



LMPI – KAZAKHSTAN_P22_L.N. Gumilyov
Eurasian National University
INTERIM TECHNICAL REPORT



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QUALITY OF THE PROJECT IMPLEMENTATION

1. Description of the implemented activities

The following activities were implemented within the project:

WP name: PREPARATION

Activity number 1.1. Activity/task name: Three regional synthesis of resources and methodologies

At the first meeting chaired by P1, the country coordinator G.T. Bekmanova. presented the methodology used in the region in accordance with the Bologna process. Specialties, within the framework of which training will be carried out at regional partner universities in the field of computer security, are represented. Into this list of specialties L.N. Gumilyov ENU included the Specialty 5B100200/6N100200 "Information Security Systems" with a Bachelor's degree in military affairs/Master of military sciences. But, only at GPI 2 European partners have informed about the impossibility of financing works related to the military affairs, which led to additional work on altering the accreditation files.

Activity number 1.2. Activity/task name: Approval of the list of curriculum renovators

The P22 Country Coordinator presented a list of renovators from 10 institutional professionals and 11 lecturers for approval.

The results of activities 1.2 and 1.3 were announced at the first meeting of the project governing bodies under the leadership of P1 (from March 20, 2017 to March 24, 2017).

Activity number 1.3. Activity/task name: The first meeting of the Steering Committee for Project Management

The first meeting of the project governing bodies under the leadership of P1 - the opening of the project took place in Rome in the period from March 20, 2017 to March 24, 2017.

WP name: DIAGNOSTICS

Activity number 2.1. Activity/task name: Training for curriculum renewal

A delegation of 10 executives carried out a study tour to the EU from 10.07.2017 to 15.07.2017. The strategies of European universities and their implementation were analyzed; Bologna and Tuning recommendations for quality control, operational resources and technological platforms of centers for excellence, the possibility of implementing double diploma practice were studied. According to the program, meetings with the Ministry of Education of Bulgaria, the administration of the university, teachers and companies were organized. The composition of the working groups of each university has been approved. The roles of each partner, working conditions for the project are defined.

The importance and impact of joint action is in the partner countries' support for enhancing the professional qualifications of lecturers in new disciplines that relate to the knowledge expected in enterprises.

Activity number 2.2 Activity/task name: Development of a strategic action plan for project implementation

A strategic action plan for the project implementation has been developed. The plan is based on the resources collected during a week of study visit to the EU and analysis of the current state of information security in the Republic of Kazakhstan. The strategic plan defines the goals, the schedule of work, the role of partners, own and European means that will be involved, and tasks.



For internal quality assurance, two councils have been created:

- Council on Project Management (Regional Management Committee) (Somzhurek B.Zh., Elyubayev M.S., Makashev E., Kakabayev A.A., Tulenbayev M.S.)
- The Supervisory Council (Zharkinbekov T.N., Sagindykov K.M., Kuttybayeva G.E., Urmashv B., Igonina E.P.)

The plan provides for the following actions: creation of a list of renovators; conducting a survey of IT-business environment specialists and analyzing the results; the choice of targeted professions and the development of professional maps; selection of bachelor and master's programs; formation of skills; training of lecturers in the EU in the field of information security; creation of the Center of Excellence; studying procedures and preparing accreditation documents; drafting an agreement on double diplomas; recruitment and training of students; creation of didactic cyberspace; creation of a modular lifelong learning program; training of professionals; organization of communication for the general public.

The strategic action plan for the project implementation was approved by Somzhurek B.Zh., the Vice-Rector for International Cooperation of the L.N. Gumilyov ENU.

Activity number 2.3 Activity/task name: Two specialty cards and the names of Bachelor and Master's programs

Two specialty cards were developed. These cards contain the name of the profession, professional sector, professional activity, general and basic skills, and necessary knowledge.

