuade and reasoning, public presentations of the project findings to the national authorities, focus on results, time management, use of feedback, delegation of authority; system-wide, creative thinking; skills to develop normative documentation and allocation of responsibility, alignment of functions, transparency of results and processes, control mechanisms, etc.

Members of project working groups also note improved language skills, skills in translation of terminology in the sphere of education management, business communication, design of presentation materials, booklets, stands, use of infographics and many others.

Raushan S. Dosgambetova, Chairman of the Board-Rector of KMU: The autonomy of universities is an opportunity to define independently the academic policy of the university, admission and selection of students, develop flexible educational programmes in accordance with the labour market needs, introduce modern educational technologies. Undoubtedly, all this results in enhancing the competitiveness of graduates and quality of their training».

Marina V. Pogrebitskaya, Director of the Department of Strategy and Quality of Education, Kozybayev University: Participation in the TRUNAK project has had a significant impact on my personal and professional qualities. In the course of the TRUNAK project, I acquired knowledge and skills in project budget management, division of responsibilities and roles, which allows me to provide advisory support to working groups on new projects. The master classes on university autonomy in Sweden, Slovenia, Great Britain, Poland, Finland and Italy, discussions with colleagues have considerably expanded my knowledge in the area of university governance (both European and national), allowed for a better understanding of systemic problems and ways to address them in Kazakhstani higher education. Knowledge of regulations and their interrelationships has increased. It has become possible to apply foreign experience in the elaboration of recommendations for the expansion of autonomy of Kazakh universities. Communication with foreign partners has increased my knowledge of English terminology in education management. Information on the structure, aims and functions of the collegiate bodies of EU HEIs was particularly valuable to me in the organization of the activity of the SKU Supervisory Board. Working as a project coordinator at the level of our university helped me to improve my teamwork, business communication and language skills».

It is evident that the achievement of the objectives of projects like TRUNAK does not depend solely on the efforts of project teams, but on the readiness of national authorities and university leaders to fully accept and implement the proposed changes, and takes longer than the time frame of the project. As mentioned above, not all proposed changes are taken on board by the line Ministries.

SECTION 2. UPDATING THE SYSTEM OF UNIVERSITY MANAGEMENT, QUALITY ASSURANCE OF EDUCATION

In 2020, the model for university autonomy with proposals for further development of autonomy of higher educational institutions in Kazakhstan was submitted to the Ministry of Education and Science of the Republic of Kazakhstan. Further development of the project we see in raising awareness and promoting the results of the project among Kazakh higher educational institutions and evolutionary implementation of the principles of autonomy at the national level. The TRUNAK Project Group will prepare a special report for consideration by the MES RK after completion of the pilot project on the introduction of autonomy in three institutions.

Raushan Dosmagambetova,
Chairman of the Board - Rector,
Medical University of Karaganda

ENHANCEMENT OF HIGHER EDUCATION AND CORPORATE SECTORS INTEGRATION IN ACCORDANCE WITH NEW SOCIAL ENVIRONMENT (574060-SP-2016-KZ - ENINEDU)

Objectives: *Enhancing business-HEI cooperation in consortium countries by changing the paradigm of education in line with Bologna process requirements.*

The topic of the project is of considerable relevance to Kazakhstan, as it seeks to overcome the contradiction arising, on the one hand, from the need to take into account the needs of the economy and the social sphere in terms of qualified personnel. On the other hand, there is a lack of an effective system of identifying their needs for training professionals. This project is a major attempt by two national universities in the country to contribute to the resolution of this contradiction by developing a set of systemic measures to strengthen mutually beneficial cooperation between the HE and the business sector.

First among such measures is the development and implementation of the System Standard for Cooperation Practice between Higher Education Institutions and the Business Sector, based on the consolidation of the best national and European experience of interaction between HEIs and the business sector, as well as the Compendium of Methodological Guidelines to the Standard. Together, these documents represent a model that can be used to organize specific processes in a specific field under specific conditions (in this case it is the sphere of HE and business). These conditions need to be clearly defined and articulated, as it is within them that the model will operate effectively. The documents developed in the project offer up-to-date conditions and methods for cooperation with the business environment: finding and establishing links with successful graduates, organizing systematic working meetings and conferences with famous businessmen, opening of branches of departments at enterprises, development of innovative projects on order of partner companies, etc. The development of a study programme with employers and the revitalization of the University Alumni Association have been particularly effective.

The documents «System Standard of Cooperation Practice of Higher Education Institutions and Business Sector» and «Compendium of Methodological Guidelines to System Standard of Cooperation Practice between Higher Education Institutions and Employers» developed and tested in two partner higher education institutions contributes to the multiplication of the best foreign experience in interacting with business sector at the national level.

Another important outcome of the project was the creation of the Academic Council for the Development of Educational Programmes, including staff, learners and employers (at least two representatives of the business community for each study programme). Employers' surveys are conducted online every year. Experience in the development of educational programmes and courses based on the identification of employers' and learners' needs, their evaluation and approval is presented in the Methodological Recommendations, which describe the algorithm of developing and designing educational programmes, key competences (universal, general, professional), which are compared with learning outcomes and disciplines that cultivate these competences according to the graduate profile.

Teaching approaches emphasize practical skills through interactive learning methods. During the project the content of educational programmes on «Finance» and «Marketing» at the level of bachelor and Master degrees was updated, new disciplines were developed together with the Faculty of Information Technologies at Master level - «Electronic Commerce» in «Marketing», «Financial Management and Big Data» in the frame of «Finance», experimental educational programme «Business and Business Economics». The content of the study programmes has been updated to 42% by including disciplines/modules at the employers' request. The practical orientation of educational programmes has been strengthened through the recruitment of practitioners to implement educational programmes (at least 5 credits per discipline/module) and the use of interactive teaching methods, where the focus is shifted from the teacher to the learner. Eviews, Stata, Alt-Finance, Alt-Invest, Stock Exchange Simulator, Project-based Learning Methods, Role Games, Training, which promote the development of universal skills are used in the educational process.

There has been a change in the concept of internship. The hands-on training framework has been updated by 60 per cent. The departments began to respond flexibly to employers' requests, allowed short-term and long-term internships without being linked to the academic calendar, which increased the opportunities for employment of students, acquisition of practical skills and development of entrepreneurial thinking.

As a result of interaction with National Chamber of Entrepreneurs (NCE)«Atameken» students prepared more than 100 business plans. The discussion and presentation of the projects was carried out at the Centre for Entrepreneurship and Innovation (CEI) with the participation of entrepreneurs and representatives of NCE «Atameken». The best projects have participated in various grant competitions. Activity of the Centre created in the project hosted by Higher School of Economics and Business at KazNU and Alumni office hosted by ENU aim to ensure regular feedback from graduates within 18 months from the date of graduation . Monthly meetings are organized with employers and most successful graduates. All this contributes to the cohesion and advancement of students from different generations and to the expansion of the university community.

The level of satisfaction of students with the quality of education has increased markedly, as can be seen from quarterly monitoring and survey results, presented at the meeting of the working group on experimental programmes and are accessible for all structural units.

The project gave impetus to the creation of the Business Competence Development Cluster in KazNU, within the framework of which the Islamic Finance Centre, the MBA/DBA Programme and the Exchange Technology Centre operate, in addition to the Centre of Entrepreneurial activities. Creation of the Cluster with modern auditoriums and equipment solved the problem of the lack of a comfortable place to meet employers, positively impacted the corporate spirit of the faculty employees, has intensified the organization of extra-instructional events for students. The activities of the Cluster were presented to the country national authorities and to foreign guests (partners from China, Japan, France, Russia, Switzerland, USA, Hungary, Malaysia, Qatar), which led to increased project visibility and recognition.

Along with the involvement of employers in the educational process and in the expertise of the programme, many other methods of interaction with representatives of the business environment studied during the training of the project have found wide application in the practice of both universities. Among them: inviting employers to hold master classes, leadership lectures and seminars; organizing meetings with successful graduates; membership of the final certification commission;

membership of the jury of specialized competitions; providing the Business Cluster site at the request of employers. As a result, as already mentioned, it has been possible to update the bases of practices for students, to increase the amount of revenues for the university's endowment fund, to get scholarships (of 1.1 million tenge) for talented students. Cooperation between the Faculty of Economics and such financial institutes and companies as Halyk Bank, KZIBank, Air Astana, BankCenterCredit, KPMG, PwC, KazAeroScpace, ID Group, VTB Bank and others has been strengthened.

Interaction and cooperation have also improved among the structural units of the institutions themselves: the Rector's Office, the Council of Employers, the Alumni Association, the Department of Academic Affairs, the Career and Professional Development Centre, Service Centre for Students «Keremet», Information Technology and Innovation Development Institute, Technology Park. The results of the project were repeatedly presented at the meeting of the Rector' Office and the Republican Education and Methodological Council (REMC) hosted by KazNU. Active promotion of the project at the level of different units has led to increased awareness of Erasmus+ projects, facilitated overcoming of bureaucratic procedures, consolidated work of all units at launch of portal «Youth and career» which is used not only by universities, but also by other interested individuals and organizations.

International cooperation with EU and other partners has increased through participation in conferences, short-term internship programmes for PhD and Master students of KazNU and ENU, cooperation under the Jean Monnet programme; publication of joint articles (more than 10) in specialized magazines, signing of a network cooperation agreement with UCA and Sopron University; negotiations are under way to develop and implement a double-degree MBA programme between RUDN and KazNU.

The results of the study and the introduction of European experience in interaction between universities and the business sector were presented at a meeting of the National Educational and Methodological Council, involving 26 Kazakh universities from different regions. The «System Standard of Practice of Cooperation of Higher Education Institutions and Business Sector» sent to MES RK for further publication under the name of the Ministry, as well as proposals to legislative bodies on making changes and additions to the tax legislation, provision of tax incentives to enterprises cooperating with education institutions.

The experience of this project has convincingly shown what significant, relevant and versatile advantages can be achieved if HEIs are strategically and content-wise approaching interaction with the business sector, if integration is understood as a mutually enriching process that enables the system of higher education of Kazakhstan to reach a new, higher level of development.

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ENHANCING INNOVATION COMPETENCES AND ENTREPRENEURIAL SKILLS IN ENGINEERING EDUCATION (573965-JP-2016 - InnoCENS)

Objectives: *To enhance innovation competences and entrepreneurial skills in engineering education through university-business cooperation in order to support creation of new enterprises, new jobs and economic growth in the Partner countries.*

The main means of achieving the objective were the establishment of Innovation and Entrepreneurship Centres (IEC), training of universities' staff in innovation and entrepreneurship through training activities organized by European universities and the development of two new disciplines "Innovation systems" and "Entrepreneurship for engineers" in the frame of existing Master programmes.

The project participants learned about the innovative business practices of EU universities on the development of specific competencies and skills. Lectures, discussions and presentations were accompanied by communication games: «Card pieces», «Team building activity», «Paper chains» and «Easy icebreaker activity». The outcome of the intensive and informative training was a new entrepreneurial knowledge and skills of participants, including communication, operating in an uncertain environment, generating and searching for a business idea, processing information, developing a business plan, ability to act independently, solve problems, work as a team, etc. In addition to the above, participation in the seminars enabled team members to learn and practice tools of innovative pedagogy, to work in an international environment, to increase motivation in applying innovative teaching methods and increasing level of English proficiency, to work online and to use the INDIGO software application.

In 2018, participating universities established Innovation and Entrepreneurship Centres (IECs), whose activities are carried out in accordance with the business plan and are aimed at providing advice, training and mentoring services in the field of entrepreneurship, innovative pedagogy and assessment of innovative competences for staff, students and specialists of partner enterprises. Equipment for the Centres was purchased from the project funds, and facilities and furniture provided by universities. The IEC regularly conducts consultations for students and teachers in preparing business projects, trainings for staff, organizes assessment of innovative competences of students, meetings with businessmen, training seminars: «Innovative pedagogy», «Evaluation of innovative competences», «Development of business ideas - Kanvas model». Thanks to the consultations and training activities at the Innovation and Entrepreneurship Centre, trainees became more involved in the development of business projects (in three years their number reached 200). The innovative competencies of the university's Master students and faculty members are regularly evaluated. For this purpose a special evaluation module has been developed on the basis of the INDIGO software application; the questionnaire Barometer FINCODA is included in the programme.

In 2018 – 2019 2 disciplines "Innovation Systems" (2 ECTS) and "Entrepreneurship for Engineers" (3 ECTS) were developed and implemented in the framework of existing Master programmes. The discipline "Entrepreneurship for Engineers" is included in the educational programmes (in total 25 programmes) of all technical and technological directions of study of the university. A total of 178 master's degree students have been trained in this field.

A competition of innovative business ideas of university students was organized and held in May 2019. Twenty-two team bids were submitted. The winning team presented their work at the international competition in Valencia. In just one year, students developed about 50 projects. In 2020, projects were created on the production of new goods, tourism services, mobile applications. A project for the production of wool toys has been proposed to be implemented on the basis of the factory on wool processing, Taraz city.

The main results of the project are disseminated among higher education institutions of the country at conferences (October, 2019), webinars (March, 2020), other events.

The sustainability of the project results is achieved through the annual holding of «Entrepreneur's Day» and competition of innovative projects, introduction of the disciplines «Innovative Systems» and «Entrepreneurship for engineers» into the Master curricula of technical and technological directions of study; regular access to the consultations organized by IECs for students, development of the institute of mentoring; strengthening of links with local entrepreneurs and departments of entrepreneurship and industrial-innovative development of oblasts/city administration (Akimat).

In our opinion, the main effect of the project at the university level - the readiness of staff to develop innovative thinking among students; as a consequence, an increase in the number of students with entrepreneurial skills, which has a positive impact on the employment rate of graduates.

The project has also had a significant impact on partner organizations of universities. Employers actively respond to invitations to participate in university events and competitions. They are interested in the possibility not only to provide places of practice and work for students, but also to participate in the educational process, in the expertise of programmes.

The project fostered cooperation with EU and other universities: memoranda were signed with over 20 universities in the world during the project period alone; this in turn led to an intensification of research activity among teachers (the number of publications in high-rating magazines has increased in recent years).

Thus, a complex of interrelated activities (training of participants, creation of the IECs and development of new disciplines under the overall theme of the project) contributed not only to the achievement of its objective, but ensured productive impact and sustainability of the results of the work done in both the educational and partnership business environment.

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IMPLEMENTING A CENTRAL ASIAN CENTRE FOR TEACHING, LEARNING AND ENTREPRENEURSHIP (561553-JP-2015-AT - CACTLE)

Objectives: *Promoting quality education in business and the economy by promoting and strengthening relations between Central Asian universities and enterprises in order to stimulate entrepreneurial ability.*

The project aims at improving the quality of education in the context of interaction and strengthening relations between higher education institutions and the business and economic sectors in order to stimulate entrepreneurial ability through learning, based on the principles of broad understanding and enterprise development. The Kazakh participants in the project - Eurasian Gumilev National University (ENU), Karaganda University of Economics Kazpotrebsoyuz (KEUK) and Narxoz University - have received results that have had a significant impact on the universities as a whole. Among the important results is the creation of CACTLE Centres, as well as the development and implementation of the cross-industry universal study programme «Entrepreneurship and business development» for undergraduate students;

The project team developed the discipline «Entrepreneurship and Business Development» (10 ECTS). It is aimed at bachelor students and helps students develop creative entrepreneurial thinking, entrepreneurial skills, set goals and find ways to achieve them, take responsibility, take risks, make decisions, work as a team, plan the business and achieve success.

With this understanding, students will be able to create a business based on innovative business ideas and prepare business plans, and act in a socially responsible role as an entrepreneur. Thus, students develop competencies in the specific field of economics and business and develop the skills and attitudes necessary to act as competent, innovative, reflective and responsible members of society in different roles: entrepreneur, consumer and citizen.

The discipline «Entrepreneurship and Business Development» is developed taking into account the practice-oriented approach in learning on the basis of real business cases. The project team strived to fill the materials with useful and effective assignments, situation-specific tasks, allowing to ensure high educational performance of students. The teaching was based on an interactive method of learning, where the teacher is a facilitator and observer, while students are more active in the classroom. Joint and teamwork methods in education develops students' communication skills, leadership qualities, the ability to develop new thinking, a spirit of competition, ability to create something new, innovative, to present an idea, attract interest to the business idea. It is fitting to say here that the discipline is aimed at developing precisely the skills that are needed today in a highly competitive business environment.

Education in three languages had made it possible to ensure broad coverage of students at universities; the subject had been developed in English and adapted in Kazakh and Russian.

In ENU, thanks to the strong support and interest of management, the discipline was introduced into the educational process from September 2017 for students of the Economics Faculty as a component of choice. The positive beginning for the introduction of the discipline was that, after the presentation of the discipline to the students of the faculty, many of the students chose the course in a purposeful manner; The main motivation for the choice was to acquire knowledge in the field of entrepreneurship and to learn the basics of business organization.

According to the results of the «Entrepreneurship and business development» discipline in ENU three students of «Finance» direction of study, using the developed business plan, invested in their own start-up project, opened a cafe of healthy food in the city of Nur-Sultan; the project is at the stage of formation, but the guys have far-reaching plans.

Another start-up project - a student of «Economics» specialty opened a language education centre for schoolchildren and students. It is too early to talk about the sustainability of business projects, but the motivation and desire of students to make the business successful are high.

To create a favorable atmosphere and support initiatives of students in developing and starting own business the ENU leadership has set up a business incubator, which coordinates its work with the CACTLE Centre and helps students in the business formation stage through training, provision of advisory and mentoring support, inviting successful businessmen of Nur-Sultan to share their success stories. The business incubator also serves as a platform for starting the development of a startup through the provision of premises. There are many examples of students who, supported by a business incubator and a business centre, were able to break away and continue business outside the university. It is certain that every year more and more students will seek to set up their own business.

At KEUK University six start-up projects have been developed:

- Creation of a Science and Knowledge Centre for Pre-school and School Children;
- Creation of a Science and Knowledge Centre with VR technologies to improve the quality of knowledge and results of ENT (National Unified Entrance Test);
- Modernization of electronic commerce as a vector of development of the Kazakh economy;
- GSM Electronic Site Creation;
- Improvement of Non-cash Payments with Currex System;
- 3D Modeling Improvement.

All the startups have received the support of the university's leadership, and with cautious optimism we hope that they will be successfully implemented.

The positive impact of the project can also be seen in the significant improvement in the quality and efficiency of teaching. Through the integration of traditional teaching methods and the use of blended learning, efficient use of digital and technical possibilities, interest of students has increased and the interaction between teachers and students has improved, which ultimately resulted in the overall improvement of the quality of education.

The CACTLE project contributed to the career development of the project participants; the trainers were promoted and able to take the position of the lecturers of departments, some of the project coordinators – as heads of the departments and director of the Centre. In the project, teachers were trained and qualified «Certified University Trainer» (CUT) and Accredited Management Trainer (AMT).

