www.senvibe.uns.ac.rs

Authors

In alphabetical order:

- Prof. Hans Boden, KTH University, Stockholm
- Prof. Neil Ferguson, University of Southampton
- Zorana Georgijev, Provincial Secretariat for Urban Planning and Env. Protection, Novi Sad
- Prof. Ivana Kovacic, University of Novi Sad
- Vesna Masulovic, University of Novi Sad
- Prof. Momir Prascevic, University of Nis
- Prof. Mira Pucarevic, Educons University, Sremska Kamenica
- Miljana Stojsic-Stojanovska, Union of Employers of Vojvodina, Novi Sad
- Prof. Zlatan Soskic, University of Kragujevac
- Dr Milorad Spanovic, Institute for Occupational Health, Novi Sad
- Prof. Miodrag Zukovic, University of Novi Sad

Basic information about the project

Project title:	Strengthening Educational Capacities by Building Competencies and Cooperation in the Field of Noise and Vibration Engineering
Project acronym:	SENVIBE
Programme:	Erasmus+ Capacity Building in Higher Education EAC/A05/2017
Reference project No.:	598241-EPP-1-2018-1-RS-EPPKA2-CBHE-JP
Project duration:	15 November 2018 – 14 November 2022
Project coordinator:	University of Novi Sad
Project manager:	Prof. Ivana Kovacic

Project goals

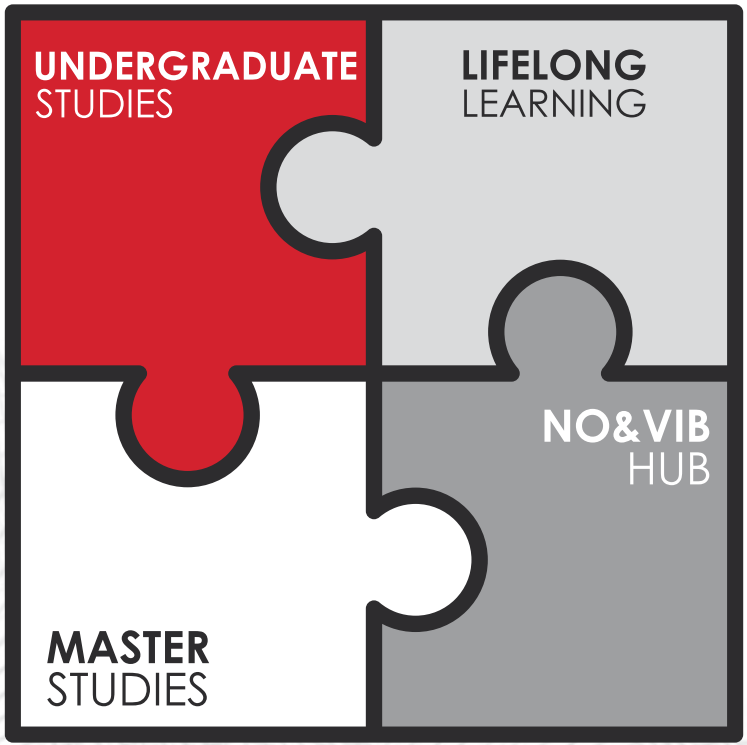
The wider aim of the SENVIBE project is the strategic improvement of educational capacities and cooperation in the field of Noise and Vibration (No&Vib). The project duration is 4 years. Capacity building and competence in this area were achieved through:

- Modernization and implementation of new modules (courses) and subjects in studies of mechanical engineering, civil engineering, traffic engineering, electrical engineering, environment protection and occupational health and safety

- Introduction of the first MSc study programme in Vibro-Acoustic Engineering in the Republic of Serbia

- Development of courses for Life-Long Learning (LLL) in the field of noise and vibrations which will be held nation-wide for interested subjects

- Establishing a unique platform (No&Vib Hub) for collaboration between academic and non-academic institutions in these fields. In addition to improvement and exchange of professional knowledge and experience, No&Vib Hub aims to improve workflows and connections between administrative bodies, business and higher education in this field, and jointly influence the awareness of the wider community on issues of noise and vibration in the living and working environment.