Areas of professional activity for bachelors are defined as: financial institutions; industrial enterprises; service and consulting companies; small, medium and large companies; government institutions; educational institutions; army; telecommunication companies. For masters, research institutes and public administration bodies have been additionally added.

The followings are defined as a professional activity for bachelors: installation, configuration and maintenance of system, tool and application software for computer systems and networks; development, compilation, debugging, testing and documentation of programs in high-level languages for the processing of digital and symbolic information; the use of software and technical means of data collection and processing, data recovery in the database and monitoring, documentation and protection of databases; network and system monitoring, incident response and documentation; ensuring information security of information through software and hardware; application of methods of cryptographic information protection; application of standards, methodological and regulatory materials that determine the design and development of objects of professional activities; analysis of information security conditions and selection of technical and organizational measures to ensure information security in the design, exploitation of computer processing and management systems; development of intelligent tools for solving information security problems.

As a professional activity for masters, the following are defined: planning of the organization's cyber security management processes; planning of the organization's cyber security maintenance processes; planning activities to ensure the organization's cybersecurity; control of process management and guarantee of cybersecurity of the organization; ensuring cybersecurity of the organization.

Hereinafter, the educational programs of the Master's and Bachelor's degrees, developed on the basis of these specialty cards, received clear boundaries regarding the spheres of professional activity of future specialists. For Bachelor's degree the main characteristic of the sphere of professional activity is operational activity, while for Master's degree it is management activity.



The significance and impact of this activity is that these specialty cards were developed based on questionnaires, interviews and documentary searches.

Date for the initial planning: April 30, 2017.

Activity number 2.4 Activity/task name: Classification of training needs in each region

For the diagnostics of training needs, the state of information security in the Republic of Kazakhstan was studied.

To date, cybersecurity is a prerequisite for the development of the information society.

The Cybersecurity Concept (“Cybershield of Kazakhstan”) provides an analysis of the current situation in the field of information security and states the following on the state of education: “The existing Kazakhstan model of higher and postgraduate education in the field of ICT, including information security, does not fully meet the current needs and development trends of the society. It does not provide sufficient knowledge for Bachelor and Master students, it is limited in the number of disciplines and specialties, some of which are simply absent from educational and professional standards. Besides, the necessary interrelation of professional standards with typical and working curricula of higher and secondary special educational institutions is not always observed”.

The use of information security for education can be interpreted, on the one hand, as the question of the impact of information security on the formation in society of sustainable ideas about "cyberhygiene" and the inculcation of a high production culture in the creation and use of information and communication technologies at all stages of the life cycle of software products and equipment (<http://mdai.gov.kz/en/pages/koncepciya-kiberbezopasnosti-kibershchit-kazahstana>).

In this sense, training and the practice of protecting personal data should become an obligatory element of educational programs.

To improve the quality of training of employees responsible for the state of information security, the requirements for practical skills and technical knowledge must be expanded. An important role in this issue is assigned to higher educational institutions specializing in the implementation of educational and research tasks in the field of information security (<http://mdai.gov.kz/en/pages/koncepciya-kiberbezopasnosti-kibershchit-kazahstana>).

A survey of IT-business experts showed that:

- leading positions on specific competencies are occupied by the following competencies:
 - to update security systems in response to new threats and new technologies;
 - to ensure the stability of security systems;
 - to provide various solutions for protection.
- on the first places on the main types of activity are such activities as:
 - installation of systems for detection, warning and prevention of intrusions;
 - setting up mechanisms to prevent, restore and ensure the continuity of the system functioning;
 - frequent detection, detection of system vulnerabilities;
 - network and system monitoring, incident response.



- On the issue of problems in the enterprise, regarding the information security, the first positions are occupied by such problems as:
 - the problem of information confidentiality;
 - low level of awareness of all employees about the importance of information security;
 - the problem of data changes.

The tasks related to the listed problems occupy 9 and 8 positions in the list of main tasks. We believe that these problems are related to the lack of information security policies in enterprises and the low level of implementation of information security standards, although the majority of respondents (267 - the first position) believe that one of the subjects that will allow obtaining specific competencies is the subject of "Security Policy".