The project has had a strong impact on the personal and professional development of the project participants. Many of them are recognized as qualified business trainers and experts in business development and business creation. For example, the ENU project participant A. Nurmagambetova after training in the framework of the CACTLE project was invited as a trainer and programme designer by NCE «Atameken». Other 3 teachers of the Faculty of Economics, having attended trainings at the CACTLE Centre under the CUT and AMT programme, were invited on a competitive basis as trainers of the NCE «Atameken» for training of entrepreneurs of Nur-Sultan city.

The results of the project are needed at the regional level. Thus, A. Nurmagambetova, in August 2018, conducted training as a trainer for regional school teachers on the methodology of teaching the above-mentioned discipline. Since September 2018, the discipline has been introduced in secondary schools of Kazakhstan for pupils of grades 10-11. Thus, participants not only deepened their knowledge of teaching methods, but also acquired new skills – of trainers.

CACTLE centres were opened in all partner universities. At the Eurasian National University the CACTLE Centre is a part of the University Department of Commercialization of Technology and works closely with the Business Incubator. The aim of the Centre is to work actively in the development of entrepreneurial education at the university. CACTLE will offer training to university teachers, employees of companies and entrepreneurs, support start-up projects through training and free consultations, participate in projects of national and international importance.

In KEUK the established CACTLE Centre became a structural subdivision of the resource centre as follow-up of «COMPLETE and CACTLE» projects hosted by the Department of Strategic Development of Karaganda Economic University. The aim of the Centre is to facilitate the development of entrepreneurial skills and to participate in continuing education for teachers, students and employers through refresher courses and training.

Within the framework of the course «Business Management and Taxation» the KEUK team managed to establish relations with employers and other stakeholders. Contracts have been signed for the provision of bases of practice, future internships and for obtaining relevant practical information.

The CACTLE project is not only a new experience, but also a new opportunity. As an important result and continuation of the project the team notes its impact at the level of Central Asia. Following the completion of the CACTLE project under the Programme for Enterprise Development in Higher Education (Creative Spark) in November 2018, two universities (ENU and Narxoz University) received grants from the British Council. With the support of a new project, the Centres are disseminating CACTLE results to universities in Central Asia. For example, under the CUT programme for university professors of three countries CACTLE ENU organizes online training for colleagues from the Kyrgyz Balasagyn National University and Fergana State University, Uzbekistan. Forums and seminars have been organized with the participation of representatives of government and social structures, entrepreneurs of creative industries in three Central Asian countries.

SECTION 3. INTERACTION BETWEEN HIGHER EDUCATION AND BUSINESS, DEVELOPMENT OF ENTREPRENEURSHIP SKILLS

The CACTLE project has had a positive impact on strengthening of communication between partner universities: in October 2018 ENU concluded a memorandum of cooperation with Ferghana State University, which promotes academic mobility; in December 2019 Kazakh-Uzbek cultural centre has been opened in the Ferghana state university (Uzbekistan).

Participation in a project is not only a learning experience, but also an opportunity to pass on knowledge to others as a mentor, a trainer, a manager.

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MODERNIZING HEALTH EDUCATION IN UNIVERSITIES (561857-JP-2015 - ModeHEd)

Objectives: *To modernize curricula, educational and methodological complexes in medical disciplines and develop multimedia components and electronic textbooks.*

During the project, team members took part in trainings and seminars organized by European universities. As a result, they have learned and applied in practice new knowledge, skills, means and methods of teaching related primarily to their professional activities, including:

• Integration of multimedia component in "Provision of first medical care" discipline in the framework of the programme for undergraduate students (pharmacy, public health, nursing);

• Distance learning: detailed familiarization with new distance learning programmes: ZOOM, WEBEX, Hangouts; conducting online classes in AIS Platonus system, that provides access to teaching materials, as well as personal information about the achievements online;

• Use of electronic resources and international databases;

• Specificity of Sport Medicine programme and new teaching methods: case-study in clinical practice for the study of diseases (recovery, improvement, without change, death), which allows to logically build each specific case and connect it with diagnosis, use of drugs, differential diagnosis, treatment, etc.

• Brainstorming used in doctors' consultation to conclude a diagnosis, make a decision on operational intervention, etc.

• TBL (Team-based learning) – on the organization of operational management, for example, when introducing an anti-epidemic regime (in case of a pandemic);

• CBL (case-based learning) - working in small groups to make the most effective decision, for example, defining therapeutic measures for hepatitis C;

• Clinical scenario - a detailed algorithm of the disease development, taking into account various options in its progress, which is reported by students (for example, in myocardial infarction, grade 4 burns, hypoglycemic coma);

Introduction to educational process of the listed techniques in conjunction with videos (video lectures) helped to better prepare both academic staff and students, allowed to expand significantly the clinical range of students, to estimate the level of the knowledge of colleagues, more confidently argue and defend own point of view and to make a decision.

Another, not less significant achievement – development and modernization of educational programmes and methodological supporting materials. In the programme "Sports Medicine" the KazNMU team have completely updated the section "Assessment of students learning achievements". The programme is designed based on the ESG standards and its quality was confirmed during the international accreditation (2018) and post-accreditation audit (2019). The programme was included the Unified Register of Educational programmes of MES RK. This had a positive impact on the rating of higher education institution.

The programme developed in 2017, is regularly revised and modernized - in total by 70%. Modernization of the postgraduate education on "Sports Medicine" resulted in major changes in training academic staff, sports' doctors, trainers, medical and physical education instructors through the Ministry of culture and sport.

Modernization of the mentioned programme positively impacted the activity of many services related to sport medicine, including the Olympic sport, sport management, anti-doping control, changing functional duties of sport managers and sport doctors, thus, going beyond the education system.

Participants of the project from SKMA together with partners from Uzbekistan developed a double-degree bachelor programme in "General Medicine" and a manual "Improvement of Best Practices of providing First Premedical Aid" for students of medical (pharmacy, public health care, nurse business) and pedagogical higher education institutions.

The new manual is more informative and user-friendly than the one previously published, and allows authors to make additions and changes to the content of the discipline, if necessary, in response to employers' requests and changes in the programme. Preliminary authors studied the experience of European colleagues, the status of training courses, the working curricula of higher educational institutions in Kazakhstan and Uzbekistan, and drew up a schedule for the modernization of topics and the expansion of the multimedia segment in the discipline. As a result, the course included an information block, lectures and presentations, test assignments, tasks, multimedia animation and video material, and an electronic textbook.

The University Training Centre was supplied with sets of molasses (superficial wounds, amputations, burns and haemorrhaging vessels) for training in first aid, allowing to fully simulate the clinical situation, as close as possible to the real situation and work out appropriate algorithm of actions.

In the course of three years of interaction with EU colleagues in the framework of the project, two electronic training manuals were jointly prepared and published: «Sports medicine» and «Therapeutic physical culture and physical culture hygiene». Teachers use electronic textbooks when conducting online classes on AIS platforms Platonus, Zoom, Hangouts, WebexMeet.

Distance learning has improved students' learning and understanding of the material, has enabled the efficient allocation and use of time resources in preparation for classes, and has enabled students to acquire practical skills on their own, which is reflected in the analysis of the session results.

The innovations created by the project, which deal with both the content and procedural aspects of the educational process in medical institutions, are in demand not only at the institutional, but also at the national levels. This applies along with modernization of sports medicine, also to general medicine in general, in which all citizens of the country are interested.

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PROMOTING THE INNOVATION CAPACITY OF HIGHER EDUCATION IN NURSING DURING HEALTH SERVICE'S TRANSITION (585811-SP-2017 - ProInCa)

Objectives: *To promote the development of the sustainable innovation capacity of Kazakhstan Medical Universities for the modernization of nursing in healthcare through the implementation of four specific goals:*

- Development of cooperation mechanisms and exchange of knowledge in the field of nurse business between the education and health care organizations, also international academic community of nurses;
- Development of evidence-based nursing practice in Kazakhstan health care;
- Strengthening the role of medical universities in development of research activities in Kazakhstan nursing health care;
- Development of leadership and management system in Kazakhstan nursing health care.

In order to achieve this goal, the international principle of the trinity of nursing education, research and practice with the active involvement of representatives of all interested parties is applied: medical universities, colleges, clinics, professional associations, etc. (Picture - 1 below).

Picture-1

Main outcomes:

Nursing is an important component of health systems, represented by a large army of nurses and a significant human resource capacity to meet the population's need for quality health services. In this connection, one of the main directions of the programme documents for the development of health care in Kazakhstan is the strengthening of nursing services.

The project has created a mechanism for the integration of the real nursing sector in Kazakhstan into the relevant worldwide nursing community. It includes the exchange of research results through webinars, seminars, workshops. According to the results of the peer review conducted by university professors and chief specialists of the departments of health, the awareness of the senior and principal nurses, deputy directors of medical organizations on the main trends in nursing development, improvement and reform in world nursing practice have become sufficient. As a result, the compliance of medical personnel with the delegation of a number of doctoral authorities in the primary health care to GCI standards in hospitals in a number of regions of Kazakhstan has increased to satisfactory: from 25-35% (from the launch of Densaulyq programme) to 40-56% in January 2019. This is largely due to the active work of ProInCa teams in medical universities.

According to the directors of Ekibastuz, Pavlodar higher medical colleges, deputy directors of Karaganda regional medical centre, the Karaganda multidisciplinary city hospital, the ProInCa project allows you to get up-to-date information about new technologies in nursing. According to Marina Kopbaeva, deputy director of Makazhanova multidisciplinary clinic,

Karaganda, this helped, in particular, to introduce elements of best practices of Finland, Slovenia - Kazakhstan's partners in the project - into the management of nursing. The project researchers A. Aitmagambetov, I. Meermanova, together with the senior nurses of the departments, introduced the methodology for assessing the safe hospital environment borrowed from nursing organizations in the Netherlands, Groningen, which increased the effectiveness of preventing falls in the hospitals by 50%.

The project contributed to the establishment of direct contacts between the Association of Nurses of Kazakhstan "Paryz" and the European Association of Nurses ICN - a participant in the interim ProInCa conference. Preliminary work is underway to join Paryz as a collective member of ICN. The management of the “Paryz” Association notes that the interaction with ICN is already working ahead of schedule: prerequisites are being created for the introduction of a new philosophy of nursing and a code of professional rights and ethics of secondary health workers in Kazakhstan, following the example of ICN.

An important result of the project is the creation of the Centre for Nursing Improvement (CNI). With the implementation of the project in medical universities, attention to the faculties of nursing has increased. So, separate departments of Nursing are opened, whose teachers are participants in the ProInCa project.

The establishment of the Centre for Nursing Improvement is one of the main achievements of the project, ensuring the sustainability of its results. For the Kazakhstani healthcare system, the Centre is a unique structure that has no analogues today. The mission, strategy and content of its electronic platform, as well as the plan towards ensuring the sustainability of the Centre, has been discussed with a wide range of stakeholders. This, in turn, has resulted in a rapid increase in popularity of the CNI website. Practicing nurses from remote regions can find all the necessary information on nursing on one site - from contacts of experts and regulatory documents of the Ministry of Health to international databases on nursing.

It will have a long-term effect and will ensure the sustainability of the project deliverables. Already today, the interaction of medical universities has increased significantly thanks to creation of the Centre. A consortium agreement of five Kazakh medical universities-partners in ProInCa project on supporting the activities of the Centre through regional offices set up at universities has been signed and entered into force. The work of the Centre was supervised by the Department of Science and Human Resources (DSHR) of the Ministry of Health of the Republic of Kazakhstan. At the national level, this has brought together the country's higher colleges, practical health care organizations and universities interested in the information and didactic tools to improve the skills and competences of middle-level medical workers. The operation of the Centre has stipulated a diversity of ways of training nurses and enhancing capacity building of nurses.

All educational materials are uploaded on the public platform (www.nursekz.com), accessible free of charge and can be used by all stakeholders.

Currently, the platform has become a venue for interaction between practical nurses, nursing education and scientific research. It brings together all stakeholders in nursing: medical universities and colleges, hospitals and clinics, national and regional associations of nurses, teachers, researchers, practicing nurses, managers, etc. All necessary information for nursing specialists is concentrated there: clinical protocols and guidelines, methodological recommendations, training materials, statistics, information on scientific projects, a database of national experts, contacts, useful links, etc. The blog for nursing leaders and forum for exchange of views have been created there as well.

The functioning of the CNI is supported by the project team (preparing and updating content, development and uploading training and other materials on nursing, etc.) jointly with medical universities, the national association of nurses "Paryz" and the association of medical colleges.

Approaches to evidence-based nursing practice in healthcare have changed significantly. Prior to the ProInCa project the evidence-based medicine aspects in relation to nursing in Kazakhstan were not considered. The project has developed a well-structured system of education comprised of teaching methods and practical use of evidence-based nursing skills. In the course of training a pool of national experts and trainers (30 specialists) in the field of education, science and nursing practice has been set up. 500 nurses from all regions of the country were trained in this area.

Criteria for assessing the effectiveness and quality of the nursing process, based on evidence-based nursing practice, have been introduced into the regulations of medical organizations. This has contributed to fundamentally changing the ideology of nursing care through the change of mentality and approaches of managers and nursing experts. The positive impact of the project in these areas is convincingly testified by the results of interviews with regional actors: university teachers, medical workers, administrative and managerial stuff.

Experts on nursing evidence-based practice, research and leadership in nursing have been trained. Thanks to this, Kazakhstan's first clinical regulations on nursing at the national level have been developed and introduced: on care of a patient with asthma, on care of adult patients with type 2 diabetes, on risk assessment and prevention of cardiovascular diseases, etc.

Educational and methodological complexes in disciplines "Fundamentals of Evidence Nursing Practice" (5 ECTS, 150 hours), "Evidence Nursing Practice" (5 ECTS, 150 hours), "Introduction to Evidence Nursing Practice" (2 ECTS, 90 hours) implemented in undergraduate and Master nursing education have significantly contributed to changing the paradigm of education at academic bachelor and scientific-pedagogical Master levels. These achievements are in line with the goals of the Development Strategy of Kazakhstan and the State programme "Densaulyq" in terms of introducing innovative methods in ensuring public health and delegating a number of functional duties of doctors to medical sisters.

On the basis of benchmarking (Delphi-survey), recommendations were formed for medical universities of Kazakhstan to improve the infrastructure of scientific research. In this regard, the plans for the development of medical universities now include the expansion of the library fund through subscription to full-text publications on nursing science, purchase of equipment, ICT tools for research, and setting up equipped laboratories for nursing.

The recommendations of the Ministry of Health addressed to universities and research institutes in the priority areas of scientific research in the field of nursing, based on in-depth study of nursing science in Kazakhstan. This made it possible to draw attention of the leadership of the Ministry of Health and the Ministry of Education, universities and research institutes of medical profile to the development of nursing research in the future.

For the first time in Kazakhstan educational modules «Research projects and projects on development in nursing» and «Methodology of qualitative and quantitative research in nursing» for Master degree, applied and academic bachelor programmes have been developed, peer reviewed and included in the Register of educational programmes of RK.

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Based on the training materials on professionalism and leadership and assessment criteria developed in the framework of the project, a number of training seminars and master classes on leadership were conducted over a three-year period from 2017 to 2020. This has allowed to organize a cascade training for over 40% of senior nurses. The feedback given by participants after three months indicates a positive change in the perception of leadership and leaders in nursing. The respondents have noted that awareness in initiative and leadersip of the heads of nursing staff has increased, the number of patients' complaints has decreased from 25% to 70% (depending on medical organizations), patient-centred care has been widely introduced by the trained staff as a result of modern management principles learned at the master classes.

The involvement in the project allowed the project participants to familiarize themselves with the best international practices in nursing. Teachers of nursing of medical universities in Kazakhstan are mainly doctors, and the project has provided a unique opportunity to visit leading European organizations of nursing (centres, clinics, foundations), establish personal contacts with foreign nursing experts for further long-term cooperation.

Increased awareness and commitment of individual teachers, managers, health professionals regarding the specifics of nursing as an independent profession;

Skills on the use of evidence in nursing education, science and practice, methodology and approaches used by European universities in the implementation of improvement projects have been mastered;

Participants improved communication skills in the international nursing science community and advanced their skills in leadership and nursing management, using the knowledge gained from existing international practice.

Team members have acquired skills in the use of IT technologies in educational and communication activities for information and training activities.

Acquired skills in carrying out qualitative research in nursing, including multi-centre nursing. Members of the team have mastered methods of conducting online webinars for large audiences, acquired skills of working with platforms Zoom, Cisco Webex, GoToMeeting etc. This is a noticeable increase in professional development, which allows the project participants from Kazakhstan to work more confidently in the field of nursing research and evidence-based practice with foreign partners.

The project participants, including teachers, undergraduates, master and doctoral students, gained confidence in academic English language, enriched with experience in participating in scientific international conferences and master classes.

The trained participants of research team make the main pool of experts in nursing researches in participating higher education institutions that is estimated by the management as considerable progress and the prospect of accelerated development both scientific research in general, and development of school of nursing education in country.

Impact of project is felt at the national level. Within the project by means of Delfi-survey of experts, national priorities of scientific research in field of nurse business for the short, average and long-term periods defined. Recommendations of priorities of researches are transferred to Department of science and MH RK human resources and to medical schools of the republic for definition of hot topics for future projects. Today on the basis of certain national priorities, medical schools developed a number of joint scientific projects, including "Assessing nurses' actual and perceived knowledge towards self-care management of patients with type 2 diabetes mellitus", by "Nursing Care for Patients with heart failure", "Palliative nursing care: Unclear managerial situation in SMU", "Changing the role of a nurse in the context of compulsory social health insurance (PHC site)", etc.

A number of proposals of the ProInCa project team is included in the draft of the Plan of measures of the Ministry of Health of RK on realization of the main directions of development of nursing in the Republic of Kazakhstan for 2020-2025, namely, in sections: introduction of a new control system in the sphere of preparation and activity of nurses, revision of educational programmes according to the European directives, increase in potential of teachers of nursing, development of research activity of nursing experts.

The project impact is visible in the changes in content and methodology of teaching disciplines of evidence-based nursing practice and science.

The analysis of the Kazakhstani programmes of bachelor and Master degrees in "Nursing" showed lack of discipline, fundamental for this specialty, on evidence-based nursing practice.

Based on the results of the project, the courses «Fundamentals of Evidence-Based Nursing Practice» (5 ECTS 150 hours) and «Evidence-Based Nursing Practice» (5 ECTS 150 hours) at the bachelor level programmes in the specialty «Nursing» and at the Master level in the specialty «Nursing» a discipline «Introduction of Evidence-based Nursing Practice» (2 ECTS 90 hours) were introduced.