UNDERGRADUATE
STUDIES
LIFELONG
LEARNING
NO&VIB
HUB
MASTER
STUDIES

Partners

Serbian academic partners:
- University of Novi Sad – Project Coordinator
- University of Nis
- University of Kragujevac
- Educons University

EU academic partners:
- University of Southampton, Institute of Sound and Vibration Research, Southampton, UK
- KTH University, Stockholm, Sweden

Non-academic partners:
- Provincial Secretariat for Urban Planning and Env. Protection, Novi Sad
- Union of Employers of Vojvodina, Novi Sad
- Institute for Occupational Health, Novi Sad

Associated partners:
- Chamber of Commerce of Serbia
- Young Acousticians Network

UNIVERSITY OF
Southampton

EDUCONS
UNIVERSITY

УНИЈА ПОСЛОДАВАЦА СРБИЈЕ
SERBIAN ASSOCIATION OF EMPLOYERS

УНИЈА ПОСЛОДАВАЦА ВОЈВОДИНЕ
UNION OF EMPLYERS OF VOJVODINA

Work package WP1 – Preparation: Courses, Master Programme, Hub

The first goal of WP1 was a systematic study of the state-of-the-art in education in the field of noise and vibration in the EU and Serbia, which resulted in the publication of reports on:

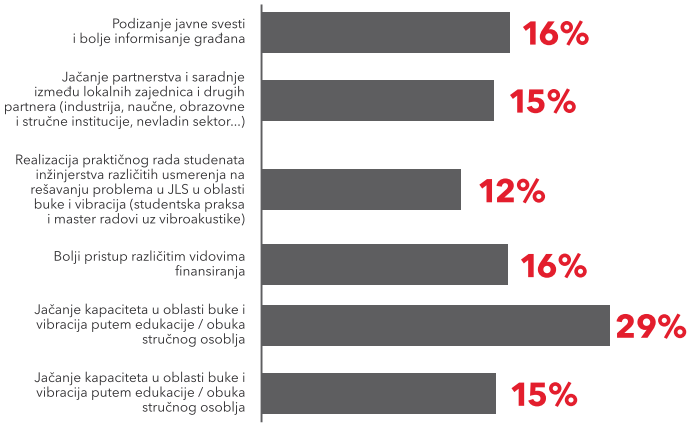
- Survey and comparison of Serbian and EU education in the field of noise and vibration
- Review and analysis of the existing MSc programmes of vibration and acoustic engineering in EU
- Examples of good practice of connecting interested parties in the area of noise and vibrations within the EU.

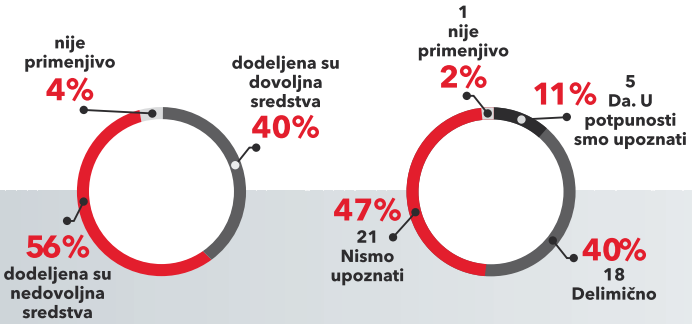
The next goal of WP1 was to determine, on the basis of previously obtained knowledge, directions for improving the level of education in the field of noise and vibrations by defining common learning outcomes for:

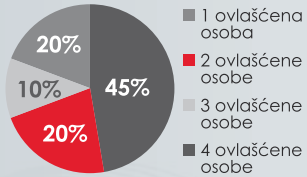
- Courses dedicated to the problem of noise and vibrations in six engineering programmes of Serbian academic partners: mechanical engineering, civil engineering, traffic engineering, electrical engineering, occupational safety and environmental protection
- Master programme in Vibro-Acoustic Engineering at the University of Novi Sad
- 2 types of LLL courses: 'Environmental & Occupational Noise and Human Vibration Risk Assessment', intended primarily for professionals who deal with vibration and noise measurements in working and living environment, and 'Environmental Noise Management', intended primarily for employees in local self-government and state administration bodies who plan and implement environmental noise protection action plans.