Based on respondents' responses, the following information security needs were identified:

- knowing the legislative framework in the field of information security;
- the ability to design, develop and apply information security technologies and tools;
- the ability to apply standard and design new cryptographic algorithms and protocols to protect information in computer systems and networks;
- the ability to implement information security systems in information and communication systems in accordance with standards;
- the ability to apply methods and means of countering unauthorized access to information in accordance with the requirements of regulatory documents on the system of technical protection of information.

Based on the results of the analysis and synthesis of the survey materials, two cards of Bachelor and Master's degrees in information security were compiled.

Date for the initial planning: April 30, 2017

WP name: DEVELOPMENT

Activity number 3.1 Activity/task name: Training of lecturers in the EU (two weeks)

11 lecturers were trained at the University of Library Studies and Information Technologies (Sofia, Bulgaria) from January 29, 2018 to February 10, 2018.

Lectures on the main disciplines on computer security (development of secure software, network monitoring, cybersecurity) were attended, and relevant training resources were acquired (manuals, textbooks), Bachelor's educational programs were developed within the Bachelor Degree specialties of 5B070300 "Information Systems", 5B070400 "Computer Science and software", and Master's Degree specialties of 6M070300 "Information systems", 6M070400 "Computer Science and software".

The significance and impact of this activity is in the achievement of unified approaches to the development of educational programs by partner universities. The difference in the modified educational programs for the specialties mentioned above and for Bachelor's and Master's programs is insignificant, this means that the training materials will be prepared jointly by the partner universities. In the future, the modified educational programs make it possible to develop an educational program "Information Security"



for a two-diploma education jointly with the University of Library Studies and Information Technologies (Sofia, Bulgaria).

Activity number 3.2 Activity/task name: Bachelor's and Master's programs and courses and 6 folders of documentation for the application for accreditation

Lecturers, trained in the EU, each have developed two dossier files for accreditation on the specialties of "Information Systems" and "Computer Science and Software" for the Bachelor's and Master's degrees. Curricula and blocks of education programs, with the detailed content of disciplines, the conditions of alternation and testing of knowledge are described.

The significance and impact of this activity is that:

- modified educational programs of Bachelor and Master's degrees are oriented to the consumer, because they are developed based on the competences, which were determined by the results of the questionnaire survey of IT business environment experts, interviews and documentary studies;
- in the implementation of educational programs, it is proposed to involve practitioners, and certified Java lecturers - the EPAM SYSTEMS laboratory, lecturers - instructors of Cisco and HP academies;
- educational programs include discipline for the study of advanced technologies (OLAP, SAS DATA Management, Rapid Miner, Deepsee Cache; SonarLint, FindBugs, pylint, PyChecker; SQL Server, Cache, MPI, OpenMP, CUDA; DES, SS 28147-89, AES, RSA, elliptical cryptography, cryptography based on finite automata);
- themes of developed disciplines were drawn up according to the international training standards for cybersecurity and oriented as to fundamental scientific knowledge in the field of information security, and to develop practical skills on information systems security, network security policies, encryption algorithms, etc.

Educational programs were developed during the period from January 29, 2018 to March 30, 2018.

WP name: The system of initial and continuous training, available remotely online and covering all training needs in the field of development, administration, management, protection of computer systems and networks in enterprises

Activity number 4.1 Activity/task name: Activities of partner universities on the organization of educational processes in their universities

Work is underway to prepare courses for each module. Courses will be available in written and multimedia form, and will be partially held in a virtual classroom. The allocation of credits to these subjects will be carried out in accordance with the educational programs developed in the work package 3.

It is expected that educational activities will be carried out through exchange tools (mail, private forum with a lecturer, telephone, videoconference). But, unfortunately, from the European partner universities' side these educational activities have not yet begun.