In developing and implementing the above-mentioned mandatory programmes, the project team was guided by the key competencies of the new generation of nurses accepted by the European Federation of Nurses. The content of the training programmes covers the development of an understanding of the principles of evidence-based nursing practice, information retrieval skills in evidence-based nursing, design and research methodology in nursing, best practices in nursing. Recommendations for the use of national materials in evidence-based disciplines reflect the use of different learning methods - Blended learning, research-based learning (RBL), problem-based learning (PBL) and their respective evaluation methods - project evaluation, case studies and tasks. The training materials underwent external and internal peer review and received positive feedback from both national and foreign experts. All materials are available for use by nursing professionals in teaching nursing students at the bachelor and Master levels.

The educational modules «Research and Development Projects in Nursing» and «Methodology of Qualitative and Quantitative Research in Nursing» for Master degree have been developed in accordance with European standards, Applied and academic bachelor studies. The developed modules (leadership, qualitative research, evidence-based nursing practice) are included in the new academic bachelor programme and in the National Register of Programmes (25.04.2019).

The project influenced the development of distance and other IT technologies in nursing education. Most of the practising nurses from the regions of Kazakhstan who took part in the project training activities for the first time had experience in Zoom, Moodle, etc., and labeled them as efficient and resource-efficient technologies.

The Principle of Trinity in Nursing (Education, Research and Practice), with the active involvement of all stakeholders, has strengthened the links between medical schools, colleges, clinics, associations and others.

The development of educational programmes, recommendations and priorities for research in the field of nursing are based on the results of discussions on practical health problems. Close work in teams during the project period has made it possible to establish personal professional contacts between representatives of educational and health organizations and professional associations from different regions of Kazakhstan.

Practising nurses participated actively in the project training, as a result of which they acquired skills in research projects in nursing, leadership and management. For example, at the University Medical Centre clinics, nurses initiated 5 research projects in line with priority themes for the health system:

1) Guidelines and best practices in the provision of care to patients with vascular catheters;

2) Reduction of potential risks during nursing related to artificial lung ventilation in newborns;

3) Overcoming the communication barrier in the professional activity of nurses,

4) Prevention of post-operative complications in ophthalmic practice (cataract, glaucoma),

5) Nursing of children diagnosed with Autism.

The educational modules "Research Projects and Projects on Development in Nurse Business" and "Methodology of Qualitative and Quantitative Researches in Nurse Business" are developed for levels of master degree, applied and academic bachelor degree according to the European standards.

The developed modules (leadership, qualitative researches, evidential sisterly practice) are provided in the new educational programme of the academic bachelor degree included in the National register of educational programmes (25.04.2019).

The project impact on development of remote and other IT technologies in training of experts of nurse business. Most of the practicing nurses of the regions of Kazakhstan participating in educational events of the project for the first time had experience in Zoom programmes, Moodle, etc., and noted them as effective and resource-saving technologies.

The principle of trinity of sisterly education, research and practice applied at implementation of the project with active involvement in all events of interested parties, allowed to strengthen relations between medical schools, colleges, clinics, associations, etc.

In addition, a pilot project to introduce a new nursing management system, expanding the powers and responsibilities of nurses according to their level of education, has been implemented at selected clinics that are associated with the project team.

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TRAINING AGAINST MEDICAL ERROR (561583-JP-2015-KZ - TAME)

Karaganda Medical University (KMU) has ben involved in 12 Tempus/Erasmus+ CBHE and projects and 8 ICM projects. Among them TAME has a special place - this is the first project in which the university became coordinator of a consortium of 10 universities from 7 countries - universities of Kazakhstan, Ukraine, Vietnam, Greece, Sweden, Czech Republic, Great Britain.

Objectives: *To develop and introduce innovative pedagogy methods that will provide training for students in a safe environment that is close to the needs of clinical practice, in order to prevent medical errors; to increase the capacity of medical teachers through participation in a project involving training in teaching and independent creation of teaching materials using virtual technologies.*

By analyzing the results of our project, we can see how many changes have taken place.

Previously, there was no module/course on prevention of medical errors in the training programmes of medical universities in Kazakhstan and in partner countries. As part of the expansion of academic freedom of higher education institutions during the implementation of the TAME project, we have a unique chance to modify the existing «General Medicine» programme at Bachelor level, introducing 2 modules "Prevention of Medical Errors" 2 ECTS each for pediatricians and general practitioners (GP). The module design requires active involvement of learners in the process of clinical decision-making based on the analysis of a specific case of a «virtual patient» with medical errors included. In this way, conditions are created for students to adapt to a real clinical environment in which a doctor constantly has to make important decisions for the safe and effective treatment of a patient.

In revising the educational programme we managed to change the logic of its design taking into account the teaching methodology and creation of an effective learning environment for safe «collision» of students with medical errors. The process of its development required close cooperation between the staff of the Academic Department (AD) and other departments. The AD staff have become more sensitive to the needs of staff and students in building the schedule of activities and credit calculation for clinical problem-based learning. They now speak the same language as the teachers, and they understand the essence of the curriculum itself, logically building the transition from theoretical to clinical learning.

The introduction of the new module has led to an understanding of the need for a change in approaches to the delivery of training and the development of specialized teaching materials for clinical training using e-learning.

As a result of the experience gained, the universities' academic staff are now prepared for the transition to distance learning, including in clinical disciplines using e-learning elements and materials developed within the framework of the project, based on the «virtual patient». The Asia-Pacific Association of Biomedical Educators (headquartered in Singapore) has been interested in our experience in tele-education using virtual patients and invited to present the results "Adapted to sudden shocks in Medical Education: Tips, Tools and Tricks" at the webinar on 30.04.2020.

Prior to the implementation of the project, the evaluation of the programme was conducted only through feedback and on an ad hoc basis. Research in the field of medical education was carried out only in the framework of scientific works at the postgraduate level.

The uniqueness of the TAME project was the possibility of carrying out a study in the field of health education, which enabled academic staff to be involved in the development of a strategy for evaluating the effectiveness of a modified programme on the basis of feedback to examine the progress (performance) of students. Teachers were actively involved in all stages of research: in the design of research, in the development of assessment tools that included not only questionnaires, but also specially designed tests, checklists, scripts for standardized patients, Focus-groups for trainees, analysis of data, preparing publications and presentation at conferences. Our teachers actively apply their research skills in their work. We can say with confidence that the introduction of innovation in higher education is not intuitive, but evidence-based.

Another very important result of the project - our teachers for the first time had the opportunity to be trained to develop clinical cases with medical error using a "virtual patient" on an open online platform.

A unique technique was developed by Professor Jonathan Round, a pediatrician who created similar clinical cases with medical errors at St. George University, London. Professor Round taught our teachers this technique using 6 original cases with a "virtual patient". Our teachers, having mastered the principles of their construction, have developed 36 new cases in Kazakh and Russian languages, and all members of the consortium have prepared 122 cases. Now, both in the academic situation and in practice, students have the opportunity to learn how to make clinical decisions outside of direct contact with the actual patient. The cases made it possible to extend the scope of the project - teachers are more active in applying this methodology to teach other clinical disciplines and modules where contact with the patient is required. To date, more than 1330 students of the 4th and 5th years of study of specialty «General Medicine» have been enrolled in the modified programme. We see further extension in the development of new cases for full coverage of students of the 4th, 5th, 6th and 7th years of study.

D-PBL training (Decision-making problem-based learning) has enabled us to systematically change the way we organize the learning process by introducing problem-oriented learning. Of course, our teachers have used interactive teaching methods in the past, including many elements of problem-oriented learning. However, it was in this project that a holistic training package - virtual clinical case files - was prepared, which provided an analytical, not descriptive, way of communicating and processing information. This is a presentation of the problem, where we define it as a real, applied situation in life, in which the goal requires a reasoned decision and choice. With the new approach to learning, students have the opportunity, using the cases (in other words, a «virtual patient») placed on the electronic platform OpenLab, to choose treatment options in a situation that requires analysis and decision making to prevent medical errors. The cases are available on the project website: http://tame-project.org and on the OpenLab platform: http://olab.tame-project.org

The project has trained 32 certified tutors who fully understand how to adapt and create clinical cases with medical errors on the basis of a virtual patient using the OpenLab platform, and teaching methods based on the new teaching technology. This is a custom-made, «one-of-a-kind» preparation that requires a great deal of dedication and significant resource investment. We plan to train 20 tutors more in the 2020-21 academic year to fully provide students with training using the cases.

Through participation in the project, many teachers have improved their English language skills, their motivation to prepare and implement new projects, to participate in internships and to upgrade their skills.

Students took an active part in the TAME project. During the analysis in focus-groups, students expressed their high appreciation of the methodology, in which they were given the opportunity to «face» a medical error for the first time in a safe environment. A number of students noted increased confidence in better preparation for clinical practice in this matter, development of clinical, critical and analytical thinking skills, motivation to self-improvement to prevent medical errors in future practice.

Based on the findings of the project, TAME students demonstrated better empathy skills, better medical interviewing skills, and ability to deal with medical errors.

Students' feedback:

“This develops our clinical thinking. In the future, it will help us in our work. That is why I am glad to participate in this project”;

“Sometimes it was difficult because we slept only four hours a day, but this was compensated by knowledge and experience for our future practical activities”;

“ In the prevention of medical errors, we became more prepared, as each case involved a review of errors. All the cases were from life, and we could see what doctors faced in practice. Even if we chose the wrong tactics, we later corrected, analyzed the errors to prevent them in practice”;

“The strength of such education is that decisions have to be made very quickly when the patient has a complaint from several systems that could confuse, but needed to highlight what is most important at the moment and make the right decision.”

“There was a situation where the choice was to concede to the patient and choose the treatment plan that suits him or to prescribe the treatment that is right. I believe that such a situation can be met in practice, therefore good to work them now»;

"Knowledgeable" patients often meet in times of easily accessible Internet. They’re rushing to Google the symptoms and diagnose themselves. Working with such patients, you have to behave accordingly so that do not call into question your knowledge, and define the correct tactic of introduction”;

“Working in a team, I have learned to listen to each other. We helped each other to express our thoughts correctly, actively participated in the evaluation of the clinical assignment and in the preparation of the diagnosis”.

"D-PBL is a problem-solving technology that allows to evaluate the actions of a doctor who, based on his/her knowledge and practical experience, chooses the most safe and effective treatment method for a patient. It is desirable that such teaching be introduced in every clinical discipline".

"This technique shows your gaps in knowledge and allows you to fill these gaps in anatomy, physiology, pathophysiology and clinical medicine"

The involvement of the university in the TAME project has changed the general approaches to the management of internal business processes. For example, the KMU is now adapting project management to almost all strategic activities. All Strategic Plan indicators are now coordinated by project teams composed of teachers and administrative staff from different divisions, ensuring both horizontal and vertical integration (matrix management). Before this change, the whole process was controlled vertically through a hierarchy of positions.

The introduction of the TAME project has required significant changes in academic policy and procedures.

This included new approaches in the planning and organization of the educational environment through student-oriented learning, teacher development in the creation of new assignments for e-learning, new ways of creating a timetable for learning, culture of teaching clinical disciplines with medical errors.

Astana Medical University (AMU) itroduced D-PBL into the internship curriculum, as the project showed the need to strengthen the training of graduates in terms of prevention and avoidance of medical errors in future practical activities.

KMU introduced a new teaching position «Tutor» in addition to the regular poitions of academic staff. The main requirement for this position is the ability to teach using D-PBL technology, confirmed by a certificate.

The D-PBL VP cases are included in the curriculum on a regular basis, and every year new groups of students are trained on a modified curriculum using the methodology. All the cases developed have been translated into all languages of instruction used in the partner universities of the consortium and consolidated into a common platform for all partners. All partners can use these cases not only for undergraduate studies, but also for internships and resident students.

The elective course for 2018-2019, 2019-2020 school year for interns of the 7th year of study «General medicine» «Medical errors in clinical practice of the doctor of general practice» has been developed.

We can proudly say that the results of the project have proved to be in demand by higher education institutions of both our country and colleagues from Central Asia. With the support of the Ministry of Health of the Republic of Kazakhstan, the Centre for Transfer of Educational Technologies was established, which was later transformed into the Centre for Simulation and Educational Technologies to disseminate the experience gained in Erasmus+ CBHE projects, including to all medical institutions of the Republic of Kazakhstan. The «Basic/advanced course of trainers of medical organization of education on the organization and conduct of problem-based education with the use of virtual patients» for teachers from other medical universities and colleges of RK has been developed and implemented.

Since the end of the project, more than 120 academic staff have been trained in this course from 16 medical universities and colleges in Kazakhstan. Colleagues of the Ibn Sino Tajik State Medical University, Dushanbe, Tajikistan, were interested in the methodology., With the support of the World Bank, our university holds trainings on PBL (D-PBL) for tutors of the Tajik State Medical University. The project started in January 2019.

Initially, the TAME project did not envisage a direct relationship with the labour market, but as more and more learners were involved, including in the Kazakh language, feedback from students on perceptions of their own preparedness and a sense of confidence in their future career, has led to the realization of the need for a wider continuous implementation of the training module in order to avoid medical error for the preparation of the «critical mass» of graduates for practical health care. Already on the basis of the results of the TAME project, 1,337 students from all the partners of the consortium - including KMU - 445, AMU - 256 - are trained in the prevention of medical errors in order to provide safe medical care for future practical activities. The first TAME graduates are expected to graduate in 2020-2021 academic year.

The project has achieved a close integration between the health sector and training, as all cases created were based on actual cases and were prepared by practitioners (who most often are at the same time staff of clinical departments) based on their own practices.

After the completion of the project, integration continued, new cases of "virtual patients" were created, and teachers were given a real mechanism for the close integration of actual clinical practice with the learning process.

The implementation of TAME led to the following additional results (spin-off effects):

• KMU has trained and certified 2 project managers on PRINCE2 methodology. This has made it possible both to manage the project effectively and to develop the capacity to manage new international projects in the future.

• All partner universities prepared more teachers and students than originally planned in the project proposal. With 6 staff members planned for each university and 64 students there are 120 teachers and 1,337 students trained.

• The elective course for 2018-2019 and 2019-2020 was developed and implemented for the interns of the 7th year of study in the “General Medical Practice” and “Medical errors in clinical practice of the doctor of General Practice”. In 2018-2019 academic year 23 groups (160 students) were trained. In 2019-2020 15 groups were enrolled in the elective course.

Tutors trained to teach in the Kazakh language (KMU - 8, AMU - 4)

In November 2019 and in May 2020 KMU organized a training seminar «Problem-based learning (DPBL) with the use of virtual patients (basic course)» involving 30 teachers of clinical departments, They learned to deliver training activities with the use of “virtual patients” cases and develop cases with medical errors.

• All partner universities have developed additional scenarios, using clinical cases with medical errors and evaluation tools to assess students' knowledge and skills. In particular, KMU has developed 6 scenarios for standardized patients to assess the skills and attitudes of students; a basic and advanced course for D-PBL teachers in medical universities has been prepared.

• KMU has developed 6 methodological guidelines on the use of cases with standardized patients to assess the knowledge and skills of students trained using clinical cases with medical errors and Guidelines for clinical teachers for Doctors of general Practice and paediatricians

In conclusion, we can say that in the TAME project we have had the first invaluable experience of coordinating the activities of a large international consortium. We have learned to act and to take into account differences in mentality, cultural specificities of different countries, level of training of university partners, variety of laws and regulations, medical protocols and many other aspects. The cooperation established under the project continues.

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IMPROVEMENT OF CHILDREN CARE TEACHING AS A TEMPLATE FOR MODERNISING POSTGRADUATE MEDICAL EDUCATION IN CENTRAL ASIA (598399-JP-2018 - IT-ChildCA)

Objectives: *To support the modernization, professionalization and internationalization of post-graduate training in the field of children care management in Central Asia (CA) countries in cooperation with EU HEIs willing to share their expertise and experience in the field of paediatrics, paediatric surgery and child neuropsychiatry postgraduate training.*

In Kazakhstan from 2007 to 2017 all medical institutions were transferred to a new model of training, under which paediatric faculties were abolished. The process of training paediatricians at the bachelor and internship level has been restored since September 2017. An analysis of paediatrics in the Republic of Kazakhstan revealed that paediatrics is among the most deficient in the Top 5 specialties. The modernization of postgraduate medical education through the introduction of new content in educational programmes will help to improve the quality of medical services and reduce infant and child mortality.

The main result of the project is **modernization of residency programmes** «Paediatrics», «Paediatric surgery» and **development of a new residency programme** «Children's neuropsychiatry».

In order to assess the quality and level of postgraduate paediatric education in the Partner Countries of Central Asia and to improve postgraduate training, in the summer of 2019, a survey was carried out on stakeholders on the quality and level of paediatric education in the partner countries of Central Asia. The development of the questionnaires and the analysis of the results were carried out by the project partners - experts from the Union of European Medical Specialists. More than 200 respondents were interviewed in three main areas: academic institutions, prevention and treatment organizations, and government structures. Resident volunteers participated in the survey.

The results of the questionnaire showed along with a good level of basic knowledge of paediatricians, sufficient material availability of equipment in paediatric medical institutions, also the following problems among paediatric specialists:
- Lack of familiarity with routine laboratory and functional diagnostic tools for practitioners;
- Lack of independent medical practice during residency training.
- Insufficient knowledge of English, which limits access to international medical literature such as MEDLINE, PubMed, online training, online consultations with international patients, as well as the introduction and implementation of recognized international clinical protocols and recommendations; The analysis also revealed a lack of availability of paediatric specialists in Kazakhstan.

The main results of the questionnaires and the recommendations of the experts on the development of curricula in accordance with European standards are presented in 3 languages in the " Baseline document for a Central Asia curricular proposal for the professionalization of children care management".

A comparative analysis of the European educational programme «Training Curriculum» with the Kazakh residency programme on «Paediatrics» showed that the mandatory component of the cycle of specialised disciplines corresponds to 80%. The differences were in the number of years of study (RK programmes - 2 years, EU programme - 5 years), the correlation of theoretical and clinical training time, competences, teaching methods.

A 4-year residency programme «Paediatrics» has been developed to date. This duration is considered by international standards to be the minimum necessary for full-time training.

According to the State standard 2015, the volume of the residency programme is 140 ECTS. The volume of the «Paediatrics» programme developed within the framework of the project is 240 ECTS (update part - 100 ECTS). The entire 4-year training load is divided into 25% of credits (60 ECTS) for theoretical classes (frontal lectures, seminars, webinars, congresses, simulations, etc.) and 75% (180 ECTS) for practical and clinical skills (in-patient management, outpatient pediatric activities, etc.).

Training is provided on a modular basis, with an increasingly complex structure, from general to more specialized training:

3 years - General basic education.

1 year - Specialization in one of the three areas of paediatrics:

Primary care or public pediatrics.

Secondary care or general inpatient paediatrics.

Tertiary care or specialized in-patient paediatrics

Features of the updated curriculum:

• A module «General skills and competences» (20 ECTS in total) added which includes theoretical and clinical classes on physiology, development and growth, metabolism and nutrition, immunology and infectious diseases, pathology, neonatology, injuries and resuscitation, basic and extended life support, emergency and intensive care, safety.

Added courses (18 ECTS) covering the entire period of study («Long courses»), which include:- Medical English (4 ECTS).