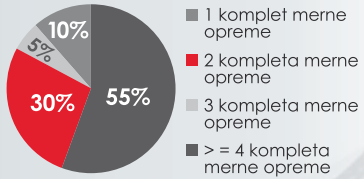
All previously presented results have been published in the fundamental document of the project preparation phase 'Report on Needs Analysis and Gaps Detected in Educational Capacities and Cooperation in the Field of Noise and Vibration Engineering in Serbia'.


SENVIBE
Erasmus + Projekat broj 598241-EPP-1-2018-1-RS-EPPKA2-CBHE-JP
Jačanje obrazovnih kapaciteta kroz izgradnju kompetencija i saradnje u oblasti inženjerstva buke i vibracije
SENVIBE
Izveštaj o analizi potreba i nedostataka uočenih u obrazovnim kapacitetima i saradnji u oblasti inženjerstva buke i vibracije u Srbiji
Aktivnost 1.7
Datum: 22.11.2019.


Podizanje javne svesti i bolje informisanje građana
16%
Jačanje partnerstva i saradnje između lokalnih zajednica i drugih partnera (industrija, naučne, obrazovne i stručne institucije, nevladin sektor...)
15%
Realizacija praktičnog rada studenata inžinjerstva različitih usmerenja na rešavanju problema u JLS u oblasti buke i vibracija (studentska praksa i master radovi uz vibroakustike)
12%
Bolji pristup različitim vidovima finansiranja
16%
Jačanje kapaciteta u oblasti buke i vibracija putem edukacije / obuka stručnog osoblja
29%
Jačanje kapaciteta u oblasti buke i vibracija putem edukacije / obuka stručnog osoblja
15%


nije primenjivo
4%
dodeljena su dovoljna sredstva
40%
56%
dodeljena su nedovoljna sredstva
1
nije primenjivo
2%
11%
5
Da. U potpunosti smo upoznati
47%
21
Nismo upoznati
40%
18
Delimično


20%
45%
10%
20%
1 ovlašćena osoba
2 ovlašćene osobe
3 ovlašćene osobe
4 ovlašćene osobe


10%
5%
30%
55%
1 komplet merne opreme
2 kompleta merne opreme
3 kompleta merne opreme
> = 4 kompleta merne opreme

Work package WP2 – Preparation: Resources, Facilities and Equipment

The goals of WP2 were to provide technical foundations for improved education in the field of noise and vibration at the academic Serbian institutions participating in the project, which was achieved via three types of activities:

- Design, development and improvements of the IT service e-SENVIBE, based on the Moodle platform, which supports modern educational methodologies of distance learning (e-learning and b-learning) for:
  - 3 common and 12 specialist topics for moduli (courses) taught at BSc studies,
  - 15 modules of the MSc studies of Vibro-Acoustic Engineering at the University of Novi Sad,
  - 2 LLL developed during the project
  - activities and relevant contents for members of the No&Vib Hub
- Acquiring modern equipment and resources needed to improve the teaching process:
  - instruments for noise and vibrations measurements for:
    - construction of laboratories for acoustic measurements (A-Lab) and vibration measurements (V-Lab) for the University of Novi Sad
    - for environmental noise and building acoustics measurements for the University of Nis,
    - for sound intensity and vibration measurements for the University of Kragujevac
    - for environmental noise measurements for the Educons University
  - literature, which consists of 40 most important titles in the field of noise and vibration,
  - video equipment: cameras, portable microphones, and cameras for distance teaching
- Training of Serbian teachers and technicians at leading institutions in the EU and Serbia:
  - two study visits (June 2019 and May 2022) to KTH University in Stockholm
  - study visit (December 2019) and online training (June 2022) by University of Southampton
  - training on noise and vibration measurements at University of Nis and University of Kragujevac

www.senvibe.uns.ac.rs


NOISE MANAGEMENT
NOISE MANAGEMENT
MACHINE DIAGNOSTICS

Work package WP3 – Development of Modules and Courses for Different Engineering Departments