Activity number 4.2. Activity/task name: 20 teachers in each of the three countries are professionally engaged in their new role in their didactic cyberspace.



WP name: Optimization of job opportunities and entrepreneurial spirit of students

Activity number 5.1. Activity/task name: 25 teachers trained in career and employment counseling in each country

Activity number 5.2. Activity/task name: Module for training on entrepreneurship for the administration, management and protection of computer systems and networks in companies.

This work has not been started yet. As noted in the work package, the content of the next two modules will be written and digitized by the GOP team led by the European P4 and P2 referent, as well as all European teachers who will provide European resources:

- Methods of job search and knowledge on the economic sector of informatics.
- Creation of business in the field of development and management of computer network security.

Initial planning: April 30, 2017 – May 30, 2017.

WP name: Project management

Activity number 6.1. Activity/task name: Establishment of pilot bodies

The composition of the GPI: one representative from P1, P2, P9, P19, P22, two representatives from P4, P5, P6, P3. GPI is headed by Uninettuno University (P1) with the support of the Technical Coordinator (P2). Promoter (P1) signed agreements with each partner, where the tasks and budget for their implementation are detailed.

The composition of GPR: it is headed by a leading university, consists of representatives from each of the regional partners, a representative of the reference university, and an external appraiser.

Three meetings of GPR were held.

GPR1 was held from May 25, 2017 to May 28, 2017 in Astana, the following issues were considered:

- on the progress of the survey of IT-business environment specialists;
- skills-based learning;
- on drawing up a card of specialties.

GPR2 was held from November 13, 2017 to November 14, 2017 in Astana, the following issues were considered:

- analysis of the survey results of IT-business environment specialists;
- a description of the profiles of employment - by interview and analysis of regional needs;
- distribution of employment profiles in terms of Bachelor's and Master's degrees;
- a model of competence on cybersecurity.

GPR3 was held from February 22, 2017 to February 28, 2017 in the cities of Kokshetau, Astana, Almaty and Taraz. Questions regarding the verification of specialty cards and educational programs are examined.

The duration for implementing activity for the establishment of pilot bodies is 31.11. 2016



Activity number 6.2. Activity/task name: Bilateral agreements between P1 and each partner

Promoter (P1) signed agreements with each partner, where the tasks and budget for their implementation are detailed.

Activity number 6.3. Activity/task name: 6 people (by region) study in France to manage the project Erasmus+

Omarbekova A.S. and co-worker of accounting office Biakhmetova G.A. trained in France for the joint preparation of training and financial reports. Real case studies, modeling of accounting documents were carried out. The training is organized in France jointly by P1 and P2 for 3 days (duration November 27, 2018- November 29, 2018).

2. Visibility

To promote the project and advertise new educational programs, we use all popular and available resources for the publication of project materials, news:

Facebook link: <https://www.facebook.com/lmpi.kazakhstan>

Instagram link: https://www.instagram.com/lmpi_kazakhstan_/

https://youtu.be/qseRVh_cKbl, <https://youtu.be/Z-2HgwteyKg>

<http://www.enu.kz/ru/sotrudnichestvo/tempus/>

<http://www.kgu.kz/lmpi>

<http://lmpi.kaznu.kz>

<http://www.lgorod.kz/>

<http://www.tarsu.kz/ru/1-proekt.html>



CURRICULUM DEVELOPMENT

1. New/updated courses

We are developing 26 courses: 10 for bachelor degree and 16 for master degree.