Evidence-based medicine (1 ECTS). Introduction and implementation of internationally recognized clinical protocols.

Online collection of international medical literature (1 ECTS). Updated medical knowledge, access to evidence-based medicine, online and simulated education, pediatric research using the Internet.

Deontology, bioethics, law and professionalism (1 ECTS). Development of intuition and logical thinking.

Communication (1 ECTS). Working with parents, patients and colleagues.

Foundation of Ultrasound in Pediatrics (10 ECTS). Study of methods and instruments of medical imaging.

• The module «Skills and Competences in a Specialty» has been extended to include 7 new disciplines such as «Adolescent Medicine», «Ophthalmology» and some others with a total number of 9 ECTS and extended basic clinical disciplines (additional 53 ECTS). Thus, 12 weeks (3 months) of neonatal intensive care and 12 weeks of intensive care in paediatrics; 3 months of neonatology, 3 months of infectious diseases, 2 months of laboratory medicine, 3 + 3 months of public medicine (intended for on-site work with a general pediatrician or in a field hospital)

Internal expertise of the resident programme on «Paediatrics» was carried out by the methodological bureau of the Faculty of Medicine and Health Care of KazNU, the Committee of Educational Programmes (CEP) on paediatrics of KazNMU and KazMUNO.

External review of the «Paediatrics» programme was carried out by independent experts: Association «Paediatrics Union of RK», Scientific Centre of Paediatrics and Paediatrics Surgery of RK. In 2021 it is planned to upload the «Paediatrics» programme in the Register of the Unified System of Higher Education Management for expertise and approval by the Centre of the Bologna Process.

In modernizing the residency programme on «Paediatrics» it was possible to change the logic of the programme design, as well as to improve the teaching-learning methodology.

The following changes were made to the postgraduate resident programme:
- Changing the ratio of theoretical and clinical training from 30%-70% to 25%-75% with an emphasis on practical activities (work in university clinic and clinical bases).

Performing a set minimum of independent routine procedures to improve practical skills.

Training in an institution or group of institutions providing resident practice in the full range of specializations, including in-patient, day and out-patient care.

In the model curricula of the residency, increase up to 20% the share of special related courses («Infections» and «Surgery»), as well as the inclusion of new courses (up to 5 ECTS) on otolaryngology, ophthalmology, psychoneurology, etc.

The approach to the evaluation of students' knowledge has changed: intermediate control is carried out in the form of a miniclinical exam, clinical tasks are carried out in the Simulation Centre of the Faculty of Medicine; there are paper / electronic journals of independent routine procedures for obtaining credit units.

The use of active teaching methods (command-oriented, problem-oriented approaches) has made it possible to completely restructure the curriculum on a modular basis, with integrated training aimed at the practical application of knowledge and effective clinical training. The use of project-based training has enriched the curriculum with topics reflecting recent international advances in paediatric science. The programme provides for a system of evaluation with an increasing proportion of the practical component from course to course, using the most appropriate methods according to the final results of each discipline and course, in accordance with the options of the International Medical Foundation.

Tele-medical equipment acquired as part of the project has increased the possibilities of teaching the latest highly specialized techniques in paediatrics, and has made it possible to conduct online consultations of patients and consiliums.
It may be noted that the project has strengthened close cooperation and interaction between the structural units of the University, for example in KazNU between the Faculty of Information Technology, International Relations Office, Department of Innovative Development. The new generation of paediatricians is required to possess digital skills: collecting, processing and analysing data, working with patients' medical databases. The development of the content of the disciplines «Evidence-based medicine», «Online-data collection on international medical literature» was carried out jointly with specialists of the KazNU Department of information technologies, which gave rise to new interdisciplinary scientific research. The participants of ChildCA project participated in the joint development of the new PhD programme «Artificial Intelligence in Medicine» with the IT faculty, successfully registered in the National Register.

Paediatric treatment and prevention establishments: The Paediatric and Paediatric Surgery Research Centre, the City Children's Clinical Hospital #2 and the Children's Emergency Medical Centre #1 have shown great interest in the programmes being developed, support the idea of paediatric residency training for four years, are ready to provide their premises as clinical base for resident students.

«Children's Neuropsychiatry» programme is a completely new specialty for Kazakhstan. According to world health statistics, neuropsychiatric diseases dominate other diseases, affecting young children and adolescents. Approaches to the treatment of neuropsychiatric pathologies involve a complex medical and pedagogical correction. Networking, exchange of experience, wide discussion of the stages of E+ projects have had a synergy effect: collaboration of ChildCA pediatricians with the DECIDE team has emerged whose aim is to promote the rights of persons with special needs to have access to education. Training of human resources for child neuropsychiatry will enable early diagnosis and detection of neuropsychiatric disorders in children, personalized treatment and rehabilitation. In October 2020, the ChildCA team took part in the international online conference «Development of Inclusion in Kazakhstan: Theory and Practice» organized by the DECIDE team. Participants in ChildCA and DECIDE projects have been able to create a discussion platform for strengthening intersectoral, inter-institutional cooperation between education, health and social welfare departments, non-governmental organizations and business entities.

ChildCA Country Coordinator - Kazakh Asfendiyarova National Medical University that has the power to discuss and recommend changes to State standards of medical education, the normative and legal acts in the field of medicine. It is expected that the Residensy Child Care Programmes, developed and updated in accordance with international standards, will train the demanded specialists and will be supported by the Ministry of Health, and Ministry of Education and Science.

Participants said that, in addition to the impact at the institutional level, the project had enhanced the individual qualities of staff members and created opportunities for their professional development. Residents who participated as volunteers in the questionnaire stress that, thanks to the project, they have improved their English language skills and broadened the range of professional contacts by studying professional literature and participating in working meetings of universities.

Umit, resident: "Participating in this project as a resident has given me a lot of experience, namely identifying weaknesses that I need to work on, in particular, improving English proficiency. The implementation of this project gives us the opportunity to train highly specialized competitive specialists in pediatrics. I consider such a project not only promising, but simply NECESSARY! And to all of us! I hope very much that it will be successfully implemented, and I wish all success in this very useful and promising enterprise!"

Koshkarova Meruert, resident, pediatric surgeon: "Thanks to this project I have improved my knowledge of English and broadened the range of professional contacts, by studying professional literature and participating in the working meeting of all the higher educational institutions in Bukhara, where we were involved in translating the presentations of the speakers, during discussions within the framework of the meeting and direct communication with conference participants".

Aigerim Aliakparova, project manager: "Thanks to the project, close cooperation and interaction between the structural subdivisions of KazNU was established. We have learned new skills of personal development, gained experience of communicationand decision making".

In **addition to the activities** carried out during the implementation of the project, for example, KazNU has signed agreements and established a partnership with medical institutions in Central Asia - project participants.

In the period from September 2019 to February 2020, within the framework of the concluded bilateral cooperation agreement, academic mobility of staff was carried out between the Higher School of Medicine KazNU and the Bukhara State Medical University.

The Dean of the Faculty «Medical Pedagogy and Higher Nursing Affairs», Professor of the Department «Infectious Diseases and Epidemiology» of the Bukhara State Medical Institute A.R. Obloculov conducted 36 hours of practical and lecture classes on the course «Infectious Diseases» in the KazNU Higher School of Medicine department of clinical specialties.

The KazNU team has carried out refresher training cycles «Active methods of study in higher education and methods of assessment of knowledge and skills» for staff of seven faculties of the University (physics, geography, political science and journalism, biology and law faculties). In total, about 100 teachers were trained during the project period and were awarded certificates. As a result, in these seven faculties the distribution of teaching time among the types of study allotted to disciplines has changed. The number of lecture hours has decreased, the number of practical exercises with the use of active teaching technologies has increased, and methods and means of conducting classes have been revised. Interactive forms - business and role-playing games, «cases», project-based activities, etc. are used in all disciplines.

To intensify cooperation in research with stakeholders, a series of joint scientific articles have been published in peer-reviewed international journals (Scopus) and Kazakh periodicals. Jointly with colleagues from the Pediatrics and Pediatric Surgery Centre 2 articles were released in 2020: E3S Web of Conferences 159, 08005 (2020) BTSES-2020 «Comprehensive assessment of the Aral Sea region children's health; Functional deviations of the cardiovascular system in children». Also a series of articles on comprehensive assessment of the health of schoolchildren and adolescents (in the KanNMU Herald "Paediatrics and paediatric surgery"), as the main results of the joint research activity on «Development of scientific bases of formation of preventive environment for preservation of public health».

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SECTION 5. REALIZATION OF THE RIGHT OF PERSONS WITH SPECIAL NEEDS TO ACCESS TO HIGHER EDUCATION

DEVELOPING SERVICES FOR INDIVIDUALS WITH DISABILITIES (598661-JP-2018-RO - DECIDE)

Objectives: *To foster the right of individuals with special needs to access education; enjoy the right of participation in everyday society and to combat discrimination by instilling awareness and acceptance in society as in line with the Bologna Process and the UN Convention on the Rights of Persons with Disabilities.*

In the absence of a comprehensive education programme on inclusive education in its broad sense, the project team has expanded its activities in several directions. One of the results was the development of inclusive education programmes (modules) based on country and world analysis and a flexible approach to their use. The flexibility of the programme allows them to be used both for a degree in formal education (bachelor, Master, PhD) and for professional development (short courses).

The Kostanai Baitursynov Regional University (KRU) team used a broad approach. Here, as in other universities participating in the project, modules were developed. The study programmes of the disciplines «Pedagogical Psychology» and «Psychological Support of the Personality of Learners» include such topics as «Psycho-pedagogical support of students with special educational needs» and «Social and psychological integration of people with special needs». This has brought a new focus on pedagogy and psychology with elements of critical thinking and awareness of the potential of persons with disabilities;

In addition to the development and introduction of modules in the curricula of various directions of study, it was decided to further develop a Comprehensive Programme for the Development of Inclusiveness, which led to significant changes in the university's regulations, reflecting university policy. The development and further improvement of inclusive education in higher education up to 2025 on the basis of a systematic and integrated approach and, in the future, the development of the university as an inclusive university are given as a priority, including reasonable adjustment and universal design of the institution, creation of an accessible and comfortable architectural and educational environment for persons with disabilities;

In KazNU, in all pedagogical specialties of the university, the subject «Inclusive Education» was (Module 2 - 2 ECT; Module 4 - 3 ECTS) introduced in the undergraduate programme, aimed at developing the ability of specialists to apply modern strategies and methods of inclusive education. It is planned to introduce inclusive education modules in Master programmes in social work and public health as elective subjects, as well as opening of a new specialty «Modern technologies in inclusive education». The implementation of the education programme is aimed at training a professional capable of interpreting and using the latest concepts in the field of inclusive education.

In KATU the team developed Modules 3 «Use Library!» and Module 5 (Meeting needs - cognition and learning (including moderate and severe learning difficulties and dyslexia)"- 1 ECTS. As the title indicates, the content of the modules is aimed at introducing learners (university teachers) to the basic concepts of cognitive and learning disabilities, their types, including dyslexia and inclusive education practices in Kazakhstan, various tools and methods used to train students with these types of learning disabilities.

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The pilot testing of the modules has shown that they are necessary for the professional development of teachers in higher and secondary schools and for their inclusion in the programmes of higher educational institutions as a component of professional retraining, and to raise awareness of the society as a whole about the various aspects and problems of inclusive education and their solutions. Many participants noted that they were not always aware of the specific learning difficulties of children and adults with special needs and the variety of problems such as dyslexia, dysgraphia, dyscalculia, hyperactivity, attention deficit, autism and many others.

Analysis of the current status of the system of inclusive education in the Republic of Kazakhstan, study of the legislative basis and scientific and methodological aspects, and the results of training measures, generalization of the project experience allowed to form the basis of independent direction of scientific search «Satisfying needs - knowledge and learning».

All HEIs of the project have created favourable conditions for its effective implementation. In particular, the use of library resources helps to create a suitable learning environment using assistive technologies, materials and sources for students with disabilities, as well as for the training of teaching and administrative staff.

Participation in training activities has certainly had a positive impact on the professional development of teachers. Joint programming, learning and sharing of experiences with European partners, trainings and online webinars, Skype meetings in English, common discussion of plans and allocation of assignments have contributed to improved English proficiency, strengthening team spirit, improving skills in the design and development of training courses, project and time management and, in general, improving the content and quality of training of professionals in the field of inclusive education.

Universities are expanding partnerships; more teachers and staff are becoming aware of inclusive education and are equipped with the most up-to-date knowledge and educational technologies for the development of children and adults with limited health opportunities, facilitating their involvement in social life. The launch of the education platform improves access to open courses for a wider range of stakeholders.

For example, in KazNU education of students with special needs is no longer limited to social work; it is included in the priority area of the University's Teaching and Methodology Unit and is supervised by the Vice-Rector for academic affairs. Physical accessibility of university facilities for people with disabilities is being addressed. A plan to create a barrier-free environment on campus has been developed and is being implemented. For example, the central alley has been renovated and ramps built.

The project team focuses on the universal introduction of the principles of inclusive education, increasing the attractiveness of the institution to new entrants, so that higher education becomes more comfortable with the organization and accessibility of education, professional and social adaptation of persons with special needs, improvement of their social and psychological status and further successful integration into society. Universities are setting up so-called Liaison Office where the "Access Officer" assists students with special needs in a wide range of issues.

SECTION 5. REALIZATION OF THE RIGHT OF PERSONS WITH SPECIAL NEEDS TO ACCESS TO HIGHER EDUCATION

The higher education institutions involved in the project, in particular, KRU, has concluded partner agreements with the regional branch of the Institute of Advanced Training of Pedagogical Staff in Kostanay Oblast» under the JSC «National Centre of Advanced Training «Orleu» and the branch of the «Academy of Public Administration under the President of the Republic of Kazakhstan» in Kostanay Oblast (Agreement of 15.01.2020) on joint promotion of project results at the regional level.

Interaction of KRU with the Commission on Social Issues and Culture of the Majilis (Parliament) of the Republic of Kazakhstan, Ministry of Education and Science, Ministry of Coordination of Employment and Social Programmes, Ministry of Health, Federation of Trade Unions of the Republic of Kazakhstan, Public Fund «Alliance of Civic Initiatives» of the Kostanay oblast, The Mothers' Council of the Assembly of the People of Kazakhstan, the Foundation of the First President, NGOs and visual disability societies are bringing the impact of the project to the national level and are promoting changes in the country's educational policy with a view to developing mechanisms for inclusive higher education.

National Awareness Day on 9 October 2020, dedicated to inclusion, initiated by KATU, for the first time brought together a wide range of stakeholders - from line ministries to NGOs - and provided a good platform to discuss pressing issues in an area that affects all social groups in society, drawing attention to addressing the problems of people with special needs. The project team is confident that its recommendations will attract the attention of both national and local executive bodies and will contribute to improving the forms and methods of their work to develop an inclusive society in Kazakhstan.

Lilia Sargsyan,
Professor, Department of Psychology,
Kostanay Regional University
named after A. Baitursynov

ENHANCING COMPETENCIES OF CENTRAL ASIAN UNIVERSITIES IN AGRICULTURAL POLICY FOCUSED ON ENVIRONMENTAL PROTECTION & LAND MANAGEMENT
(561590-JP-2015 - ECAP)

Objectives: *To contribute to the enhancement of the theoretical approach towards the land management and environmental protection through developing innovated programme curricula in the field of "Environmental protection and Land Management"- in the context of the EU Common Agricultural Policy (CAP) principles.*

Sixty teachers from KazNAU and KRU have studied at trainings on «Ecology» and «Land administration» in European partner universities with award of certificates. Thanks to trainings, teachers have fundamentally updated their methodological resources by mastering new «skills of the 21st century» (critical and innovative thinking, media and information literacy, self-control, adaptability, leadership, social and multicultural awareness, etc.) and technologies for developing distance courses. The training programme also included new professional topics for participants: GIS, Remote Data Tools, EU New Agricultural Policy, EU Environmental Law, Land Administration.

The study of these issues has helped to change the content of the reformulated disciplines and the new Ecology course as a multi-disciplinary one - topics from other areas and directions have been added to the lectures. The material of the trainings helped to expand the topics of diploma works of interdisciplinary nature (Water Protection Strips of the Tobol River plus agricultural policy, Climate change plus sealing of the urban territory, etc.). During the project, 10 new distance courses were created. The acquired professional knowledge is actively applied in the educational process in the departments «Ecology» and «Land resources and cadastre» in KazNAU and KRU. The participants of the project confidently apply e-learning, MOODLE platform, competent approach to the formation of new courses and curriculum.

In KazNAU 2 disciplines «Land Resources Monitoring and Cadastre» and «Natural Resources and Sustainable Development» for undergraduate students were developed in 3 languages and introduced into the educational process. Textbooks in three languages, Kazakh and Russian, have been published in the developed disciplines. More than 40 undergraduate students were trained in «Cadastre, «Ecology» in the newly developed courses. In these courses, online training is also conducted.

Employers took part in the development of disciplines in KazNAU. Two round tables were held with them, during which employers noted a lack of ability of graduates to work independently. To address this need, in developing the content of the subjects and the methodology of the classes, in addition to the discussion, the project method of training was introduced, which to a large extent aims at developing the autonomy of the students.

As has already been mentioned, the representatives of the enterprises participate in the development of the programmes/courses by coordinating the content with the experienced specialists of the enterprise. Most often, it is the head of the enterprise or department, who himself is a graduate of Ecology, or can involve other specialists for consultations. For example, in KRU, the content of 5 training courses was agreed with employers in the region (Environmental Quality – with Department of Ecology, Environmental Monitoring – with LLP “Ecogeocentre”, Land Administration – with Department of Agriculture, Soil Science – Department of Land Management, Environmental Resource Management – with Department of Natural Resource and Environmental Management).

Thanks to the modern skills acquired, the level of employment of graduates in the specialty «Cadastre» increased by 25% and made up 100% in 2017. The University has developed an innovative curriculum (2017), which is based on practice- and region-oriented approach to developing the trajectory of the specialty «Ecology»; introduction of multi-disciplinarity in the content of disciplines; use of new methodologies (a compendium of practical work using new teaching methods has been prepared).

The content of 10 bachelor courses (of which one is completely new) and two Master courses has been updated. Since 2018, distance courses have been introduced. Four innovative courses were developed in three languages, uploaded on the project's platform and the KazNAU and KRU distance learning portal. The design of the new courses (structure, labour intensity, etc.) are in line with the requirements of the Ministry of Education and Culture of the Republic of Kazakhstan.

The ECAP project has created opportunities for the application of blended learning in the field of «Ecology» in KRU. Various types of educational materials were introduced in this specialty: both for offline and online learning. As a result, at the institutional level there are numerous changes related to the promotion of distance learning and its sustainability through the development of new courses at the Faculty of Agrobiology, where such training has not existed in the past. For the first time in a remote format, 10 courses in the field of «Ecology» (9 courses, 1 of them is new) and «Agronomy» (1 course) were developed and introduced in the teaching-learning process.