The main task of WP3 was to modify existing and develop new modules and subjects (topics) in the field of noise and vibration for different engineering departments at the bachelor level, to develop learning materials for all engineering departments and to implement modified and new modules and subjects. This task was realized by achieving the following results:

- Modification of existing modules and subjects for BSc students:
  - 9 existing modules have been modified
  - Parts of 9 existing modules have been modified
  - https://senvibe.uns.ac.rs/2021/02/03/redesign-of-existing-courses-12-december-2020;
- Development of new subjects/topics for BSc and MSc students:
  - 3 new subjects developed for BSc students
  - 1 new subject developed for MSc students
  - https://senvibe.uns.ac.rs/WPcontent/uploads/2020/11/SENVIBE_Report_Task-3.2-FINAL.pdf
- Development of materials for e-learning and b-learning in the e-SENVIBE platform
  - Published digital materials in the form of multimedia presentations (28), web applications (4), animation and simulation (19), tests (12), video material (4), and noise measurement examples
  - Published printed materials (university textbook and study material)
  - https://www.e-senvibe.senvibe.uns.ac.rs/login/index.php
- Implementation of modified and new modules and topics
  - Over 1300 students at 4 universities enrolled in modified and new modules and had access to the materials developed


SenVBe

Work package WP4 – Development of LLL courses and the "SENVIBE Glossary"

The main tasks of WP4 were the development and implementation of Life-Long Learning courses and the creation, printing and distribution of the 'SENVIBE Glossary'.
The realization of these tasks was achieved:

- By developing the course 'Environmental & Occupational Noise and Human Vibration Risk Assessment', with 11 lecturers held (6 hours of theoretical classes and 2 hours of practical classes in 3 thematic areas: 'Human vibration risk', 'Occupational' and 'Environmental Noise') and implementing it twice:
  - Online course on 17-18 May 2021 with 17 attendees
  - Online course on 28-29 March 2022 with 36 attendees
- By developing the course 'Environmental Noise Management', with 5 lecturers held (3 hours of theoretical classes and 1 hour of discussion) and implementing it twice:
  - In Novi Sad on 21 June 2022 with 51 attendees
  - In Kraljevo on 29 June 2022 with 15 attendees.

  SENVIBE LLL courses were attended by a total of 119 participants.
- By creating the publication 'SENVIBE Glossary', which consists of two parts. The first part includes descriptions and translations into English of relevant terms in the field of noise and vibrations, as well as explanations of accompanying phenomena and systems in which they occur. The second part of the publication contains a sublimated description of European and domestic regulations in the field of noise and vibration in the context of environmental protection and occupational safety. A total of 300 copies of the 'SENVIBE Glossary' were printed.


PROCENA RIZIKA
OD BUKE U ŽIVOTNOJ I RADNOJ SREDINI
I VIBRACIJA KOJE DELUJU NA ČOVEKA
Kurs za celoživotno učenje


MENADŽMENT
BUKOM U ŽIVOTNOJ SREDINI
Kurs za celoživotno učenje


SERTIFIKAT
Kojim se potvrđuje da je
uspešno položio/la završni test na kursu celoživotnog učenja
PROCENA RIZIKA OD BUKE U ŽIVOTNOJ I RADNOJ SREDINI I VIBRACIJA KOJE DELUJU NA ČOVEKA
ISHODI KURSA


SERTIFIKAT
Kojim se potvrđuje da je
uspešno položio/la kurs celoživotnog učenja
MENADŽMENT BUKOM U ŽIVOTNOJ SREDINI
ISHODI KURSA

Work package WP5 – Development of the New VAE Master Programme

WP5 was dedicated to the development and implementation of a new MSc Academic Programme Vibro-Acoustic Engineering (MASVAE) at the University of Novi Sad, and the following results were achieved:

- Programme development
  - The new title of Master Engineer of Vibro-Acoustic Engineering was registered and included in the list of professional, academic and scientific titles in Republic of Serbia
  - Developed content of MASVAE (curriculum contains 12 modules and enables profiling towards Vibration Engineering, Acoustic Engineering or Environmental Noise and Vibrations)
  - Accredited programme as an IMT study programme, by the Certificate of the National Body for Accreditation and Quality Assessment in Higher Education dated 22 April 2021
- Programme promotion
  - Recorded a promo film and posted it on YouTube
  - Created the MASVAE website, available through the SENVIBE site
  - Created and distributed leaflets in electronic and paper form
- Programme implementation
  - 25 students enrolled for 25 available places
  - Appropriate promo material was distributed to all students, which included the 'SENVIBE Glossary' (created within WP4)
  - Classes were held mostly through the Microsoft Teams platform, while laboratory exercises were held live, using new equipment. The e-SENVIBE platform (created within WP2) was also used, in which each module has its own presentation with newly developed digital learning materials


ZAŠTO IZABRATI MAS VAI?
ŠTA ĆEMO NAUČITI NA MAS VAI?
MOGUĆNOST IZBORNOSTI I PROFILIŠANJA
Vibraciono inženjerstvo
Akustičko inženjerstvo
Buka i vibracije u životnoj sredini
INTERDISCIPLINARNOST
KOMPETENTNO NASTAVNO OSOBLJE
SAVREMENOST I MEĐUNARODNA USKLAĐENOST
Nove laboratorije
Moderna oprema
Platforma za učenje
Digitalni nastavni materijali
SAVREMENOST MATERIJALNIH RESURSA
NAUČIĆEMO DA:
RAZUMEMO
zvuk i vibracije
na naprednom nivou, koristeći analitičke, numeričke i eksperimentalne metode
PREPOZNAJEMO I RAZUMEMO EFEKTE
zvuka i vibracija
na strukture i živa bića, primarno čoveka
KONTROLIŠEMO I KORISTIMO
zvuk i vibracije
za dobrobit čovečanstva


SENVIBE Vib

Work package WP6 – Establishing the No&Vib Hub

The cooperation platform No&Vib Hub is an organizational basis for networking academic and non-academic institutions that are interested in noise and vibrations. No&Vib Hub was founded at the University of Novi Sad on 10 November 2020. The work of No&Vib Hub is directed by the Coordination Body headed by Prof. Ivana Kovacic, coordinator of the SENVIBE project, and logistical support for the platform is provided by the Centre for Vibro-acoustic Systems and Signal Processing (CEVAS) of the Faculty of Technical Sciences of the University of Novi Sad. So far, 45 members from the governmental, academic, research, economic, professional and non-governmental sector (NGO) have joined the platform. Joining can be done online via the No&Vib Hub website.

After its establishment, No&Vib Hub realized the following activities::

- Presentations and promotions on the occasion of the International Noise Awareness Day
- Proposals for changes and additions to legal regulations
- Creation of brochures: 'Occupational Noise – Guide for Employees and Employers', 'Occupational Vibration – Guide for Employees and Employers' and 'Guide for the Local Self-Government Units – Environmental Noise'
- Conducting noise and vibration surveys among the general population and NGOs
- Production of educational video materials 'Environmental Noise', 'Occupational Noise', 'Sense of Hearing and Health Effects Caused by Noise', 'Noise Pollution'
- Creation of a leaflet about noise for a wider community 'What is noise? - a reminder of what we should know about it'
- Finding positions for internship (ongoing)