New/ updated courses for Bachelor program

Nº	New courses	Kz Credits	ECTS	Total	University
1	Authentication, certification and PKI	3	5	135	P22 ENU
2	Operating system security	3	4	135	P22 ENU
3	Intelligent Data Analysis	4	6	180	P22 ENU
4	Technical means and methods of information protection	3	5	135	P22 ENU
5	Information Security Standards	3	5	135	P22 ENU
6	Network Security	3	4	135	P22 ENU
7	Database Security	3	4	135	P22 ENU
8	Web application Security	3	5	135	P22 ENU
9	Development of secure software	3	5	135	P22 ENU
10	Fundamentals of cryptanalysis	4	7	135	P22 ENU

New/ updated courses for Master program

Nº	New courses	Kz Credits	ECTS	Total	University
1	Practical virology	4	7	180	P22 ENU
2	Protection of cloud computing	4	7	180	P22 ENU
3	Cryptographic analysis with software	4	7	180	P22 ENU



4	The architecture of cybersecurity systems	3	6	180	P22 ENU
5	The Basics of Cybersecurity	3	6	180	P22 ENU
6	Computer Forensics	3	5	180	P22 ENU
7	Reliability and efficiency of information security systems	3	5	180	P22 ENU
8	Assessment of the security of communication and information systems	3	5	180	P22 ENU
9	Information Security Audit	3	7	180	P22 ENU
10	Intelligent information security platforms	4	7	180	P22 ENU
11	Knowledge Management	4	7	180	P22 ENU
12	Multi-agent systems	4	7	180	P22 ENU
13	Network Cybersecurity and Protection	3	5	180	P22 ENU
14	Java for security purposes	3	5	180	P22 ENU
15	Designing Cybersecurity of Databases	3	5	180	P22 ENU
16	Industrial Cybersecurity	3	5	180	P22 ENU

For the Bachelor students of the specialty 5B070400 “Computer technics and software” (Computer engineering) and Master students of the specialty “6M070400-“Computer technics and software”(Computer engineering)” within the ERASMUS + LMPI project, the above-mentioned disciplines are introduced into the educational program from the academic year of 2018. The compulsory disciplines of the specialty remained unchanged.

In percentage terms, the level of updated courses compared to current courses at the Bachelor level is:

Development tasks / updates in % - 20.4% (10 out of 49).



Upon completion of training, the student receives a Bachelor of Engineering and Technology degree in specialty 5B070400 – Computer Science.

In percentage terms, the level of updated courses compared to current courses at the master level is:

Development tasks / updates in % - 72.7% (16 out of 22)

After graduation, the Master student receives a Master of Science degree in specialty 6M070400 - Computer science.

Globally (i.e. for the totality of the courses intended to be developed/updated) and as compared to the proposal, express in percentage the level of achievement so far concerning

- The development/update tasks
- The recognition/accreditation tasks
- The percentage of courses already implemented/delivered to the target group(s)



ACTIVITIES RELATED TO TEACHING/TRAINING

We carried out the following teaching/training/research activities:

WP name: PREPARATION

Activity number 1.1. Activity/task name: Three regional synthesis of resources and methodologies

Activity number 1.2. Activity/task name: Approval of the list of curriculum renovators

The P22 Country Coordinator presented a list of renovators from 10 institutional professionals and 11 lecturers for approval.

The results of activities 1.2 and 1.3 were announced at the first meeting of the project governing bodies under the chairmanship of P1 (from March 20, 2017 to March 24, 2017).

WP name: DIAGNOSTICS

Activity number 2.1. Activity/task name: Training for curriculum renewal

A delegation of 10 executives carried out a study tour to the EU from 10.07.2017 to 15.07.2017. The strategies of European universities and their implementation were analyzed; Bologna and Tuning recommendations for quality control, operational resources and technological platforms of centers for excellence, the possibility of implementing double diploma practice were studied. According to the program, meetings with the Ministry of Education of Bulgaria, the administration of the university, teachers and companies were organized. The composition of the working groups of each university has been approved. The roles of each partner, working conditions for the project are defined.

WP name: DEVELOPMENT

Activity number 3.1 Activity/task name: Training of lecturers in the EU (two weeks)

11 lecturers were trained at the University of Library Studies and Information Technologies (Sofia, Bulgaria) from January 29, 2018 to February 10, 2018.