Cooperation with European and Uzbek partners has strengthened through joint participation in conferences, project studies, preparation of teaching materials, etc.

University students are very interested in the introduction of new courses and teaching methods.

Marina Alekseeva,
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Kazakh National Agrarian
Research University

ENHANCING COMPETENCES OF SUSTAINABLE WASTE MANAGEMENT IN RUSSIAN AND KAZAKH HEIS (585761-JP-2017 - EduEnvi)

Objectives: *Modernization, accessibility and internationalization of higher education in Physical sciences and Environment protection in Kazakhstan and Russia through developing competences of teaching staff in the area of sustainable waste management and based on the latest EU pedagogical approaches.*

One of the main important results of the project is the increase in the level of different categories of competences of project participants. These are methodological and instrumental competences, as teachers, through pedagogy and e-learning tools, have learned to work with new learning formats, mastery and application of new learning technologies, video recording, methods of working with graphics tablet, MOODLE system etc. All teachers-participants of the project use e-learning tools (Canva, Logo, Prezi, Google Form, Google Classroom, Zoom, WebEx meeting, Kahoot, Socrative and others). Practical tasks are created using examples of the real market to involve students in solving specific situations and projects arising in the industrial field, which in the end is aimed at raising the qualification level of students, and to develop the capacity for further employment.

Just a few examples of cases:

- Assess the extent of ambient air pollution at the “Atameken” plant by the monitoring average daily concentrations of nitrogen oxide, nitrogen dioxide and formaldehyde;
- Assess the ecological status of atmospheric air in the territory of Atyrau city and Atyrau oblast for one month according to air quality monitoring stations according to the indicators;
- Create your own mental map-scheme (mind map) and systematize your knowledge and understanding of risk classification. To perform this task, listeners are advised to use Google.it tool (https://coggle.it/);
- The city has an outdated recycling technology. How do you improve the recycling rate? Please propose a comprehensive technology that will produce fertilizers from organic waste along with biogas, as well as proteins.

Also the teachers - participants of the project have increased the level of interpersonal competences - the ability to work in a team, cohesion, initiative. The training and weekly meetings of the consortium members to discuss the modules have contributed to an increase in the level of communication skills, proficiency in English, and invaluable experience working in the international environment, helped to increase motivation of the young participants to succeed in career advancement.

The project has had a positive impact on students and university professors in addressing environmental issues. The themes of students’ start-ups are more closely related to solid waste treatment: treatment of sewage and sea surface from organic and oil stains; treatment of household and industrial waste.

It has become a tradition to hold joint events with public organizations active in the environmental area and higher educational institutions – members of the consortium (South-Kazakhstan Auezov university (SKU), Kokshetau Ualikhanov University (KokU), organization of online meetings of students and staff with activists of environmental movement in Kazakhstan (Pakizat Saylaubekova -Recycle BYRGE).

There are excursions organized by students and teachers to the garbage-processing complex of Almaty and the industrial base for processing plastic rocket plastic, interviews

with representatives of enterprises, joint seminars and webinars on promoting environmental culture (“Clean corner”).

Training seminars have led to fundamental changes in teaching methods and the use of digital technologies in learning, as well as in online teaching. Training activities became more student-oriented; the modern methodological approaches used in the preparation of the modules and specific situations built on real industrial problems helped to increase the motivation of students who, preparing for classes, not only identified specific problems, but also proposed ways to solve them, learned new digital skills and technologies, a variety of applications.

The content of the courses on waste management, organized in cooperation with employers, is in line with the objectives of the new State Programme for the Development of Education and Science of the Republic of Kazakhstan for 2020 - 2025, which enabled universities to include them in the updated curricula of HEIs for academic years 2019-2020 and 2020-2021. We may also mention a spin-off - the course "Fundamentals of Ecological Biotechnologies" in three languages is included in the 2020-2021 Master Programme in the field of "Biology" at South-Kazakhstan pedagogical university (Associate partner of the project).

Process-oriented methods were used in course development and teaching. The course structure of all partner universities includes topics related to processing and disposal of municipal solid waste and industrial waste.

In SKU in the study of disciplines, students created virtual laboratory works, portfolios, prepared video presentations, conducted interviews in enterprises, used case situations related to industrial problems.

At KokSU students are motivated to solve cases and situations. The problem-based tasks of the online course were created taking into account the needs and challenges faced by enterprises. For example, such tasks as determining the level of road traffic fatalities in Akmola oblast based on statistical data, assessing the impact of the Kokshetau solid waste landfill on various components of the environment or the impact of the landfill on aircraft traffic, etc.

Along with methodology, the team focused on the development of new and updated courses aimed at developing professional competences in waste management.

The KazNU team in the frame of the Master programme «Thermal Energy», «Technical Physics», Standardization and certification (by industry) developed 4 new disciplines (each by 5 ECTS): Energy management in thermal power plants, Industrial solid waste management system, Standardization of products obtained by using «Green technologies», Recycling and recycling of waste of enterprises of thermal power industry. The courses developed in two formats - online and offline - are built as modules of the mentioned above Master programmes.

At Kokshetau University a new discipline «Waste Management of Production and Consumption» (5 ECTS) is included in the bachelor programme 6B05201-Ecology; the online course "Introduction to Ecological Risks" - are a part of the discipline «Modern Methods of Risk Assessment in Ecology»; such disciplines on waste management as «Waste water treatment», «Waste management», «Environmental assessment and environmental safety», «Waste storage and recycling» are included in the 7M05201 - Ecology programme at Master level. The discipline «Sustainable waste management» was developed and included in 8D05201 - Ecology at PhD level.

SECTION 6. ENVIRONMENTAL PROTECTION AND LAND ADMINISTRATION

The SKU team has developed jointly with employers a new interdisciplinary programme “Ecobiosafety in the agro-industrial and industrial zone" at Master level «7M05120-Biotechnology». The disciplines are closely linked to the subject matter of the project:

"Environmental design and monitoring", "Fermentative kinetics in the processing of agricultural raw materials", "Biogas technology", "Optimization of biotechnological processes for the processing of agro-industrial wastes", "Pollution problems in agro-industrial production" and "Ecological-biotechnological alternatives in agriculture".

The programme was externally assessed by the Ministry of Education and included in the Register of the unified higher education management system (UNES). A significant difference from the already existing programmes is that team members used the recommendations of the Lillebayelt Academy partners «Working with creating a framework of the new Curriculum in cooperation with local industry» which are based on an industry-centered approach to learning.

Thanks to the project, a mechanism for interaction and strengthening relations with the world of work has been established. On the basis of questionnaires, interviews, discussions and teamwork in the programme development process, employers have articulated their requirements for university graduates. Employers were actively involved in each stage of the project, sharing their opinions, practical experience, materials for the creation of case-studies and challenges, as well as their recommendations and comments to both the quality of the graduates' training and the quality of the courses. As a result, both content and teaching methods are aimed at equipping students with knowledge and skills that enhance their employability. The courses are also required for refresher training of enterprise staff.

The joint meetings with representatives of enterprises: JSC «Tartyp», Public Movement «Recycle Birge», JSC «KazWaste», AlEC, JSC Chempharm, JSC «Eco-Dump», JSC «LS Kokshetau», JSC «Kaz AgroGreen», JSC "Pro-Kazakhstanoil Products" allowed not only to identify competences, but also led to strengthening cooperation with former partner organizations and the establishment of links woth new ones.

Inviting employers to discuss the content of the courses resulted in their interest in mutually beneficial cooperation. Employers are actively involved in the training process - giving lectures, providing places of practice, interacting with potential candidates during the practice for possible employment in enterprises. Contracts have been concluded enabling students have practical training, internships and studies in the enterprises. In 2019-2020, contracts were concluded with enterprises engaged in the sorting of solid household waste in Kokshetau city «Eco-Dump» and JCS «LS Kokshetau», in Shymkent with company «Zerde-Fito», KazAgroGreen, JCS Pro-KazakhstanOilProducts, JSC Chempharm on the professional practice of students.

It can be stated with satisfaction that, as a result of the project, all Kazakh higher educational institutions involved in the present project have changed their methodology for the development of such courses; they became interdisciplinary, developed with the involvement of representatives of enterprises, take into account their needs and requests, and are focused on learning outcomes.

The activity of EduEnvi project participants also impacted on scientific directions of the departments, where adjustments were made according to the needs of the enterprises. For example, the work of Bergaliev S.A. is related to the use of secondary plastic in additive production (KazNU); Nusenova A., Seydimurat I. - to solving problems related to the bioremediation of soils from heavy metal salts and oil, and many others.

All research works were carried out on the order of enterprises. The equipment purchased in the project has made it possible for all universities to create additional recording studios with minimal post-processing and positively afrrects the quality of distance and online learning – particularly relevant under the present circumstances.

In KazNU, for example, Online Competence Centre can record online courses simultaneously with several lecturers, including visiting professors, thus reducing the time for recording and processing courses.

In the framework of the EduEnvi project, cooperation agreements have been signed between universities and research institutes: University of Valladolid (Spain); SKU and Kokshetau University; Tampere University of Applied Sciences with KazNU and Kazakh Institute of Soil Science and Agricultural Chemistry, Uspanov University of Soils and Agricultural Chemistry, "Institute of Polymer Materials and Technologies". The agreements enable academic exchange of teaching staff and students in various fields, as well as internships for Master, PhD and bachelor students and joint research.

Based on the agreement with the Valladolid University the Kokshetau University has set up «Centre of Spanish Language Studies», which contributed to strengthening mutual cooperation of universities.

Established on the basis of the National Park «Burabay» Centre for research work of Master and bachelor students of Kokshetau University has also resulted on improving the quality of studies and interaction with stakeholders.

Participation of the project team members in developing recommendations for the development of distance courses and online educational programmes, contributed to the changes in the Rules of MES RK on the Organization of the Educational Process on Distance Education Technologies at the institutional level.

A number of events were organized throughout 2019-2020 to share the project findings and enhance visibility of the project among universities and the general public, including the ErasmusDay2020, Winter School, webinars, a special section in the frame of the Annual International Conference of Young Scientists and Students «Farabi world», TV interviews, etc.

A survey was conducted to identify the attitudes of respondents to the problem of waste management, including the citizen's attitude to the problem. The project helped to intensify efforts on separate collection of waste.

The project made an impact on improving interaction between the school and HEIs in the area of professional orientation of schoolchildren. Some examples of goals and the impact of the EduEnvi project on the younger generation can be found on the Youtube channel, formed by A. Zhunuskhojayev, teacher of Nazarbayev school at https:///youtu.be/66OoAlXr2AM.

The project contributed to promoting cooperation between the university and international and national organizations resulting in the joint conducting events and conferences linked to the direction of the project. Among them: conference "Plastic Pollution: Solutions Search and Cooperation" jointly with Environmental Analytical Agency «Greenwomen» (Kazakhstan), Centre «Promotion of Sustainable Development» (Kazakhstan) with the support of UNDP and UNICEF Offices in Kazakhstan.

Botagoz Mutalieva,
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South Kazakhstan State
M. Auezov University

INTERNATIONAL UNIVERSITY COOPERATION ON LAND PROTECTION IN EUROPEAN-ASIATIC COUNTRIES (561841-JP-2015 - IUCLAND)

Objectives: *To foster international cooperation among partner Universities through the implementation of training activities (namely summer schools and workshops) dedicated to the topic of Land Degradation, at both regional and cross-regional level, by allowing the interaction among European, Far East Asian and Central Asian partners.*

Initially, the main objective of the project was to organize and conduct 6 summer schools on land degradation and their restoration. However, in the course of implementation, the project team decided to develop a full-fledged programme. In order to increase the level of knowledge of undergraduates in the field of land use in the agro-industrial complex and industrial zone, a modular educational programme "Ecobiosecurity in the agricultural and industrial zone" was developed (52 ECTS), consisting of the following modules:

- Biologics for solution of environmental problems of agricultural sector (6 ECTS).
- Ecological designing of manufactures and monitoring (6 ECTS).
- Optimization of biotechnological processes of agriculture wastes processing (6 ECTS).
- Environmental contamination problems in agroindustrial manufacture (5 ECTS).
- Theoretical and applied aspects of Biotechnology (6 ECTS).
- Degradation of lands and ecological aspects of their recultivation (6 ECTS).
- Monitoring of bioresources and methodology of biotechnology of populations (6 ECTS).
- Ecological-biotechnological alternatives in agriculture (5 ECTS).
- Foreign Language (professional) (6 ECTS).

Main objective of the modular educational programme – increasing the level of knowledge and improvement of competences of the students on the solution of the problems connected with deterioration and restoration of soil by biotechnological methods.

According to the internal university rules, there is a practice of involving employers in the development of educational programmes. For this purpose, at Biotechnology department in "Agricultural biotechnology" programme the team carried out a survey to identify needs of enterprises to training of future specialists. Among them: "Zher Ana", company producing bio fertilizers, Scientific institute of livestock and crop production, representatives of other stakeholders interested in land protection who gave their suggestions and recommendations to the content of the programme and required skills.

In the course of training, interested enterprises provide base of practice, that gives learners the chance to acquire practical and technical skills through work on farms and in industrial enterprises. Thus, the requirements for specialists are identified and taken into account both in the preparation of educational programmes and in the course of their implementation.

Respectively, the percent of employment of bachelor graduates in Biotechnology made up 64.3% in 2017, 61% in 2018, at Master level the results are higher (100%).

As noted above, one of the original objectives of the project was to organize and run six summer schools. This component has also been successfully implemented. Within the framework of the Schools, students and teachers from partner countries have received training in higher education institutions in Italy, Slovakia, Croatia, China, Kyrgyzstan and

Kazakhstan, which has contributed to the improvement of knowledge not only in the field of land degradation, but has also enhanced communication abilities of all participants, contributed to broadening the horizons of team members, made it possible to get acquainted with culture, traditions, cuisine, language of host countries.

The educational activity of the students also took place in relations with intrenational students and professors, where success was determined not only by knowledge of the subject matter, but also by the level of proficiency in the English language, which also motivated the participants of the project to study it. This has led to a variety of relationships that have had a significant impact on training results through the exchange of scientific information, support and mutual assistance in the search for and evaluation of the results of joint work. And now, after the project is completed, students and teachers continue to communicate on social media, supporting each other during the Coronavirus pandemic, in particular colleagues in China and Italy.

Computer and information technologies are firmly embedded in the educational system. The teaching, methodological and scientific activities of professors and lecturers are closely related to the possibilities of computer technology and the use of Internet resources. The creation of a single scientific and educational information space, integrated with the world's information infrastructure, enables the teaching staff to improve and facilitate their work.

The results of the project and the equipment acquired from the project budget are used by students and professors of the Department of Biotechnology, as well as by partners and persons interested in land degradation issues. The Internet-based training allowed the use of teachers' video-lectures, case-studies, tests to prepare for the examination session, as well as to broaden the horizons, possibilities to study materials related to land degradation, microbiological and biotechnological methods of water purification, etc.

Theoretical material is especially well acquired in a working situation, in industrial conditions. For the purpose of acquaintance of students with biological methods of sewage treatment, on discipline "Ecological biotechnology" associate professor of Biotechnology department A.A. Saparbekova and students visited treatment facilities of Shymkent: "We came to an excursion to study biological methods of sewage treatment in practice. Our students looked how it is possible to receive biogas, how electric power is used, saw possibilities of sewage treatment actually to such a minimum that it can be used as irrigation water for farmlands". https://otyrar.kz/2019/12/studentov-yukgu-otpravili-na-ochistnye-sooruzheniya-shymkenta/

The competitiveness of the State in the phase of globalization is directly linked to the solution of acute environmental problems; this is considered a priority for all developed countries.

The involvement of partner countries geographically close to each other (China, Kazakhstan and Kyrgyzstan) has also shown the similarity of regional problems that have led to land degradation. Participation in the project, sharing best practices from European partner universities, has improved knowledge of land protection, desertification, erosion and salinity. The review and research materials jointly published have also had a positive impact on the educational process as a whole.

Already today, about 60% of the land cover of the Republic of Kazakhstan is to a certain extent related to degradation, depending on the characteristics of the environment and its economic use. Land protection specialists are needed for possible soil restoration. SKU students studying Biotechnology participated in the IV International Student Scientific Conference in Moscow, which took place from November 25, 2019 to February 15, 2020

(online). At the conference, the work of five countries (Russia, Kasakhstan, China, Belarus, Uzbekistan) in 26 scientific fields, including ecological biotechnology, was presented. The best scientific work of SKU student Radmir Kasymov (a sparticipant of summer school) on the topic "Study of phytotoxic activity of soil and soil micro-organisms of the Turkestan region" was acknowledged as the best one.

In November, 2019 the specialty 'Biotechnology' underwent the procedure of the international specialized accreditation. 1 student and 2 undergraduates who were earlier involved in the IUCLAND project participated in the interview. In the conversation the experts praized the participation of staff and students in the international projects, noted the added value of the training at Summer schools in the European partner higher education institutions.

Almira Saparbekova,
Project Manager,
SKU named after M Auezov

NEW AND INNOVATIVE COURSES FOR PRECISION AGRICULTURE (597985-JP-2018-KZ - NICOPA)

Objectives: *To modernize curricula in precision agriculture using new technologies – Geographic Information System/GIS, big data, remote sensing – through analyzing and updating existing curricula according to educational needs; developing new certified cirriculla according to the new achievements in the area, the labor market demands and the Bologna Process; to test innovated curricula and to disseminate the results.*

One of the main results of steel developed by all participating higher education institutions new and the focused training programmes of disciplines updated practice-on exact agriculture at the level of a bachelor degree and the magistracies supported with innovative tutorials.

The methodology of their development is based on joint, with involvement of representatives of scientific organizations and enterprises of agrarian sector, planning of the results of training necessary for course development. Courses are developed taking into account the student-focused approach, provide use of innovative technology of training (design method, Case study, "the turned training", etc.). At their development the project team was guided by the recommendations about quality indicators for drawing up syllabuses, the procedure of reviewing and accreditation of courses (EMCD) developed with the European partners. When developing new and innovative courses the emphasis is placed on use of cross-disciplinary approach and modern intellectual technologies in the Geographic information system (GIS) field, BigData, Remote sensing of Earth.

Results of training decided as a result of questioning of employers and discussion of programmes at departments' meetings with participation of employers, their stage-by-stage consideration on methodical councils of faculties and scientific and methodical council of university. The deep analysis of the received comments and reviews from the organizations and leading experts in this industry with recommendations and the list of disciplines which, according to them, need to be included in working curriculum was carried out. According to the recommendation of representatives of JSC National Company Kazakstan Garysh Sapary, Naydorovskoye LLP, TNK Agricultural firm, "North Kazakhstan Experimental Agricultural Station", Astana — Phoenix for the purpose of improvement of quality of training of experts the practical preparation in the field of exact to agriculture for the subsequent assessment of results of the carried-out work in the field was strengthened.

