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EDUENVI – DEVELOPING ONLINE PEDAGOGY IN THE FIELD OF SUSTAINABLE WASTE MANAGEMENT IN KAZAKH AND RUSSIAN HEIS

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Abstract:

Concern of climate change is acute all over the world, also in Russian and Kazakhstan. The countries have started to act to improve the state of the environment, but as the standards of living are increasing in these countries, it is obvious that more actions need to be done. Also, the lack of high-quality education in the field is a recognized problem. To combat these problems the capabilities of organizing modern pedagogically high-quality education need to be improved.

The aim of EduEnvi, a three years lasting Erasmus+ CBHE project (2017-2020), is to build capacity in the partner universities in Russian and Kazakhstan by developing online education in the field of Sustainable Waste Management. This article concentrates on the views of the higher education institutions staff on what has been learned during the project. The results are based on the interviews with the university teachers who have participated in the project activities.

Keywords*: Online pedagogy, Sustainable waste management, Capacity building, Online course development*

Improving the state of the environment has been recognized as a major challenge in the past years in Russian and Kazakhstan. Protecting the environment by efficient waste management, reuse of materials and recycling are priorities in both countries. For example, in Russia the waste management legislation was updated 2014 and objectives for recycling were set (Lidings, 2020). In recent years the infrastructure for waste management also has been developed by the help of international projects. However, as the standards of living are increasing, there are not enough proper, safe and controlled landfills and other waste management practices have to develop to ensure sustainable waste management (SWM).

One recognized problem is the lack of professionals and high quality education in waste management. This came up both in the preliminary needs analysis carried out by Tampere University of Applied Sciences (TAMK) during the project preparation and in the need analysis conducted with the external stakeholders and carried out by Kazakh and Russian partner universities during the first months of the project. Need for improving modern pedagogical approaches and online learning education are both current challenges in the partner countries (EduEnvi-project description 2017, 56-57, EduEnvi 2019).

The aim of EduEnvi project is to build a sustainable solution to these challenges by developing master level online courses in the field of sustainable waste management (SWM). The project is funded by Erasmus+ Capacity Building for Higher Education Programme, and thus the aim is to support the modernization, accessibility and internationalization of the education in partner countries (e.g. European Commission 2020, 160). According to these alignments, the aim of EduEnvi project is to build the capacity of partner universities in implementing online learning modules in the field of SWM and in other study fields and continue this after the end of the project. European partners: TAMK from Finland, Universidad Valladolid from Spain and UCL University College from Denmark support the development in their expert areas: online pedagogy, SWM and university-industry co-operation.

Various workshops and teacher training sessions have been organized during the project and eight modules, all together 20 online courses have been developed (60 ECTs). These courses cover comprehensively the topics of SWM (table 1). When developing the modules, the partner universities have co-operated for example by sharing expertise about the contents and experiences about learning activities. However, there has usually been one university in charge of development of each course. The online courses were piloted during academic year 2019-2020. Al-Farabi Kazakh National University was responsible of organizing the piloting and the feedback collection.

Feedback was received from 147 students, 12 teachers and five enterprise representatives. The feedback consists of structural questions and open feedback.

This paper discusses Russian and Kazakh teachers' experiences and learnings during the project. The findings are grouped into three categories: reflections on student feedback, development of personal and organizational capacity and developing expertise in sustainable waste management. Finally, the partners next steps are described, and preliminary conclusions are drawn on the results of the project.

Table 1. The modules and courses developed in EduEnvi and the universities responsible of the development