Activity number 3.2 Activity/task name: 6 people (by region) study in France to manage the project Erasmus+

Omarbekova A.S. and co-worker of accounting office Biakhmetova G.A. trained in France for the joint preparation of training and financial reports. Real case studies, modeling of accounting documents were carried out. The training is organized in France jointly by P1 and P2 for 5 days (duration November 27, 2018- November 29, 2018).

The main channel for informing the partnership is e-mail, skype meetings, personal meetings.

Each university chooses a participant according to the aim of the training.

In the meeting in EU (10.07.2017 - 15.07.2017) of rectors/vice-rectors of the universities and heads of non academic organizations took part the rectors/vice-rectors and heads of non academic organizations which had involved in the project.

11 teachers were trained at the University of Library and Information Technologies (Sofia, Bulgaria) from 29.01.2018 to 10.02.2018/

The teachers were chosen from among the renovators. The criteria for selection were experience in the development of IT education programs, basic education, communication skills and high learning ability.



Omarbekova A.S. and Accounting Officer Biakhmetova GA trained in France (term 27.11.2018-29.11.2018) for the joint preparation of training and financial reports. The criteria for selection were experience Omarbekova A.S. had similar experience in previous Tempus project and Biakhmetova G.A. manage finance documentation in ENU by this project.



AWARNESS RAISING, DISSEMINATION, SUSTAINABILITY AND EXPLOTATION OF THE PROJECT RESULTS

The actions already taken for raising awareness and contributing to the dissemination, exploitation and sustainability of the results achieved by the project:

Broadcasting Workshop N ° 1

Event type	Names of the Institutions present	Event date	Place	Number of professionals who attended the event	Broadcast results
Common channels for disseminating project information	P22-P30	constantly	Facebook link: https://www.facebook.com/lm pi.kaz akhstan .	220	publication of events, educational advertising programs
Common channels for disseminating project information	P22-P30	constantly	Instagram link: https://www.instagram.com/lm pi_ka zakhstan_/	582	publication of events, educational advertising programs
Newsletter No 1	P22-P30	2017	P22-P30 university admissions committee	more than 4000	educational advertising programs
The brochures Distributed at the projects exhibition ERASMUS in Astana	P22-P30	2017	P22-P30 university admissions committee	more than 2000	educational advertising programs
The brochures Distributed at the projects exhibition ERASMUS in Astana	P22-P30	2017	P22-P30 university admissions committee	more than 100	educational advertising programs



The newspaper "The beloved city Kokshetau"	P 25	2017	Journal	Kokshetau	educational advertising programs
participation in the event "Open Day" in ENU	P22	17.02.2018	P22 http://www.enu.kz/ru/info/obyavleniya/51264/?sphrase_id=1343369	more than 200	educational advertising programs
Posting an interview in youtube	P22	2017	https://youtu.be/qseRVh_cKbl , https://youtu.be/Z-2HgwteyKg	more than 100	educational advertising programs

Broadcasting Workshop N° 2

Event type	Names of the Institutions present	Event date	Place	Number of professionals who attended the event	Broadcast results
site web	P22	constantly	http://www.enu.kz/ru/sotrudnichestvo/tempus/	more than 17000	educational advertising programs
site web	P23	constantly	http://www.kgu.kz/Impi	more than 3000	educational advertising programs
site web	P24	constantly	http://Impi.kaznu.kz	more than 17000	educational advertising programs
site web	P25	constantly	http://www.lgorod.kz/	more than 1000	educational advertising programs
site web	P29	constantly	http://www.tarsu.kz/ru/1-proekt.html	more than 3000	educational advertising programs



There are all necessary conditions for work at the department, faculty, and university:

- Special office (room) for work with the name of LMPI project with computers, access to the internet, printers and etc (IT faculty).
- The order of the rector about the working group was issued to the group with the indication of the supervising vice-rector..
- A regular university monitoring of the project.
- Political support of the leadership of the University of Erasmus projects, administrative and resource support.