Programmes are developed according to the National frame of qualifications and professional standards, the Dublin descriptors and the European frame of qualifications.

Disciplines became a part of educational programmes in all Kazakhstan HEIs consortium members.

So, in SKU of M. Kozybayev the contents of 6 educational programmes of a bachelor and the 5th master degree, among them are updated: Agronomics, Forest resources and forestry, Radio engineering, electronics and telecommunications, Instrument making, Astronomy and methods of remote sensing, Physicist and physical examination.

In KATU of S. Seyfullin new EP "Exact Agriculture" for undergraduates was improved due to inclusion of cross-disciplinary and innovative courses: "Remote sensing and application of TSH and environment", "Management and decision-making in exact agriculture", etc.

At Kokshetau university of Sh. Ualikhanov, educational programmes Agronomics (bachelor and master degree) are upgraded; Agrarian equipment and technology (bachelor and master degree).

SECTION 6. ENVIRONMENTAL PROTECTION AND LAND ADMINISTRATION

New disciplines developed within the project:

1. Remote sensing of Earth - 5 ECTS;
2. Use of images SENTINEL 1-2-3 for monitoring of agricultural fields-4 ECTS;
3. The global navigation satellite systems (NAVSTAR, GLONASS, GALILEO, etc.) – 3 ECTS;
4. Optimization of algorithms of computer sight and realization in real time - 4 ECTS;
5. Web technologies (Agro SDI, Geoportala, Geoservices, Geoanalytical systems) – 3 ECTS;
6. Technical support of technological processes in exact agriculture system - 5 ECTS;
7. Productivity sensors for exact agriculture - 3 ECTS;
8. Physics and chemistry of soils - 4 ECTS;
9. Forage production - 3 ECTS;
11. Management and decision-making in exact agriculture - 3 ECTS;
12. The statistical analysis and spatial modeling – 3 ECTS;
13. Ecological aspects of exact agriculture - 3 ECTS

Updated disciplines within the project:

1. Remote sensing of the Earth - 8 ECTS;
2. Use of pictures of SENTINEL-4 ECTS;
3. The global navigation satellite systems - 3.5 ECTS;
4. Web technologies (Agro SDI, Geoportala, Geoservices, Geoanalytical systems) – 3 ECTS;
5. Bases of exact agriculture - 5 ECTS;
6. Productivity sensors for exact agriculture - 3 ECTS;
7. Physical properties of soil and their measurement - 4 ECTS;
8. Application of exact agriculture in crop production - 4 ECTS;
9. Management and decision-making in exact agriculture - 3 ECTS;
10. An intensive course on use of new technologies "in field conditions" - 2.5 ECTS;

The developed new and innovative courses focused on practical activities and form of ability creative use of adjacent knowledge of experts. Implementation of innovative technologies and tools, use of the necessary software, sensors, the special equipment and systems give the chance of increase in production efficiency of products of agriculture.

For example, in KATU of S. Seyfullin in new master programme "Exact Agriculture", 9 programmes of a master and bachelor degree are updated (Agroengineering, Selection and reproduction of page x. animals, Stern and feeding, Management of land resources, Geodesy and cartography, Applied geodesy, Agroecology, Agrochemistry, Agronomics).

Curricula of all HEIs received the positive decision of the Academic Councils of HEIs, their independent external examination by experts of Bologna Process Center of MES RK is carried out, they are included in UCSHE (Uniform Control System of the Higher Education)

As a result of the training events organized by the European partners, members of the team mastered new knowledge and skills. Especially important they consider acquisition of

technical skills of work with the equipment, skill of processing of satellite data and research skills when studying methods of interpretation of data of Remote sensing of the Earth, a technique of system work on development of design thinking of students, skills of project work in team, development in students of social and leader competences, independent search and the analysis of specialized information. The project promoted increase in level of language training, motivation to further learning English, development of skills of business communication, including at the international level, skills of recording;

The important result of training, according to them, is a contribution of the project to professional development, development of skill of interaction with various categories of representatives of the sphere of exact agriculture, including engineers, IT specialists, farmers, academic staff, governmental employees, uses of modern communication means for creation and dissemination of information on the project, for business communication.

During passing of a training many members of the team learned processing of experimental data after static processing, to their reduction to very high precision, ability to quickly solve objectives, to find the correct solution in extreme conditions, mastered new knowledge for teaching special disciplines in the directions of a system of collecting and data processing, the system of artificial intelligence, the system of computer sight. They also got acquainted with a technique of use of space and geoinformation technologies for maintaining TSH, mastered skills of work with downloading and use of pictures from the websites sentinel-hub.com, glovis.usgs.gov, digitization of cards as a result of training events.

Along with professional knowledge in the field of the Geographic information system (GIS), BigData, the remote sensing of Earth (RSE), exact agriculture, participants highly appreciated a technique of development in the studying such universal competences as ability to adapt and generalize results of modern economic and agroecological researches for teaching cross-disciplinary courses.

During implementation of the project language competences of many participants of the project which allow them to conduct special disciplines in English considerably improved, to give classes at the international summer school in 2020 (Prague is July), in 2021 (Nur-Sultan - June).

Interaction between participating higher education institutions of the project and the enterprises of the agrarian sector improved. To some extent it was promoted by creation of the new equipped PAL laboratories (Precision Agriculture Lab), a virtual class (Virtual Class Room – VCR) and Office of PASO (Precision Agriculture Service Office) which mission – dissemination of knowledge in the field of exact agriculture among farmers.

PASO activities: marketing of needs for exact agriculture and development of the corresponding services for various target groups; development and deployment of training courses and/or developing the skills of various target groups, support of associations of farmers, etc. The office of PASO can be considered and as an integral part of the new or existing student's startups for the enterprises for development of innovative technologies, business incubators, science and technology parks or divisions. Creation of PASO allowed to systematize work on dissemination of knowledge and to come into closer contacts with farmers.

One of the main objectives of PASO - holding seminars on exact agriculture for various target groups. Such seminars were organized for specialists of agro-industrial complex, teachers of higher education institutions of the Republic of Kazakhstan, workers more than 20 farms of farms. In total more than 1600 listeners are trained.

SECTION 6. ENVIRONMENTAL PROTECTION AND LAND ADMINISTRATION

Cooperation of higher education institution with the leading European universities positively promotes strategy implementation of internationalization of higher education institution, positively affects the general image of the universities, increase in their appeal to entrants. In plans of team of the project – creation of the joint international edition on exact agriculture, preparation of publications in English, joint conferences, training, development of two-degree education.

Sarah Kitaybekova,
Head of International Cooperation,
KATU named after S. Seifullina

SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT (561969-JP-2015-DE - SARUD)

Objectives: *To develop a professional Master programme on sustainable agriculture and rural development tailored to the demand for professionals of public services, local and regional government, private service providers and enterprises.*

Of the total number of 120 ECTS 90 ECTS were developed in the process of designing the SARUD programme. It can thus be said that the programme is essentially innovative; it responds to the demands and needs of the agricultural sector and is based on a situation analysis of the labour market and needs survey of stakeholders; The specificity of the scientific-pedagogical SARUD programme is its articulated interdisciplinary character, which is visible both in its overall structure and in the content of each separate discipline in specialities «Economics» and «Agronomy». Experts from the agricultural sector, development institutes and the academic community participated in the design and review of the programme, both at the design stage and after its completion. Interdisciplinarity fully meets the requirements of the sector and society as a whole, since at present there is an increasingly growing trend towards the integration of scientific knowledge and the complexity of the most important aspects of evolution. There is a growing need for creative professionals with a broad vision, developed critical thinking, capable of handling complex information and making responsible decisions.

Participation in the project has helped to upgrade qualifications of economic and agricultural teachers. As part of the implementation of the project, teachers from Kazakh partner universities in the fields of bioeconomics and agro-ecotourism were trained in further training courses. Teachers and members of the working group have acquired new knowledge in the development of interdisciplinary educational programmes and have mastered new teaching methods. The experience gained by the project participants led to building capacity in the organization of advanced training courses in sustainable rural management both in the context of optimization of economic costs and profit-making, as well as on the implementation of advanced crop and livestock technology in the region, through the introduction of elements of sustainable rural development. 2 manuals on “Sustainable Agricultural Technologies: Crop Production, Agro-ecotourism” were prepared for publication authorized by Republican Education-Methodological Council.

The content and methodology of the SARUD Master programme are aimed at equipping learners with interdisciplinary professional competencies in sustainable agriculture and rural development. The teaching and methodological documentation of the educational programme (Study plan for the entire period of study, Study programmes, Modular Programme, Catalogue of Elective Disciplines, Sillabus of Disciplines (units), including the evaluation system, has been fully developed, Educational and methodological complexes of disciplines).

The practical orientation of the Master course "Sustainable Agriculture and Rural Development" has been strengthened through teacher training. Positive experience has been gained in the development of joint courses, webinars, online seminars, books of experts, catalogue of elective disciplines based on the EU model. In their work teachers use a wide variety of methodological techniques (brainstorming, group work, case-studies, visualization, business and role-playing, other activities). These were developed by module designers and teachers of the Master programme trained in the frame of internships and trainings in the SARUD project partner universities. In the teachers' arsenal are the ability to use cognitive and didactic games,

quizzes, discussions, creating and solving problem situations, analyzing specific situations, learning by algorithm, “immersion”method, interviews, expert analysis and many others.

The dynamics in the number of applicants is increasing – from 8 in 2017, 21 in 2018 and 19 thereafter. There are students from other countries (Afghan citizen) among the students.

Experience shows that individual modules and author’s courses are demanded among specialists of enterprises and can be used as refresher courses organized by the Insitute of further training of universities. The first training, organized for representatives of employers, showed that the course «Organization of entrepreneurial activity in rural areas» with a focus on land issues for village akims, employees of agricultural departments at the regional level, «Management of rural development», «Ecological concepts of sustainable agriculture» are of great demand. They are attractive not only to former graduates (agronomists, economists, sociologists, environmentalists), but also to people with practical experience, both in agricultural enterprises and in public administration organizations, including regional agricultural administrations/akimats.

The knowledge platform and networks on sustainable agriculture and rural development established by the project, integrated with international and regional case studies, continue to be used by interested organizations and individuals.

The SARUD teaching and learning materials (complexes) are being further upgraded and updated. It is planned to use the advanced variants of modules also in PhD studies.

To this end, the project team, in addition to the internal system of quality assurance, continues the review of the programme content and methodological materials by well-known specialists, representatives of enterprises and other universities. The productive cooperation of Kazakh project participants with foreign and Kazakh experts helped to ensure the most optimal combination of disciplines in economics, sociology, ecology and technology in the Study Plan, as well as their content up to the level that meets modern requirements. Quality assurance of the SARUD programme was carried out by external experts and is included in the National Register.

In April 2019 the KATU SARUD programme was accredited by the Independent Agency for Accreditation and Rating (IAAR) for 5 years.

Nadezhda Meleshenko,
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KATU named after S. Seyfullin

TRANS-REGIONAL ENVIRONMENTAL AWARENESS FOR SUSTAINABLE USAGE OF WATER RESOURCES (561775-JP-2015-DE - TREASURE-WATER)

Objectives: *To contribute to empowering of universities by enhancing synergy between HE and enterprises in the field of Transboundary Water Resources Management (TWRM) based on national and European standards and taking into account regional peculiarities.*

A key outcome of the project was the development and validation of a strategy and a trans-institutional model for the interaction of universities and enterprises in transboundary water management.

The development strategy of the trans-institutional IALP model is determined by socio-economic and pedagogical factors. The creation of an innovative, competitive professional education system is the economic strategy of the model for the successful development of production.

The social strategy for model development is the provision of job security for graduates in accordance with the acquired specialty.

The pedagogical factor of the strategy consists in the joint design of educational activities, the content of education, the competencies and qualifications of graduates, the organization of industrial practices, traineeships for teachers, and further training and retraining of specialists.

The Industry-Academy-Learning Partnership (IALP) model of interaction is implemented on a mutually beneficial basis, but the parties involved are directing efforts towards the improvement of professional education. The main areas of cooperation within the partnership are: Mobilization of additional resources for the conduct of refresher courses and modules on transboundary water management in the Republic of Kazakhstan, Defining the content and assessing the quality of training for the water sector; forecasting needs, shaping the labour market and education services; developing a legal and regulatory framework for partnership.

A Committee for Monitoring and Evaluation of the Interaction between the Academic and Water Sector has been established as a working body for the implementation of the Model.

The implementation of the IALP model has helped to increase the interaction between universities and water-related enterprises. Further training courses for specialists, based on the needs of the sector, are in demand and help to build trust and strengthen mutually beneficial cooperation among enterprise representatives. Company representatives participate with teachers in the development and teaching of modules on efficient use of water resources, legal aspects of transboundary water management. Cooperation takes the form of an increase in the volume and geography of industry hosted practices in university curricula, increased employment opportunities for graduates, joint research, organizing consultations and developing strategic documents on water resources management.

The strategy has been effective in:

- The number of partners from the production sector has increased. The partner base includes such organizations and companies as Esil Basin Inspection, «Kazvodhoz», KazAqua, Sherubay-Nura Basin Inspection, Kazhydromet. This provides more opportunities for learners to have better and more practice bases and to conduct research.

- Involvement of transboundary water management partners in the educational process. Specialists of the KazAqua Company and the Esil Basin Inspection took part in the design of the disciplines «Integrated Water Management» for the 6B052 «Environment» Master programme. As a result of the course, the students noted the relevance of up-to-date data on the state of the water resources of Kazakhstan and transboundary areas and its usefulness for employability. As a result of strengthened partnerships, the percentage of employment of Master graduates increased from 60 to 80%.

- Strengthening partnerships through training courses and the use of E-learning laboratory. In September 2020 35 participants attended the online courses for the water sector despite the quarantine. As noted by the participants, the course «Water Safety» covers various aspects of water safety, environmental, legal and social issues.

Thanks to the participation in the project, the professional qualification of the teachers of the Department of Management and Engineering in the field of environmental protection of ENU in the management of water resources of transboundary water use, environmental monitoring of transboundary waters has improved noticeably. Research activity has increased - the number of articles in journals with impact factor, the number of Master theses and dissertations on cross-border management aspects has increased (ENU has prepared 3 diploma projects in the field of ecology). Improved English language competences of the team members (Beisenova R.R., Zhamangara A.K., Akbaeva L.H., Amanbek Z.) has resulted in the increased number of courses taught in English from 3 to 7.

It is also important to note the increase in knowledge and skills in the digital educational environment, which has had a significant impact on the prompt adaptation of teachers and learners to distance learning under the coronavirus situation.

The courses «Integrated Water Resources Management» developed in the framework of the project are included in the Master programme «6M060800 -Ecology». Ten Master students have been trained in this discipline. The discipline «Water Safety» for doctoral studies, which was developed jointly with university partners, also became part of the university's educational programme.

In the course of the project implementation, cooperation with a number of structural units of the University was strengthened, such as the ENU Institute of Further Educatio, through which further training courses are promoted and administered; The Centre for Distance Technologies is responsible for the technical support of the Moodle platform (Water Safety course).

Three years of close cooperation with the consortium's higher education institutions has opened new avenues of cooperation. Applications have been developed and submitted on water treatment and management projects with the University of Capodistrian, Greece. Scientists of the Tyumen State University and Capodistrian University are involved in the preparation of PhD candidates as foreign supervisors.

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STRENGTHENING NETWORK EDUCATION, RESEARCH AND INNOVATION IN ENVIRONMENTAL HEALTH IN ASIA (573640-JP-2016-IT - TUTORIAL)

Objectives: *To strengthen research capacities in Partner countries in areas of public health through tuning existing PhD studies, development of new MSc programmes and implementation of blended learning approach.*

The project was implemented in six work packages. The activities of the First Package were mainly educational, so their results were more visible at the individual level. For example, team members have mastered and successfully applied blended learning methods, including Google and Kahoot interviewing, using Camtasia for distance learning, preparing and recording video lectures. The project helped to develop research skills, to learn the methodology of interdisciplinary and cross-level education of bachelors in nursing and interns in General Medical Practice (GMP). Within the framework of the project, teachers learned to correctly plan the module, discipline, the content and architecture of the module. The acquired knowledge and analytical skills helped participants to analyse the indicators of the local health system and geo-location systems professionally. All project participants note significant progress in English language development: earlier it used to be a few traditional and short phrases about name, age, place of residence and education, now they are able to present in sufficient detail in English, the nature of their activities in the project and to make a presentation during and after the project.

To address the second objective of the project, relating to the updating of the education programme in the field of environment, occupational health and public health, the participants focused on the development of a new Master's Degree in Health and Medical Prevention (HMR).

All universities have created map-based programme matrices - skills and competences. These are new sections of the programme that provide a detailed description of the expected results of their implementation and the related estimates. The programmes were developed in accordance with European standards, details of which were provided to the project participants during master classes at European universities. The introduction of requirements for the skills to assess the impact of different environmental factors on human health made it possible to describe in detail the competence of «Ability to apply scientific principles, methods and knowledge». The new review principle, involving a student, an employer and a teacher in the process, has led to a redefinition of the expected outcomes of the Public Health Master's programme.

The new approach to the content and structure of the HMR programme has made it possible to analyse the needs of both employers and trainees. It is well known that ensuring such conformity is a central feature of quality education. It is important that the development and evaluation of new and updated programmes was supported by experienced specialists, experts of the project, for example, specialists of the NCE «Atameken».

These are, in a way, detailed technical tasks for each objective.

In the **Semei medical university (SMU)** the Master programme was replenished with a new discipline (3 ECTS) «Hygienic evaluation of influence of environmental factors on public health». The development of a programme of such relevance for Kazakhstan, and especially for Semey, will enable university graduates to study professionally the problems of air pollution, drinking water and soil in villages and towns; to assess the risks to the health of

the local population under the influence of radiation and chemical factors; to conduct an analysis of the morbidity of the population, hygienic and preventive measures to reduce the risk to the health of the population of the region.

In **KazNMU** the Master programme included 7 new disciplines in the specialty “Medical and Preventive Care and Public Health”; at PhD doctoral degree - 4 disciplines in specialties “Public Health and Medicine”.

14 new disciplines were developed in the frame of Master Programme in Occupational Health, Environment and Public Health in Karaganda Medical University in line with the needs of stakeholders. Peer reviews were received for 28 disciplines. In all new and updated programmes, learning outcomes were based on International Labour Organization and World Health Organization standards, as well as of the Association of Schools of Public Health in the European Region, which also corresponds to the health development programme of RK «Densauliq».

The main advantage gained by universities by introducing new curricula and modules based on the needs of internal and external stakeholders in the content of the proposed education – is their real focus on training of high-quality, labour-market-required human resources. The quality of their training is ensured by compliance with both national and European standards.

The development of programmes and modules was accompanied by the introduction of new teaching methods, including blended learning. The interns and bachelors were interested in the new methods and appreciated the practical value of the skills acquired in the course of study.