	Name	Leader
Module 1	**Comprehensive risk assessment in waste management**	
Course 1	Introduction to environmental risks	Kokshetau State University, KAZ
Course 2	Environmental, social and economic risks	Tyumen State University, RUS
Course 3	Solid wastes and environmental risks	Tyumen State University, RUS
Module 2	**Biotechnologies for waste utilization**	
Course 1	Basics of ecological biotechnologies	South Kazakhstan State University, KAZ
Course 2	The Applied Aspects of Using Biotechnological Methods for Waste Utilization	ITMO Univeristy, RUS
Module 3	**Non-energy technologies for waste utilization**	
Course 1	Basics of waste utilization	Al-Farabi Kazakh National University, KAZ
Course 2	Reuse of side products and outputs	Al-Farabi Kazakh National University, KAZ
Course 3	Physico-chemical treatment methods in waste management	Al-Farabi Kazakh National University, KAZ
Module 4	**Energy technologies for waste utilization**	
Course 1	Waste-to-energy plants and technologies	Al-Farabi Kazakh National University, KAZ
Course 2	Energy efficient technologies in waste treatment	Al-Farabi Kazakh National University, KAZ
Module 5	**Development of business and entrepreneurship for sustainable waste management**	
Course 1	Modeling of business processes in the field of waste management	ITMO Univeristy, RUS
Course 2	Business planning for sustainable waste management projects	ITMO Univeristy, RUS
Module 6	**Public administration and municipal governance in Sustainable Waste Management**	
Course 1	Institutional approach to SWM decision-making	Ural Federal University, RUS
Course 2	Public and municipal governance in SWM	Ural Federal University, RUS
Course 3	Budget and financial base of SWM	Ural Federal University, RUS
Module 7	**Environmental management and waste prevention**	
Course 1	Waste prevention: sustainable business models, tools and good practicies	ITMO Univeristy, RUS
Course 2	Application of ISO 14001 for waste prevention	ITMO Univeristy, RUS
Course 3	Theory and practice of waste management in companies	ITMO Univeristy, RUS
Module8	**Life cycle assessment and life cycle costing**	
Course 1	Introduction to LCA based on ISO 14040 series	Tyumen State University, RUS
Course 2	Application of LCA for waste prevention	ITMO Univeristy, RUS

This paper is based on materials collected in and after the piloting phase of the developed online courses. The primary material consists of video interviews organized by TAMK and by the leader of the piloting work package from Al-Farabi Kazakh National University in March 2020 after the piloting had finished. The main reason for organizing the interviews was to analyze the pilots and reflect on what has been learned so far in the project. The interviews focused on the courses the interviewed university had responsibility of.

Representatives of five partner universities were organized to discuss their experiences of course development, piloting and capacity construction (table 2). Also, the feedback collected from students and working life partners during piloting was discussed. If all the teachers involved couldn´t participate to the interview the teams were asked to discuss the questions within the teams before the interview so that the opinion of all the teachers could be heard.

Table 2. The universities that the interviews were organized with and number of staff involved

University, Country	Number of staff participated in the interview
Al-Farabi Kazakh National University, Kazakhstan	4
M.Auezov South Kazakhstan State university, Kazakhstan	2
Sh. Ualikhanov Kokshetau State University, Kazakhstan	9
Ural Federal University, Russia	2
University of Tyumen, Russia	3

The interviews were mainly carried out in English, but as some interviewees, preferred expressing themselves in Russian one native Russian from TAMK´s project team translated answers from Russian to Finnish. This may have caused some misunderstandings even though confirmative questions were asked. The interviews were organized online, and each interview lasted about 45 minutes. All the interviews were recorded, expect one.

The questions that were discussed in the interviews:

1. How do you find the feedback received from the pilots regarding the course(s) you have developed? How does it help you develop the courses?
2. How do you feel your capacity in online pedagogy is improved personally? What about the capacity of your university as higher education institution?
3. What have you learnt about the subject (sustainable waste management)?
4. What are your next concrete tasks regarding to EduEnvi project?

Reflections on feedback

The feedback received from the students regarding to developed online courses touched quite diverse issues. Some feedbacks related to the course structure. Many students liked to experience new kinds of ways of learning. Some students found online courses more difficult than face-to-face courses. In the interviews, some teachers expressed that this is very important information, because in online environment it is more difficult to find ways how to support the students. Also, teachers were pleased to learn, which activities students had liked and what kind of content they wish more.

Some of the feedback concentrated on the technology used in the online courses. The participating universities have used different platforms. All of the online courses of Kazakhstan partner universities are placed at the National Open Education Platform, moocs.kz and open.kaznu.kz. Tyumen State University used Eliademy platform that caused problems because the maintenance of Eliademy could not be guaranteed. Now this university will consider which platforms to use in future. This question needs to be solved in the university level.