No&Vib HUB

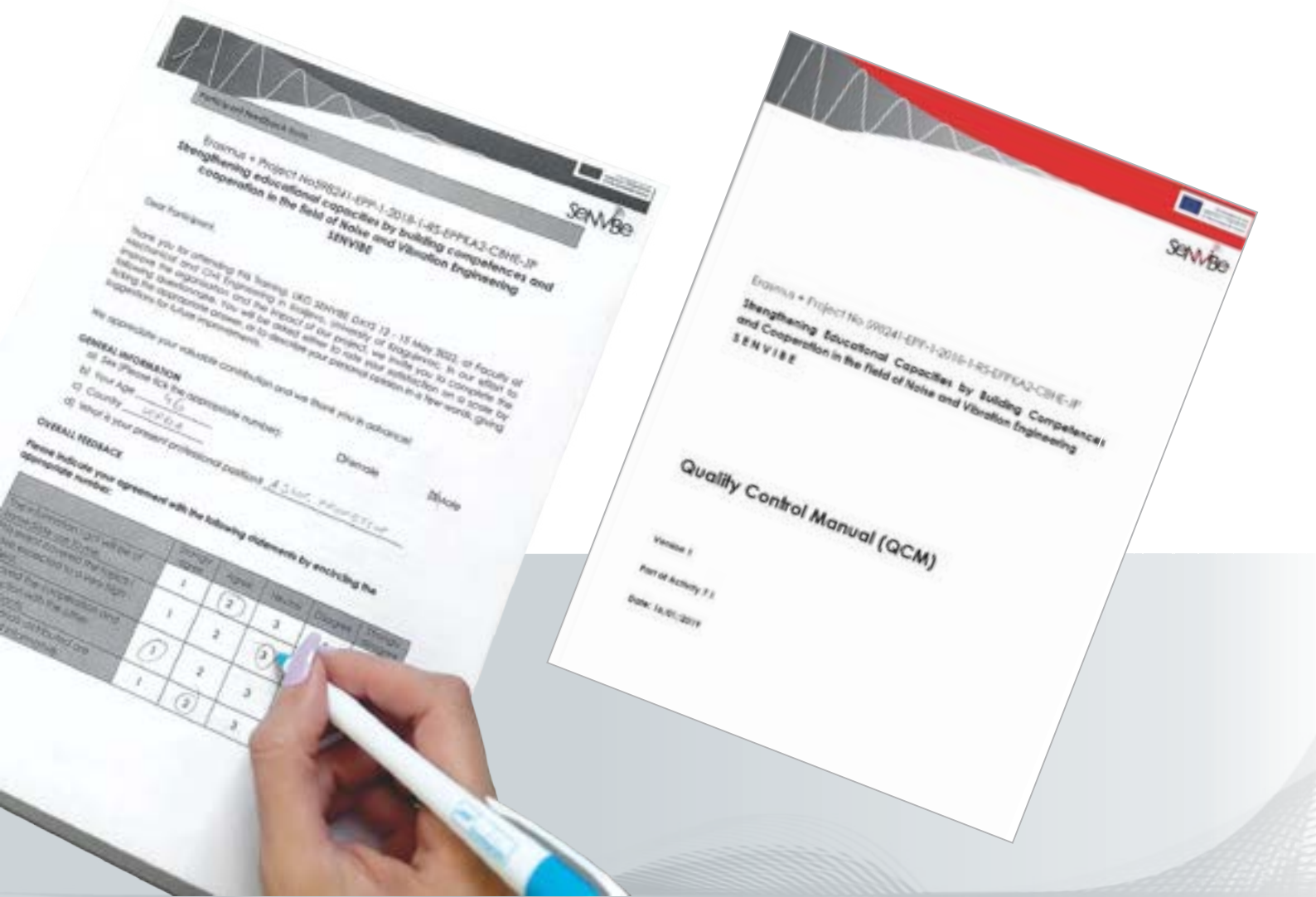

Nevladin sektor
UNS, Educons
Državni sektor
SUPEP, UNI
Stručno-profesionalni sektor
UNI
Obrazovno-naučni sektor
UNS, UniKG
Privredni sektor
UPV, IOH, UniKG


VODIČ ZA PRIVREDU –

Work package WP7 – Quality Control, Assurance and Monitoring

The task of WP7 was the development of quality control mechanisms and the implementation of internal and external reviews of project processes and outcomes, as well as the assessment of realized activities by students and all interested parties through surveys that are statistically analysed, and the results posted on the project internal platform (SENVIBE Cloud). This work package was implemented through 3 tasks:

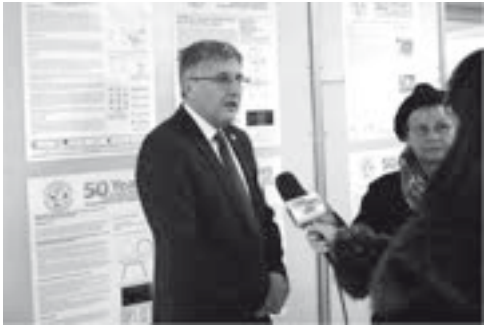
- Development of the quality control mechanisms
  - As a basic quality control document, the Quality Control Manual was developed. The main definitions related to quality management are listed in the manual. Then the processes for planning and carrying out project activities were defined.
  - The manual set the minimal principles, requirements and processes needed to implement effective quality assurance.
  - Appropriate forms were created that enabled the evaluation of the obtained results.
- Internal and external reviews of processes and outcomes
  - Internal and external reviews were conducted at 3 levels: institutional, national and international: 12 external evaluations, 12 internal evaluations, and 10 supervisory visits were carried out.
- Evaluation of conducted activities by students and all interested parties
  - For the purpose of evaluation, appropriate questionnaires were created as e-forms or hard copies for different types of activities. Surveys were created for participants of LLL courses, teaching staff, the non-governmental sector and students.
  - A total of 384 participants of the SENVIBE project were surveyed, namely: 119 LLL course participants, 135 training participants, 73 students and 57 NGO representatives. The online survey was completed 113 times. All survey results are presented on the SENVIBE Cloud.


SENVIBE
Erasmus + Project No.598241-EPP-1-2018-1-RS-EPPKA2-CBHE-JP
Strengthening Educational Capacities by Building Competences and Cooperation in the field of Noise and Vibration Engineering
SENVIBE
Quality Control Manual (QCM)
Version: 1
Part of Activity 7.1
Date: 16/01/2019

Work package WP8 – Dissemination & Exploitation

The main task of WP8 was to present the goals, conception and achievements of the SENVIBE project to experts and the general public. This task was realized by achieving the following results:

- Promotion in the electronic media:
  - 7 newsletters about the project were distributed by e-mail to 81 registered recipients
  - The Facebook account of the project, with more than 100 published posts, has over 120 followers
  - The Twitter account of the project, with more than 40 published posts, has more than 15 followers
  - Through the project's two YouTube channels, 13 video materials were published, which had over 1600 views and more than 40 registered followers
  - The project was presented in more than 20 television shows
- Promotional events:
  - 21 promotional events were organized as part of the project, including 4 information days of the SENVIBE project, 3 inter-project coaching events, 4 events marking the International Noise Awareness Day, 4 visits to schools and other institutions
  - Project partners participated in 20 events organized by other entities, including 10 participations at education fairs, as well as presentations at scientific conferences and workshops
- Printed materials:
  - 1 brochure on the project concepts, goals and implementation of the project in Serbian and English has been published
  - 2 leaflets on LLL courses and 2 leaflets on the new master programme have been published




FAKULTET ZAŠTITE NA RADU U NIŠ







EDUCONS
UNIVERZITET

SeNVBe

swarm

ALLVET

ImprESS

ISSES

Work package WP9 – Management

Project management comprised the following activities:

- Establishing internal project management structures, including:
  - Project Management Team (PMT)
  - Steering Committee (SC)
- Organizing project coordination meetings, among which are:
  - Kick-off meeting at the University of Novi Sad on 20-21 November 2018
  - Numerous meetings of governing bodies, as well local meetings of partner institutions
  - Final SENVIBE conference at the University of Novi Sad on 6-7 October 2022
- Development of management and reporting procedures
- Development of the Internal Communication Plan and Financial Management Plan
- Setup and development of the SENVIBE Cloud for hosting project documents and results by development history
- Day-to-day project management


SenVibe

SeNVBe

www.senvibe.uns.ac.rs
senvibe@uns.ac.rs
facebook.com/senvibe.project
twitter.com/senvibe

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.