As noted by the GMP interns, «We can immediately use the developed tools with patients, and Whatsapp is very convenient to use when communicating with patients to impact their behaviour». The practicality, relevance and effectiveness of these techniques were fully demonstrated in the case of Covid-19, where doctors were required (in addition to professional knowledge) to be of such qualities as promptness, ability to communicate, human exposure, use of modern means of communication.

At **SMU** the new 3 modules developed in the project are used in the distance learning format using the Moodle platform. The teachers knew it before, but they didn’t use it. During the project and in the process of introduction of the new modules, confidence in the necessity and competence of the application of the mentioned approach was created. The acquisition of new, more versatile tools, skills and competencies in the new programmes, disciplines and modules has not only had a significant impact on their specialized, substantive training, but also the development of cross-cutting/universal competences, or 21st century skills including critical and innovative thinking, interpersonal and personal skills, media and information literacy, etc. This, in our opinion, is the most significant impact of the project. It is this integration of subject-matter and universal skills that determines the professionalism of a modern professional in any branch.

In addition to introducing new curricula and teaching methods, all participating universities, through the project, have set up well equipped E-Labs to conduct various training activities, including distance learning.

The establishment of an E-Labs in universities helps to disseminate the experience of project participants, but also enhances the competence of staff and trainees in the field of study and use of ICT, makes it possible to apply this modern electronic potential under the pandemic.

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The project has had a significant impact on many aspects of the activities of the participating universities. KazNMU has introduced a strategy to develop distance education, including blended learning.

The university is piloting Whatsapp, Instagramm tools for teaching. The Faculty of Public Health was recognized as the best for the results of scientific activity in the Republic of Kazakhstan since 2018, and research publications of the project played an important role in the ranking.

KMU focuses on student-orientation, strengthening the university's research mission, development of cooperation and active interaction with Kazakh and foreign university partners in educational and scientific aspects support for capacity building of academic staff and students.

SMU has increased communication and experience in participating in Erasmus+ CBHE projects, and plans to develop new projects in the future. Horizontal linkages are being actively developed between the international division, the strategic development division, etc.

In all universities, academic staff iis continuing developing professional English skills, methods of blended learning, participates in the «Journal Club», which contributes to the development of critical thinking and joint research work skills. E-Lab have become stable growing points for the development of professional skills of staff, Master and PhD students. The joint development of modules with colleagues from other partner universities has made it possible to find points of interaction between staff and students. The sustainability of the network is ensured by strengthening the links between staff and expanding scientific cooperation.

To familiarize individuals and institutions outside the project consortium with the results of the project, the team members participated in various meetings and conferences (2018 and 2019) in Kazakhstan and Central Asian countries; the results were also shared via joint publications.

Karlygash Toguzbaeva,
Head of the Department of Hygiene and occupational medicine,
KazNMU named after S.D. Asfendiyarova

DEVELOPING TRANS-REGIONAL INFORMATION LITERACY FOR LIFELONG LEARNING AND THE KNOWLEDGE ECONOMY (574157-JP-2016-IE- DIREKT)

Objectives: *Furthering the Bologna Process for a Europe of Knowledge by developing Information Literacy (IL) programmes for use in curricula in HE+ Society at large.*

In order to successfully implement the principles of lifelong learning in the Republic of Kazakhstan, issues related to the development of information literacy skills, the application of rules and standards of quality academic writing, knowledge of academic integrity and preventing plagiarism must be addressed. Libraries and information literacy are essential components of lifelong learning. In this context, the implementation of the **DIREKT** project is expected to have a significant impact on the harmonization of European principles of LLL in the Republic of Kazakhstan, aimed at meeting the information literacy training needs of librarians and academic staff, with further transfer of knowledge to students and other interested persons.

In line with the main objective of the project, the team has developed an information literacy curriculum of 8 modules in three cycles (bachelor's/master's/doctoral):

Module 1: English for specific purposes

Module 2: Marketing skills of academic staff librarians (Theory and practice)

Module 3: Information Literacy 1 (for Librarians to train them to help learners find and use information effectively and ethically)

Module 4: Information Literacy 2 (for librarians to train them to help learners access information online and in print)

Module 5: Information Literacy 3: Innovative online library services for 21st century librarians

Module 6: Information literacy and Academic Writing 1

Module 7: Information literacy and Academic Writing 2

Module 8: English for specific purposes 2

The development of the modules was carried out in cooperation with employers, who participated in the discussion of the results of the training, advised on the technologies used in the library field, evaluated the quality of the modules developed, including all major libraries in Kazakhstan (National Library of the Republic of Kazakhstan – Almaty; Central Library System of the City of Almaty; National library for blind and partially sighted citizens, others.

All 8 modules of the DIREKT information literacy project have been introduced in 3 partner higher education institutions of Kazakhstan (KATU, KazNU, KRU) to make library and information services accessible to students. The developed modules can be integrated into training disciplines or can be taught as separate disciplines. The discipline «Information literacy» is included in the catalogue of elective courses of KATU for Masters of all specialties of the university. The introduction of the modules into the training process has helped to improve the teaching methodology. For example, in KATU the content of the discipline «Foreign Language» was integrated with the modules of academic writing (Modules 6,7) and modernized by the inclusion of such educational technologies as conducting online-Forums in which specific situations and/or problem situations are discussed for decision-making; research-based training methods that allow for self-knowledge, in-depth understanding of the problem under consideration and propose solutions and reinforcement of teamwork.

Modules 1, 6, 7 and 8 developed in KRU are implemented in the teaching of the discipline «Foreign language for specific purposes» for non-linguistic specialties at the postgraduate level (module 6). The new discipline «Information Literacy and Academic Writing» (Module 7) was introduced in the Master's Programme «Foreign Philology». Module 8 is implemented in the discipline «Business Communication Language» of Foreign Philology 3rd year of bachelor level studies. Module 1 is implemented in English language courses for librarians.

Acquaintance with European approaches in the field of information literacy has made it possible to make significant changes in the content of the educational programme of KazNU «Library Business». Based on the needs analysis, IL modules were identified for inclusion in the education programme «Critical Analysis of Information Resources»; «Electronic Libraries and Databases for Research»; «Design of Websites and Portals of Online Platforms»; «Information literacy: Innovative online library services for 21st century librarians»; «Library's marketing for research» (the course in English). «Book communications in the library-information sphere» (course is in English).

There have been significant changes in the teaching methodology: disciplines have become practice-oriented with the possibility of working on the online platform LibGuides. The content of educational programmes is based on international information literacy standards. In 2017, in the specialty «Library Business» dual education with the National Library of the Republic of Kazakhstan was introduced

The developers of Module 1.7 created a new syllabus for teaching English to librarians, taking into account the specifics of library terminology, which was agreed with the experts of the DIREKT project. The teaching methodology is based on the CLA communicative approach to English language learning, which is an example of a student-oriented approach to English language learning, in the context of library science.

This teaching methodology includes active learning in which students solve problems, answer questions, formulate their own questions, discuss, explain, debate or brainstorm during classes, and co-education, where everyone works in teams on problem situations and difficulties that are as close to reality as possible, that is, with an inductive approach to learning. Methods of «brainstorming», «jazz» trainings, method of «facilitator», project method, etc., were also used. The methodology of syllabus development was implemented in accordance with the Dublin Descriptors, the European Framework and the National Framework of Qualifications for Higher Education.

As part of the course on academic writing, meetings were organized with native speakers and Kazakhstani scientists, methodologists and authors of educational materials with considerable experience in publishing in the international scientific community. The potential of using up-to-date EU experience in the field of information literacy is strengthened and developed thanks to the trainings conducted on the materials of the online platform(http://direkt-kaz.libguides.com/?b=p), language courses in the libraries of partner universities with the participation of non-academic partners, associated partners and public organizations.

Partner universities offer regular trainings are held for students, researchers, employees and librarians, based on the DIREKT training modules, aimed at improving skills in finding relevant information and in critical analysis of sources of information.

The acquired knowledge and skills in search and evaluation of sources of information in KATU is confirmed by the significant increase in the number of published scientific articles in

journals indexed in databases Scopus and Web of science (in 2015 - 99 articles, in 2020 - 690 articles). As a result of advanced information and academic skills, undergraduate, Master and doctoral students have become increasingly involved in research projects of KATU professors and scientists as research assistants for various studies and experiments, collection of the database and subsequent reflection in scientific articles. Participation in student conferences, essay writing competitions during the annual National Awareness Day on IL and academic writing has increased as a result of the updated courses.

The DIREKT project has contributed to the modernization of university policy in the field of quality, which has resulted in the development of the culture of academic writing and the observance of the principles of scientific ethics.

The implementation of the project has had an impact on the level of individual participants and team members – it helped to enhance the level of English language proficiency of library staff who had not previously studied the language, up to A1, A2. In KRU – 10 people, KATU – 6, and in KazNU – 18 people.

According to the results of the Module 1 (English for specific purposes) in KazNU 12 people have improved their level of professional English.

The project allowed to develop the competences of librarians to work with the online platform https://springshare.com/libguides/. The section «Cataloguing and Classification Standards» with comprehensive information on library cataloguing standards was particularly useful. Mastery of educational innovative technologies allowed KRU librarians to increase efficiency of work, reducing time for searching library materials

Staff members of the Library were involved in traininga on working with the information electronic resources and databases of the Library. It was these trainings that became the growing points of librarians' professional competence and skills, which affected the quality of their work and services.

The new knowledge and skills has enabled library staff to develop new training in information literacy for trainees, teachers and staff. On the basis of a user survey, priority training topics were identified. The staff of KATU Library developed a series of trainings: «Methods of selection of scientific journal for publication», «Impact factor and other indicators for scientists», «How to collect complete information about the scientific journal: qualitative indicators of the journal in Scopus and Web of Science DB, guide for the author, magazines - predators», «Academic integrity: how to avoid plagiarism?» and «Tools for creating bibliographic links - EndNote».

The training activities have resulted in enhanced professional qualification of the librarians, which, in turn made an impact on the changes in the structure of the libraries, creation of new units. In KATU Department of Scientific and Information Resources was created - its main function is to provide advisory services in the field of information search and evaluation, to develop and conduct information literacy training for KATU teachers and scientists, to develop information literacy guides on the SpringShare platform, creation of databases of information resources, organization of trainings «Overview of open access scientific resources» and «Tools for creation of bibliographic links - EndNote» for library users. A number of guides were developed as well.

As a result of the project impact at the institutional level, cooperation and networking with international partner institutions, exchange of experience in library management, possibility of updating and disseminating the knowledge and then adapting it to the conditions of their university were emphasized.

The project has had a major impact on the development of libraries, directing their development paradigm and providing the basis for the restructuring of the library. To increase efficiency, existing departments were modernized, in particular at KazNU. The Methodological Centre, which was responsible exclusively for the scientific and methodological work of the Library, has been transformed into the «Centre for Development and Communication», which is now responsible for a wider range of activities, including training of staff, scientific and methodological work, project activities, external communication, strategy development and maintenance, etc.

The purchase of a seven-year license for the use of LibGuides - an online content management platform for the library - allows for the development of the university's library. Online platform SpringShare has provided an opportunity to modernize online library services, as the seven-year license package included in the project includes a list of the following products: «Thematic guides» (LibGuides), «Ask the librarian» (Ask a Librarian), «Base of library electronic resources» (A-Z Database List), the rubric «Frequently asked questions» (Frequently asked questions) and the platform «Subject librarians» (Subject Librarians).

This online platform is integrated with the site of, namely, the scientific library KATU (library.kazatu.kz), the content of which is periodically revised and updated.

The KazNU team notes the impact of the project on internal teaching procedures at the university. These include the intensification of the English language training of academic staff and of the staff of the Al-Farabi Library, the development of new syllabuses, updating of professional competences, etc.

The impact of the project on the management of the university is visible also in strengthening the international and innovative capacity of KazNU, increased university's cooperation with partner universities in the framework of double-degree education and international recognition of academic degrees (Mordovsk Ogarev State University, Petrozavodsk State University - Russia), publication activity of scientists and professors together with partners in international publications.

Additionally, KazNU has developed a general «Plan of Measures for Implementation of the Road Map for Development of Trilingual Education for 2015-2020», which includes aspects of academic and scientific activity. The project activities contribute to the realization of the objectives of quality external mobility, multilingual education, an increase in the number of programmes in English, expansion of the direct links of KazNU with international HE institutions.

Similar processes of internationalization have been under way in KATU and KRU, thus facilitating the integration of the institutions into international educational space and strengthening the internationalization of the institution.

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MODERNISATION OF HIGHER EDUCATION IN CENTRAL ASIA THROUGH NEW TECHNOLOGIES (598092-SP-2018-BG - HiEdTec)

Objectives:

- *To develop Concepts of adaptating the educational system to the digital generation considering the specific conditions to each of the Central Asian countries;*
- *To create Centres for Innovative Educational Technologies (IET Centres) in partner HEIs of RK and steady academic network between HEIs of RK and the Central Asia countries for materials and the best practices exchange in the field of innovative educational technologies and didactic models.*

The project isn't complete, but it is already possible to tell with confidence that intermediate results of the project had considerable impact both on individual participants, and on members of the team in general. So, for example, certain participants had a motivation to improvement of skills of English through receiving second higher education. A part of members of the team attends courses on learning English with delivery of IELTS (7.5 points). Participants deepened knowledge of the organization and carrying out remote training online, updated video lectures for students on technology on which studied at courses within the HiEdTec project. Knowledge gained during skills development allowed to use in daily work the practice-focused cases - OBS Studio for record of lectures, a video conference the Bigbluebutton system and the ZOOM platform for the organization of online classes, to apply an ultra-short-focus projector to holding interactive classes, improved skills of interaction with audience and feedback. Tools for creation of the interactive presentations about online are mastered by poll of i-Spring, record and video cutting of the materials Movavi Video Suite, Camptazia. Platforms for electronic courses, including mass open Moodle and EdX are developed. Broad access to virtual educational library of the project allowed all to study independently innovative tools for the organization of author's courses (development of video lectures, structuring electronic courses, design and the pedagogical scenario, etc.).

As a result of implementation of the project the use by teachers of innovative technologies and tools in the organization of studies extended. Use of the project equipment for classes of active training and the Centers of educational technologies acquired at the expense of means provided expansion of use of modern IT technologies in educational process, promoted their modernization in respect of broader use of modern digital technologies in implementation of educational programmes various (from humanitarian to technical) the directions.

Creation of the Center of Innovative Educational Technologies (CIET) in which courses on training in innovative educational technologies are conducted promoted transition of the university to the new level of providing educational services – in a digital format. It allowed to expand training of teachers in development of methodical materials for training by means of innovative educational technologies for digital generation. With the purpose of expansion of educational opportunities for all comers in obtaining necessary skills the creation of cloud virtual library of digital educational resources which will provide online courses with attraction to their creation of big groups of teachers of Kazakhstani universities, the Central Asia universities and representatives of production is planned.

The center regularly conducts advanced training courses of university's faculty in a scope of innovative educational technologies in educational process, developments of author's courses, seminars, IT forums and conferences will be organized. During the pandemic, number of events increased. The aims of the center include training of teachers, the consulting help, shooting of educational videos, installation of programmes on devices of teachers and providing work places, placement of courses and COR on platforms. In general training programme of 383 teachers. recommended by the European partners and adapted taking into account requirements of each Partner Countries university was provided.

The project allowed to approach more competently management of processes on the organization of distance learning in higher education institution. As a result of participation in training seminars on the organization and carrying out online classes, development of open educational resources and video lectures, structure and structure of online courses the teachers learned to create and develop author's electronic training courses independently. Participants use the gained knowledge at the organization of educational process and also hold seminars at department and share the gained knowledge with the colleagues.

The created open educational resources (OER) are directed to improvement of quality and content of education due to ensuring equal access for students to educational services irrespective of location of students, their social status and the state of health. The developed OER promoted change of traditional model of an educational system, methods of teaching and training. In development of a training material for open educational resources the iSpringSuite and Articulate technology which gave the chance to visualize a training material in the form of a dynamic number of images, animation objects, video images, virtual objects was used; provided the interactive environment for independent work of students; helped the teacher to realize active forms and methods of training. The master research on a subject of development of electronic courses is initiated and is conducted.

Work on distribution and exchange of experience and resources in the field of digitalization is carried out. The academic network at the first stage is formed partner of HEIs, with the subsequent integration with higher education institutions of Kazakhstan, Central Asia and the EU (Moodle.atu.kz). The platform is created, improvement and placement of materials on her is begun. Along with dissemination of knowledge about the project among HEIs of Kazakhstan by publications in magazines and newspapers, performances on television, participation in Almaty Technological University (ATU) conferences carries out work on involvement of HEIs entering Educational and Methodical association in the field of food, light industry, to the restaurant business (more than 20 Kazakhstan universities) organized at ATU in the academic network. Offers to join the academic network, projects and conditions of contracts are distributed to rectors of the universities. Work in this direction is continued.

The guide to innovative educational technologies developed within the project allowed trainers and teachers to use the recommended programme OBS Studio tools for record of video lectures, use of an interactive board of Amigo during the training material, application of the Moodle platform for exchange of educational information between the teacher and the student, a video conference of BigBlueButton and Zoom system who help teachers to organize online classes correctly: broadcast of own screen for a visual explanation of a training material; use of "waiting room" that without the permission didn't come into a virtual class; preliminary planning of time of classes with a reminder in Google the calendar; shutdown of a sound and its inclusion by that who "raises a hand", use of an internal chat; application of sessional halls for project work and "white board". Their results can be postponed further and for other education levels in Kazakhstan – initial, average schools, secondary professional education, postgraduate education.

SECTION 7. INFORMATION LITERACY COMPETENCIES DEVELOPMENT, IMPLEMENTATION OF ICT

At the level of the university normative documents on expansion of use of digital technologies in educational process which are obligatory to application by all structural units are developed and approved.

Goals and indicators of the project are considered when updating the ATU indicative plan. Such indicators as quantity of the electronic courses placed on ATU platforms, including mass and digital educational resources (video of materials for interactive classes) and poll in real time with use of the iSpring programme are provided in it; percent of the teachers using innovative methods of training. The quality of resources is controlled according to the standard three-stage procedure: conclusions of department, faculty, scientific and methodical council of higher education institution. On ENU and INEU platform the developed digital educational resources which are interactive, dynamic and web focused are placed. Quantitative indices are determined by number of issued acts of introduction on basis of described procedure of recognition.

Intermediate results of the project laid the foundation for transformation of the higher education system of Kazakhstan to digital generation. Developed within the Concept of Transformation of the Higher Education System project it is considered and approved by Academic councils of partner HEIs, approved by the Ministry of Education and Science of RK and recommended for application by all HEIs of Kazakhstan. The concept promotes further digital transformation on places, and assumes introduction of instruments of digitalization of the highest complexity: digital analytics on basis of Big data technology, a blockchain, artificial intelligence, science about data in educational process. Her realization will allow HEIs of Kazakhstan to use research approach to training which is aimed at the development of scientific search studying skills, formation and development of creative thinking and creative abilities on basis of IT competences. At the same time teachers keep the key role in interactive process of training focused on needs of students. Stability of results of the project in this direction is confirmed by active application by all HEIs of Kazakhstan in the mode of transition to distance learning in quarantine mode.