Feedback was also received regarding to the tools used in the online courses. Many students wished to have more videos and visual material and the teachers also think that it has been interesting to learn how to make videos. On the other hand, many teachers also expressed that there is still much to learn about making and using videos in online education.

The teachers found that the feedback is constructive and assured that it will be used when developing the courses further. According to some of the teachers the feedback tells what is most important for the students on a good online course. Thus, the feedback shows the most important objects of development: clear instructions and timetables, up-to-date materials and meaningful assignments. Also, assessment of the courses needs still refinement based on the student feedback. All the teams are aware that developing an online course needs iterations and updates.

Development of personal and organizational capacity in online pedagogy

The teachers' comments on development of online pedagogy discussed learning to use tools and materials and learning how to design and construct an online course. The most often mentioned new skill was making videos. Using blogs in teaching was also mentioned. Many of the teachers told that they have learned much about how to design an online course in practice, i.e. how to make the manuscript, how to plan the time consumption and how to assess. Also, many of the teachers realized that it is important to prioritize materials because lots of information is available. Teachers have learned how to be short and concrete. They have also got acquainted with copyright issues.

The teachers described that during this development process they have started to think teaching and learning more from the student perspective. The workshops organized during the project have helped teachers to design the courses and to pay attention to the competences students should obtain and how teaching and learning should be organized with new methods to achieve the learning outcomes. These comments describe a more fundamental change in teaching and learning paradigm.

Some of the teachers described that it is good that this kind of pioneering development work in the university can be done in co-operation so that the learning is more comprehensive, and success is shared. Teachers stated that receiving support from European universities and their peers both in their own university and from other partners in the project has been important. Networking with new partners is valued as it has challenged own thinking about teaching and the subject matter. The teachers also mentioned that training in the project was practical which helped in organizing courses and learning activities. Some of the teachers also mentioned that many departments from the university have been able to take advantage of the learned issues, not only the core project team.

All the teachers told that universities´ online learning facilities have improved during the project. The equipment is now modern and studios for making videos have been set up. Communication with technical support staff has increased during the project and the processes of producing courses have been clarified. Some teachers stated that their university is now among the national frontline pioneers of online learning.

Developing expertise in sustainable waste management

One objective of the project was to enhance modernization of Russian and Kazakh waste management. Education is not the fastest way to make a change, but it is a sustainable and long-lasting way. According to the teachers it has been very valuable to see concrete examples and to get to know how waste management is organized in Europe and in the partner cities. Co-operation with colleagues from Saint Petersburg was specifically valued by

some teachers. Teachers also mentioned that their capabilities co-operate with local companies and municipalities and to use them as learning environments developed during the project. This is a combination of learning about pedagogics and the subject matter and different actors in waste management.

Seeking information for the new courses and discussing the subject matter in the course development phase has produced learning and updating understanding. Teachers mentioned specifically risk assessment, life cycle analysis and legislation as topics in which their knowledge developed significantly.

All the teams described that environmental issues are now taken more seriously in their universities than in the beginning of the project. Some of the teachers feel that the projects related to the SWM have been starting point for general development of environmental awareness in the university. For example, various thematic days have been organized and co-operation with voluntary groups is increasing. Some universities have also possibility to promote ecological themes in comprehensive school curricula. The others describe that the project has provided them with knowledge and skills which give them a critical role in the development of the regional waste management system. All together the teachers feel that important progress is on its way through the wider perspectives to education and increasing awareness on environmental issues.

Next concrete steps regarding to the project

An important objective for the project is to include the developed courses in the curricula of the universities. All universities have accepted the courses as part of the curricula, but the accreditation process is still incomplete. However, according to the Kazakh teachers the courses are now in the recommended list which means that the next step is the accreditation.

On course implementation level the next step after piloting and feedback is to improve the courses. All teachers mentioned that they will continue testing and applying new methods and technologies. Some teachers mentioned that they will try to be more creative and concentrate more on the student perspective. They will focus making studying more interesting and pay attention to the learning process. Some teachers specifically mentioned improving video lectures, for example including teacher face in the video. Also new materials are planned in co-operation with companies.

