

ERASMUS +

An Integrative approach to
STEM Teacher Training

Project data

- 10 universities
- Linköping University - Coordinator
- 15.01.2019 – 14.01.2022
- The working language is English
- 6 work packages
- The project budget is – 926 229 euros
- The budget of the SFU is - 114 912 euros

STEM subjects: Mathematics, Physics, Chemistry, Computer Science, Biology, Geography, Elements engineering

Project participants

- Linköping University (Sweden)
- University of Limerick (Ireland)
- Hacettepe University (Türkiye)
- University of Helsinki (Finland)
- Southern Federal University
- Baltic Federal University
- Belgorod National Research University
- South Kazakhstan State University
- East Kazakhstan University

Associated partners: Sirius, Lyceum 103, schools

Analysis of the needs

- STEM disciplines are the basis for innovative development of countries
- The development of STEM programs is among the priorities of the Russian Federation and Kazakhstan
- Shortage of STEM specialists in the labor market
- Poor preparation of students in STEM, low interest, low Unified State Exam scores
- Low qualification (pedagogical) level of STEM teachers
- There are no interdisciplinary connections between faculties at the university and teachers at school
- Outdated promotion programs qualifications
- Few connections between universities and schools

Tasks

- Develop and implement Master's degree programs for STEAM teacher training based on an integrative approach
- Create regional STEM resource centers
- To improve the qualifications of teachers
- Implement various mobility schemes
students;

Develop educational and methodological resources and a STEM career atlas.

Work packages

- Work package 1. Preparation for project execution.
- Work package 2. Development of a master's program "STEM teacher training"
- Work package 3. Training
- Work package 4. Quality assurance
- Work package 5. Dissemination and sustainability of results
- Work package 6. Project management

WP1. Preparation for the implementation of the project (15.01-31.03.2019) SFU –SFU-UL

1.1. Development of project policies and strategies (communication policy, quality plan, results dissemination strategy, results utilization plan, results sustainability plan):
Implementation: launch meeting in Linköping (March 2019), two-day brainstorming session, finalizing ideas package managers.

1.2.1. Methodological seminar in Linköping (March 2019): Development of a questionnaire for different target groups and familiarization with the best European practices

1.2.2. Analysis of STEM practices at the national and regional levels, compilation of an atlas of best practices by the package management.

1.2.2. Conducting a survey by all partner universities and associated companies (60 questionnaires and interviews), summarizing the results by the leaders of the package.

WP2. Development of the Master's program 1.04.2019-1.09.2020-31.12.2021 Limerick- Belgorod State University

2.1.1. Studying the best European practices. 2 teachers from the university for 5 days in Limerick in June 2019.

An analytical report on the adaptation of the experience. Workshop on the development of descriptors and modules (Limerick) as part of the study of best practices (June 2019).

□ 2.1.2. Development of descriptors –learning outcomes based on survey results (WP1) and a matrix of results (WP guidance) by the working group.

□ 2.1.3. Development of a modular curriculum of the program – by 30/10/2019.

2.2.1. Development of new modules and updating of existing disciplines (content and methodology):

2.2.2. Development of new teaching methods and evaluation of results.

The structure of the new program

6 modules 90 credits:

- Introduction to the problem
- Methodological
- Technology
- Managerial/Leadership
- Subject
- Research

WP2. Development of master's program. 1.04.2019-1.09.2020-31.12.2021 Limerick-BelSU

- 2.3.1. Seminar on the quality mechanisms of the program in BelSU February 2020, 2 teachers from SFU
- 2.3.2. Development of quality assurance tools by a working group of 2 representatives of each university by 30.06.2020 (student questionnaires, employer questionnaires, expert assessment).
- 2.4.1. Attracting and recruiting 15 students in 2020 and 2021. Lectures by European professors (2 Limerick in 2.4.2.
- Conducting international summer schools:
 - 1 school in July 2020 in Shymkent for students of pedagogical programs: 3 students for 2 weeks and 1 teacher for 3 days
 - 2 schools in Kaliningrad in July 2021 for students of the new program: 3 students for 2 weeks and 1 teacher for 3 days

WP2. Development of a master's program

1.04.2019-1.09.2020-31.12.2021 Limerick-Belgorod
State University

- 3.4.3. Student mobility in autumn 2021:
- 2 SFU to Hacettepe University for a semester
- 2 SFU to the University of Limerick for a semester
- 2 SFU to Eurasian University for a semester
- 2 EKSU in SFU for a semester

WP3. Training 1.08.2019-31.12.2021

Helsinki- EKSU

- 3.1.1. Creation of STEM centers, purchase of equipment (11/30/2019)
- 3.1.2. Training of 3 trainers from each university in October 2019 at the University of Helsinki.
- 3.2.1. Development of training programs using the 72-hour method, mixed format.
- 3.2.2. Development of a program of extracurricular activities for STEM ambassadors 2 credits.
- 3.3.1. 2-day pilot workshop for teachers in EKSU in October 2020
- 3.3.2. Implementation of training programs for teachers in the regions: online courses and 2-day seminars.
- 3.3.3. 10-day training of 3 students-STEM ambassadors from the university in June 2021 in Gelendzhik.

WP3. Training 1.08.2019-31.12.2021

Helsinki- EKSU

- 3.4.1. Development of methodological resources: methodology of integrated approach, innovative methods, bank of project ideas, case studies.
- 3.4.2. Development of an atlas of career pathways STEM.

WP4. Quality Assurance Hacettepe University

15.02.2019-31.12.2021

4.1. Quality Assurance Plan

4.1.1. Creation of a Quality Committee (1 representative from each university)

4.1.2. Development of a quality assurance plan.

4.2. Quality of project execution

4.2.1. Evaluation of all materials by European experts.

4.2.2. Internal monitoring of the project in the Russian Federation and the KZ by the SFU and ENU. 4.2.3. Evaluation of training by students. The questionnaire is being developed by the project manager.

4.3. External evaluation

4.3.1. Interproject coaching

WP5. Dissemination and sustainability of results

15.01.2019-31.12.2021 ENU-BFU

5.1.1. Project promotion (flyers with the project logo, presentations, articles, project website on the SFU platform)

5.2.1. STEM days (every 3 months), STEM weeks (2 times a year), scientific festivals (at ENU in October 2020 and at BelSU in October 2021).

5.2.2. Project book in 3 languages in September 2021.

5.3.1. Measures to disseminate the results: presentations at universities on the implementation of the project, national seminars in Kaliningrad and Astana, the final conference in Gelendzhik in October 2021 – 3 representatives from the SFU.

WP5. Dissemination and sustainability of results

15.01.2019-31.12.2021 BIU-VSU

5.3. Sustainability of project results

5.3.1. Accreditation of Master's degree programs (extract from the decision of the Academic Council of the Institute and the university order on the launch of the program)

5.3.2. Conclusion of exchange agreements

5.3.3. Creation of a STEM network, signing of a memorandum at the final conference

WP5. Dissemination and sustainability of the results 15.01.2019-31.12.2021 BIU-VSU

- 5.5.1 Conduct 2-week summer schools in June 2020 by each university for high school students with the STEM Ambassadors participation. Implementation of a summer program in June 2020 for Russian schoolchildren and at the Nazarbayev School for schoolchildren from Kazakhstan.
- 5.5.2. Implementation of STEM extracurricular program during STEM ambassadors' practice in schools.

WP6. Linköping Project Management

Project manager at the university - package management - steering committee

Steering Committee: contact persons of each university

Intranet - internal network for communication 6 coordination meetings

Financial protocol

Agreements between Linköping University and each participant

2 reports to EACEA

Financial audit of the project