Evgeny Medvedkov,
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Almaty Technological University

"Bachelor's and professional Master's programme in the development, administration, management and protection of computer systems and networks in enterprises" (573901-JP-2016-IT - LMPI)

Objectives: *To contribute to the security of computer systems and networks in enterprises of Partner countries through professionalization of university curricula in the administration, management, development, protection of computer systems and networks in accordance with the Bologna process and using a competence approach; creation of bachelor and master's degrees in computer and network security and a new modular training throughout life that meets the needs of specialists.*

Organizations from Italy, France, Spain, Greece, Bulgaria, Germany, Viet Nam, Kazakhstan and Moldova participated in the project. Kazakhstan partners were represented by five universities and five other organizations. The project lasted from 2016 to 2019, and ended with the achievement of all the goals set.

"Ambitous project with 30 partners from 9 countries and with a budget around 1 mln. euro – the LMPI project was not easy in implementation, but has achieved good results"

Bachelor degree programmes on the administration and management of computer systems and networks, and Master degree programme in professional administration and management with specialization in security of computer systems and corporate networks have been developed and introduced in participating higher education institutions. 339 professionals were trained, teachers (10 from 5 Kazakh HEIs) have received advanced training in European universities and prepared to deliver courses for undergraduate and Master degree programmes.

A modular system of continuing education has been established, under which two new courses on the development and protection of computer networks and information technologies in enterprises have been developed and introduced. About 50 enterprise specialists were able to take these courses during the implementation of the project. To ensure the sustainability of the system, the project established a Centre of Excellence with staff and modern equipment installed. It has now been transformed into the Centre for Distance Education in ICT and operates as a unified resource centre for all country partners in this field. The demand for the results of the project, and especially for the services of the Centre, increased particularly during the pandemic and the expansion of online training.

Sustainable changes

At the individual level

Students and participants in the courses have gained access to up-to-date materials in the field of information security and have acquired professional competence in this field. The direct participants of the projects developed their skills in several areas: methodology of developing educational programmes according to the needs of employers, methodology of designing and implementing mass open online courses, They learned to apply project-based training methods in the team, increased their knowledge in the field of information security, acquired the skills of working in the project.

At the institutional level

The approach to the development of educational programmes and disciplines has changed: employers' needs have been taken into account, individual employers have been directly involved in designing the programmes; the content has been built around project-based learning and flipped-classroom methodologies. A new online course model based on the Uninettuno model (Italy) has been developed and implemented to increase the interactivity of video lectures. The educational programmes developed in the project are included in the Register of educational programmes of the Ministry of Education, which strengthens the potential for their sustainability. The established Centre of Excellence provides open access to the developed project products, in particular, to the open online courses used in the teaching and learning process. For example, Master students are using the Centre's resources to simulate remote cyberattacks. The Centre offers advanced training courses on information security. Collaboration with European universities continued through bilateral cooperation between universities and also after the completion of the project in the form of internships, guest lectures and academic mobility.

At the national level

Along with envisaged changes, in the context of the Covid-19 pandemic, the Centre of Excellence expanded its activities to the national level to disseminate distance learning experiences. For example, a series of webinars was held in conjunction with the Ministry of Education and Science of the Republic of Kazakhstan, refresher courses were organized on the best practices in distance learning, and 26 videos were created to teach distance technologies and distance learning on the Uninettuno methodology. As of October 7, 2020, more than 46,000 people had seen them. And the number of people who had viewed them is increasing.

" Teamwork made it possible to get to know my colleagues, both in my own universities and in other partner institutions, their scientific and methodological preferences, areas of interaction and joint work for the future"

"According to the Uninettuno model, «talking head» is replaced by interactive video series with obligatory feedback during the lecture"

Challenges and lessons learned

The size and heterogeneity of the consortium was the greatest difficulty in the implementation of the project, which affected the timeliness of delivery of results. Project participants recommend "to scrutinize the project application and work plan of the project, in all unclear situations feel free to ask questions to the Project Coordinator in order to clarify and resolve any questions in a timely manner, strictly adhere to the project schedule".

"Untimely fulfillment of individual tasks entails the «domino effect» and the lag time may be critical for obtaining a certain result."

Further plans.

A Project Sustainability Plan has been developed, which outlines activities to ensure long-term sustainability (6 years). The plan assigns a special role to the Centre of Excellence, which aims to further expand continuing education courses and train representatives of companies and enterprises.

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Head of Department
"Theoretical informatics,"
L.N. Gumilev Eurasian National University

TOWARDS INCOMING INTERNATIONAL UNIVERSITY COMMUNITIES (573655-JP-2016-ES - WELCOME)

The Welcome project aims *at enhancing the international dimension of Kazakh and Chinese higher education institutions by defining and implementing strategic and marketing methodologies to facilitate and increase incoming foreign students, professors and researchers.*

One of the important results for Kazakh partner HEIs has been changes at the institutional level, in particular the development of a strategy for the development of internationalization, based on the experience of European partner universities, the knowledge and skills, received in the course of training, as well as in conceptualizing own experience. The team at the Eurasian National University (ENU) developed a Strategy of Internationalization for 2020-2022. One of its tasks - to create conditions for attracting foreign students - is a key objective of the strategy and of a number of normative documents of universities.

Karaganda Medical University has also developed and implemented a Strategy for Internationalization for 2019-2023, reflecting the objectives of internationalization in educational and scientific processes, such as development of academic mobility, attraction of foreign students, teachers and researchers, development of joint and double-diploma programmes, furthering cooperation in scientific activities, etc.

Strategic Plans of Internationalization developed at Narxoz University and KazUEFMT were integrated in the overall strategy of the University. They are aimed at increasing the level of internationalization in higher education, its attractiveness and recognition in the international education area, covering a wide range of activities - from updating educational programmes, cooperation in the frame of double-degree programmes to ensuring overall quality and accessibility of educational services in a holistic manner.

The project fostered interdisciplinary communication and cooperation between various structural subdivisions of the universities. As part of the internationalization strategy, an increasing number of departments and units of universities are now participating in international processes. Previously, all issues with an international component were directly under the responsibility of International Relations Offices (IRO). At present more entities are increasingly engaged in cooperation with international partners. At the same time, the need for language skills in the units has also increased.

WELCOME has had a significant impact on the professional development of IRO staff and other units involved in the internationalization process of the University. The knowledge acquired through trainings and visits enabled them to enhance their skills in intercultural communication, client-orientation and student services to facilitate adaptation of foreign citizens. The training has contributed to the promotion of universities and their regional and international recognition.

Dinara Jaksynbek, project coordinator at Narxoz University, notes: «The “Welcome” project strengthened my personal conviction that the student is the client of the university, and international students, in particular, need quality service and hospitality».

As part of the project, WELCOME service-oriented centres have been opened in all Kazakh partner universities. Their main function – to facilitate adaptation of international students, create conditions for their education and residence, support Kazakh students and teachers travelling for mobilities abroad for the first time.

Certain services, such as visa support, counselling for students and staff travelling on academic mobility, and communication with them while abroad, have certainly been provided in the past. With the establishment of the Welcome Centres, support is now provided at the system level. For example, organization of welcome weeks, orientation sessions, lectures, mentoring (buddy system), cultural and sports events, language courses for both foreign students and students of Kazakh universities have become an integral part of the activities of the Centres. Courses in Kazakh and Russian are offered to international students, and cultural and sports events are regularly organized.

The project has had an impact on team members and staff of international relations departments of universities. Participants note that the psychological barrier to communication in English among young staff has been reduced. The acquisition of financial accounting and project management skills, as well as the ability to organize team work, has become a useful experience for individual project members.

Faculties have learned new skills in the management of international credit mobility projects and in the overall internationalization of education; they have improved communication skills in working with foreign students and teachers; the programmes were complemented with tasks including international and intercultural components, international cases are use in training.

The project has been a good opportunity to exchange experience, networking with like-minded people, to strengthen partnership and cooperation between the European, Chinese and Kazakh higher educational institutions and among Kazakh HEIs as well as. Kazakh universities participating in the WELCOME project regularly exchange up-to-date information on upcoming events. Participants share useful information in a joint chat, for example, on issues related to academic mobility programmes.

To enhance visibility of higher educational institutions at the regional and international levels, the Welcome Centres have been given official status in all Kazakh partner universities, and they have become a part of the organizational structure of universities with the allocation of a staff unit. The position of Coordinator of the Welcome Centre was institutionalized at Narxoz University. Also, as part of the Welcome Centre activity, an international volunteer-expert was invited to work at the University to foster internationalization of the University.

In KMU with the creation of WELCOME Centre the work with foreign students and academic staff has become more systemic with a variety of services made available for incoming foreign guests. This in turn helps the university to reach a strategic level of participation in international partnerships and cross-border networks, increases the recognition and visibility of the institution in the international educational area, the image of the institution. Unified approaches to project management apply to almost all strategic activities. The implementation of the Strategic Plan indicators is now coordinated by project teams composed of teachers and administrative staff from different subdivisions.

At Gumilev Eurasian National University, the Welcome Centre is a part of the Department of Academic Mobility. Its operation gave rise to incoming mobility programme “Welcome to ENU”, which is expected soon to become one of the popular brands of the university. This was also made possible due to the knowledge in marketing gained in the project.

In KazUEFMT a full-time staff unit of a specialist-coordinator of the WELCOME Centre was introduced to maintain contacts with foreign students from the very first days of their arrival at the university and until graduation. Students receive timely information and counselling services helping them to adapt to the new environment. In the past, these issues were dealt

with by the staff of the International Relations Office who sometimes did not have time to provide full support to the students. Attention is paid to social and cultural aspects. For incoming foreign students the staff of the Centre organize excursions in Nur-Sultan, to the resort area of Borovoye, other attractions. Uzbek culture days were organized in KazUEFMT, which made it possible to unite students, giving them the opportunity to share creative ideas, their impressions from the city and the country.

The internationalization process is being actively promoted in all partner universities. The project team views the project as an initial step towards further promoting internationalization and involving students, teachers and researchers to more actively contribute to enhancing internationalization processes.

Anastasia Karmelyuk,
Director, Department of International Cooperation,
L.N. Gumilev Eurasian National University

Main challenges and …. Recommendations.

Analysis shows that the Erasmus+ projects implemented in Kazakhstan have had a strong t impact on the modernization of higher education. International cooperation has been significantly expanded and strengthened through the CBHE and ICM projects, creative use of the Bologna instruments and experience of European universities, increased academic and student mobility. The level of integration of Kazakh universities into the European educational area has increased. Good practices achieved in the frame of the projects was presented above.

However, along with achievements and success stories project teams have identified some of the constraints and challenges to the full achievement of project objectives and expected outcomes. They can be roughly divided into two groups - system and local (institutional).

The main external, systemic problem, the solution of which is often beyond the control of the project teams, is that the achievement of project goals, especially of Structural ones, and their sustainability depend not only on the efforts of project teams, but also on the readiness of national authorities and university leadership to accept and implement the proposed changes. There is no mechanism to support and ensure collaboration between the universities and ministries in the dissemination and valorization of project results at the national level.

There is still weak cooperation between the academe with corporate and governmental sectors. First of all, due to lack of experience, methodology and mechanisms for interaction, as well as a lack of preparadness of the academic sector for new approaches in the organization and implementation of such cooperation.

The corporate sector is not actively involved in defining the content of training of future graduates. The universities have difficulties in identifying and translating the needs and demands of practitioners in designing programmes and their implementation. As a result, it is difficult for university representatives and business partners to understand the goals and objectives of educational programmes.

In some universities institutionalization of training centres established as a result of projects remains a problem.

Projects aimed at developing and implementing interdisciplinary programmes, including those resulting from projects, are not adequately supported by comprehensive changes in the legislation.

Individual Structural Projects are often implemented as Joint ones, do not go beyond the consortium and university level, do not produce sufficient impact at the national level. In some cases the team members are not proactive in bringing the information and project deliverables to the attention of the competent education authorities to promote through an effective valorization strategy. Team members of the Structural Projects are often limited to presenting the results of projects to the relevant authorities without proper follow-up and promotion.

Insufficient attention has been paid to the development of a project internal quality assurance system, including in the content and methodology of training, and to the integration of the international dimension in the curricula.

Unclear role definition among participants. The roles of the coordinator, team members responsible for implementing work packages, experts, non-academic partners and other participants are not clearly defined.

Main challenges and …. Recommendations.

Among the problems at the institutional level can be mentioned the following ones:

Often project participants confuse the concepts of «project result» and «project impact». As a consequense, such projects lack a focus on ensuring the impact of the project and the sustainability of its results in the long term.

There is weak cooperation, lack of synergy and exchange of good practices among higher education participants.

The team members of individual projects are not proactive enough, are waiting for instructions and advice from the European coordinator.

Weak corporate responsibility and lack of accountability of team members to the university for the quality of project implementation.

The turnover of teams at the university level, poor continuity in documenting and transferring knowledge to new members, lack of clarity of roles and responsibilities among team members on work packages.

Recommendations towards further strengthening the impact and sustainability of projects at various levels:

Ministry of education and science:

To ensure the use of the results of CBHE projects, in particular, of Structural projects, a procedure for the participation of official representatives of Ministries of Education in projects with periodic reporting at internal events could be useful.

An official section on the implementation and use of E+ CBHE project results in the annual report of Ministries of Education in Partner Countries should be included.

Project coordinators:

To develop a culture of corporate engagement and common understanding (language) in defining the content and methodology of training future professionals in the new generation of E+ projects, provide for the transfer of experience and technology from European universities in the development of appropriate tools (analysis of the labour market needs through questionnaires, interviews, focus groups, etc.) and methodology of interaction with enterprises. This approach is particularly important for projects aimed at strengthening interaction with the world of work and developing educational programmes.

Ensure a systemic approach to the organization of training activities within existing and new CBHE projects to address the lack of necessary skills of staff in the areas related to the project subject matter using the logic (study of sector needs - methodology of developing programmes - teaching methodology - preparation of teaching and methodological complex).

University leadership:

To ensure effective implementation of CBHE projects and to increase the responsibility of team members to achieving their goals, institutionalization of projects at the university level should be mandatory.

Institutional ownership and support to team members in resolving various issues related to the implementation of projects with periodic institutional reporting could be helpful.

When nominating a project coordinator (manager) at the institutional level, his/her professional and managerial competencies, ability to implement the role management concept should be taken into account.

Main challenges and …. Recommendations.

Project coordinators and teams at the institutional level:

To ensure effective interaction and involvement of official representatives of ministries and enterprises in the joint implementation of the project, it could be useful in each team to nominate a person responsible for coordinating work with them and ensuring the sustainability of results. Timely highlight the project achievements and challenges in mass media and in communication with MES is advised.

Attention should be paid to cross-cutting aspects ensuring the Quality assurance, Sustainability and Valorization are inextricably linked and their implementation is montored.

Ensure clear roles and regular accountability of team members for assigned work. Practice the implementation of mechanisms of accountability of team members for the quality of project implementation at regular meetings of the team, events at the level of university management.

Scale up efforts to disseminate and promote the results of projects and to bring information to the attention of the competent educational authorities. Special attention should be paid to issues related to the development and introduction of interdisciplinary programmes, recognition of credits acquired at European universities.

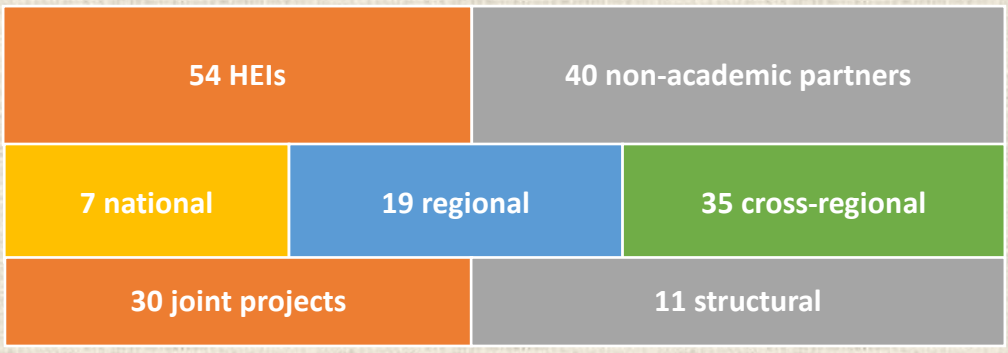
In the Plan of Dissemination of Project Information and Use of Project Results, communication channels and format of information, differentiate information according to target groups should be diversified.

Addressing the challenges identified and implementing the proposed recommendations would help to create further sound foundations for fundamental, including structural, innovative changes that are essential not only for the development of higher education institutions, but also for the higher education system, social and economic progress of the country.

ANNEX 1. ERASMUS+ CBHE PROJECTS IN KAZAKHSTAN 2015-2020: KEY DATA

New curricula	**56**
Updated curricula	226
New/updated disciplines	1013
Students enrolled in new/updated curricula	7937
Academic staff and students trained	10804
Student mobility	302
Business representatives trained	2364
Centres/laboratories/offices established	110
International agreements signed	151
Stakeholder agreements signed	477
LLL training courses developed	214
Academic staff trained	3377

ANNEX 2. 61 CBHE PROJECTS: FACTS AND FIGURES



ANNEX 3. CBHE PROJECT COORDINATION 2015-2020: MAPPING BY COUNTRY

№	Country	Structural projects	Joint projects	Total
1	Germany	-	13	13
2	Italy	2	8	10
3	Kazakhstan	3	3	6
4	Spain	-	5	5
5	Bulgaria	1	2	3
6	Greece	-	3	3
7	Slovakia	-	3	3
8	Poland	1	1	2
9	Romania	1	1	2
10	Serbia	-	2	2
11	Finland	1	1	2
12	Sweden	-	2	2
13	Austria	-	1	1
14	Armenia	1	-	1
15	Belgium	-	1	1
16	Georgia	-	1	1
17	Ireland	-	1	1
18	Lithuania	1	-	1
19	Portugal	-	1	1
20	Czech	-	1	1
	Total	11	50	61

ANNEX 4. ICM PROJECTS IN KAZAKHSTAN, 2015-2020

Call (year)	Applications	Projects selected	Grant (EUR)	Total participants	Incoming to Programme country from Kazakhstan		Outgoing from Programme country to Kazakhstan	
					Students	Staff	Students	Staff
2015	178	81	2.285.000	629	260	202	32	135
2016	192	120	2.871.000	826	277	279	41	229
2017	201	114	2.676.000	781	254	265	49	213
2018	242	148	3.506.545	1008	307	363	54	284
2019	265	240	3.499.000	1023	665		358	
2020	255	236	2.611.833	778	221	281	65	211
Total	1333	939	17.449.378	5045	3374		1671	