Many of the teachers mentioned that discussions and planning with the technical support teams will continue. Teachers still feel that they need support, for example in video editing. Also, some teachers feel that outlining the use of different platforms needs to be done in the university level. Some of the Kazakh teachers are participating in the development process of national online education standards.

Also exploiting the results of the project will be next tasks. Teachers described that they will promote the courses inside the university and will communicate results to stakeholders. One way of doing this are demonstration sessions with working life partners. Some of the teachers plan to write articles related to the development work and the pedagogical aspects.

Conclusion

The main object of the EduEnvi project is to build capacity of the local academic staff in Russian and Kazakh HEIs (Eduenvi project description, 2017). The expected and concrete result is the developed online courses on SWM. Presently, we can state that the main object of the project has been reached.

The interviews made after piloting helped to reflect on what has been learned and to clarify the development process. The interviews revealed the teachers' genuine feeling of learning, success and pioneer work both in online teaching and learning and in renewing thinking in sustainable waste management and environmental education.

Teachers have faced challenges in creating and implementing online courses. Most of them did not have any previous experience of online teaching. During the piloting teachers became more confident in online teaching and realized the importance of student-oriented approach in teaching. As a generalization of the teacher interviews the realization of the importance of student-orientation and shifting emphasis from teaching to learning has been the most important learnt matter.

Additionally, online teaching has become more visible and recognized in the universities. Developing the online courses gave teachers a deeper knowledge not only on SWM substance, but also on how to design pedagogically high-quality online course. The co-operation with stakeholders (enterprises, municipal authorities and associations) became tighter and more actual. Pedagogically it means developing more attractive (interesting) and practical tasks for the students.

To ease the workload of teachers, the technology and processes for producing online courses in universities should be functional. Technical issues, such as availability of LMS (learning management system) and decision making about investments in online learning, should be solved on institutional level. Along with the subsequent development of the courses, it is also important to promote the courses and the theme of SWM on institutional level and to stakeholders widely. Development of master level online courses (in the field of SWM) undoubtedly gives opportunity for improving the competitiveness of the partner universities.

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ПЕРСПЕКТИВЫ РАЗВИТИЯ ВЫСОКОСКОРОСТНОГО ЖЕЛЕЗНОДОРОЖНОГО ТРАНСПОРТА В РЕСПУБЛИКЕ КАЗАХСТАН

PROSPECTS FOR THE DEVELOPMENT OF HIGH-SPEED RAIL TRANSPORT IN THE REPUBLIC OF KAZAKHSTAN

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Abstract:

Rail transport is a relatively safe mode of transport. Having arisen at the beginning of the XIX century, by the middle of the same century it became the most important transport of industrial countries of that time. Railways have many advantages - high load capacity, reliability, relatively high speed.

First in Japan, and now in Europe, a system of high-speed railways was created, allowing traffic at speeds of up to three hundred kilometers per hour. Such railways have become a serious competitor to airlines over short distances. The formation of a Eurasian transport partnership is interested in eliminating technical and institutional "seams" on transcontinental communications, in creating speed and high-speed roads. It is important for Kazakhstan to respond in time to global trends and get involved in the ongoing process of modernizing the railway infrastructure, using all available resources. Its vast territories, low population density, big distances between cities and remoteness from the world main global markets have always made the building or railway system crucial for the country. In order to put into practice such an ambitious project an efficient technology and knowledge transfer are necessary. M.Auezov SKSU is the main initiator and integrator of scientific and educational processes in the territory of the South Kazakhstan region and is a full participant in this project, coordinated by Erasmus+. The key study fields within a new master program would be innovative resource-saving, environmentally compatible and cost-efficient technologies for high speed as well as theoretical and empirical approaches of modern transportation development.

Keywords: *transport, railway transport, Republic of Kazakhstan, high-speed, development, experience.*

The transport complex of the Republic of Kazakhstan, represented by rail, road, inland water, air, pipeline modes of transport, roads and railways, shipping routes, plays a crucial role in the implementation of inter-farm and interstate relations. The share of transport in the gross domestic product of the republic in 2018 amounted to 7.2%.