PUBLIC SECTOR-UNIVERSITY COOPERATION: MOOCS ON ENVIRONMENTAL AUDITING

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INTRODUCTION

MOOC is an acronym for "massive open online course" and it denotes free online courses, which do not have restrictions on registration, being designed for large numbers of learners. 2012, when several well-financed MOOC providers associated with top universities emerged, has been called “the year of the MOOCs“ by the The New York Times (Pappano, 2012). A large number of world leading universities offer MOOCs now: in 2018, 900 universities offered MOOCs for 100 million learners (Shah, 2018).

The University of Tartu started to develop MOOCs in the beginning of 2014 and has since implemented 27 courses (see the list of University of Tartu’s MOOCs at https://moocs.ut.ee/). Between 2014–2018, 31,256 participants have taken part in University of Tartu MOOCs and the average completion rate has been 52.2%. The purposes for the development of MOOCs have been to ensure free access to higher education for different target groups, to introduce the University of Tartu curricula in English, to promote the possibility of studying at the university to potential learners, and in the broadest sense to serve society.

Massive open online courses can also be used in degree education, embedded within a course, whether bt taking the MOOC during the period of study or using a previously passed MOOC via recognition of prior learning. Teachers have pointed out that participants in MOOCs have a more diverse educational background than traditional students and they often work in the field. Based on these students’ active participation, questions and feedback, the teachers have an invaluable opportunity to improve their learning materials (which they also use in their subject courses) with new perspectives. In this way, MOOCs also contribute to improving the quality of learning and to supporting the learning process in degree programs.

NEED FOR TRAINING

Supreme audit institutions from all over the world engage in the assessment of environmental tools and policies implemented by their governments and public authorities. The National Audit Office of Estonia has extensive experience in environmental auditing, and for over 10 years has been steering the activities of international working groups on environmental auditing. MOOCs are a cost-effective way to share this expertise with peers from around the world as well as with non-auditors interested in public-sector environmental policies.

Since 2016, the University of Tartu and the National Audit Office of Estonia have jointly developed and implemented three MOOCs on environmental auditing: “Introduction to Environmental Auditing in the Public Sector”, “Auditing Environmental Impacts of Infrastructure” and “Auditing Water Issues” (under the aegis of the EUROSAI Working Group on Environmental Auditing (WGEA)). The fourth course, “Auditing Waste Management” is under development and is based on the practice of several supreme audit institutions from around the world that collaborate within the environmental audit working group of the International Organisation of Supreme Audit Institutions (INTOSAI WGEA).

Citation: Pilt, L; Seene, A; Ristolainen, T; Kesküla, K; Rasso, T (2019) ***Public sector-university cooperation: MOOCs on environmental audit.*** In: eucen Studies. eJournal of University Lifelong Learning. Conference Mainz, 3(1), 2nd edition, pp 5-12. © **eucen**, 2019. https://doi.org/10.53807/0301rxba

The National Audit Office of Estonia chose the University of Tartu as a partner in developing and implementing MOOCs because of the university's extensive experience and technical and pedagogical competence in implementing e-learning and MOOCs.

OVERVIEW OF THE COURSES

The first MOOC, “Introduction to Environmental Auditing in the Public Sector“, has been designed to give learners an overview of basic environmental management principles and the methods of public sector environmental performance auditing. After the course, the successful learners will better understand the importance and complexity of the concept of sustainable development, know the common governance tools that are used in environmental management, and be familiar with the common steps in the audit cycle, including an audit design matrix and the process of reporting and communicating audit results.

Learning module for this course is available at: https://sisu.ut.ee/env-intro

The second MOOC, “Auditing Environmental Impacts of Infrastructure“, focuses on the public sector audit of infrastructure projects from an environmental and sustainability perspective. Participants learn about the importance and scale of environmental and sustainability impacts arising from infrastructure development. The course covers main governance tools and methods that are used for managing the environmental impacts of infrastructure. Those who pass the course successfully will be able to plan a performance audit addressing the environmental and sustainability impacts of infrastructure, including the formulation of audit questions and criteria.

Learning module for this course is available at: https://sisu.ut.ee/env-infra

The third MOOC, “Auditing Water Issues“, concentrates more specifically on the management of water resources, again from the viewpoint of auditing the environmental and sustainability impacts. Learners passing this course will understand the importance and scale of environmental and sustainability impacts arising from water issues and can draft and analyse performance audit design matrixes addressing the environmental and sustainability impacts of water issues. They know the legal framework and main governance tools that are used for water management.

Learning module for this course is available at: https://sisu.ut.ee/water

The MOOC “Auditing Water Issues“ consists of examples of audit cases based on the practice of several Supreme Audit Institutions from the European Organisation of Supreme Audit Institutions (EUROSAI) region. Supreme Audit Institutions from the following countries contributed to developing the MOOC: Albania, Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, Lithuania, Malta, the Former Yugoslav Republic of Macedonia, the Netherlands, Slovenia, Turkey.

The credit value of each course is 26 hours (1 ECTS).

LEARNING PLATFORMS

For the technical implementation of the MOOC study materials the website and learning module building platform Sisu@UT (https://sisu.ut.ee) is used.

Sisu@UT has been developed on the basis of a free open source OpenScholar software project at the University of Tartu and is designed to create websites related to teaching and research at the university. It is a user-friendly tool for compiling learning modules, learning objects, and personal or project websites. All university staff that have a university computer network ID can use the platform.

Sisu@UT has received very positive feedback from its users especially with regard to the free open source software, which enables a user to add and change interactive features online inside the same web site / learning module. It makes the management of learning modules easier and less time consuming than other similar offline tools or online tools that do not enable interactive elements (Pilt, Tartes, Marandi, 2014).

The MOOCs are managed in the university's Moodle environment (https://moodle.ut.ee).

The University of Tartu has been using the Moodle environment since 2009 and uses it for both degree education and continuing education courses, MOOCs included. In 2018, 48.2% of continuing education learners (18,934 learners) participated in partially or totally web-based courses. The added value of using Moodle is the data exchange with the Study Information System (SIS), which facilitates the registration of participants and the issuance of certificates. Using the same Moodle environment to run MOOCs allows the university to save on development and administration costs.

Learners register for the course in the university's Study Information System (SIS) using the link provided in the course description. The learners' data is automatically transferred from the SIS to Moodle. Their usernames and passwords for Moodle are also created automatically and a notification about it is sent to the learner.

The learners' data is updated automatically every night or manually whenever necessary. It is also possible to automatically transfer learners' results from Moodle to SIS, where the completed learners report is finalised.

INSTRUCTIONAL DESIGN

The main components of the courses are: course description and study guide; instructions; communication tools (e.g. forums); links to study materials, activities and assessments (quizzes, discussions); and a feedback survey about the course and the learning environment.

The digital study material package supports the achievement of learning outcomes by being well structured, instructive, illustrated, interactive, giving automatic feedback, and being suitable for independent learning for learners with different learning styles. The learning materials package includes content (text, pictures, animations, videos up to 10 minutes), learning activities, tips for auditors, case studies, thinking exercises (see Figure 1), and self-assessment to evaluate the achievement of learning objectives (see Figure 2). Videos are provided with subtitles.

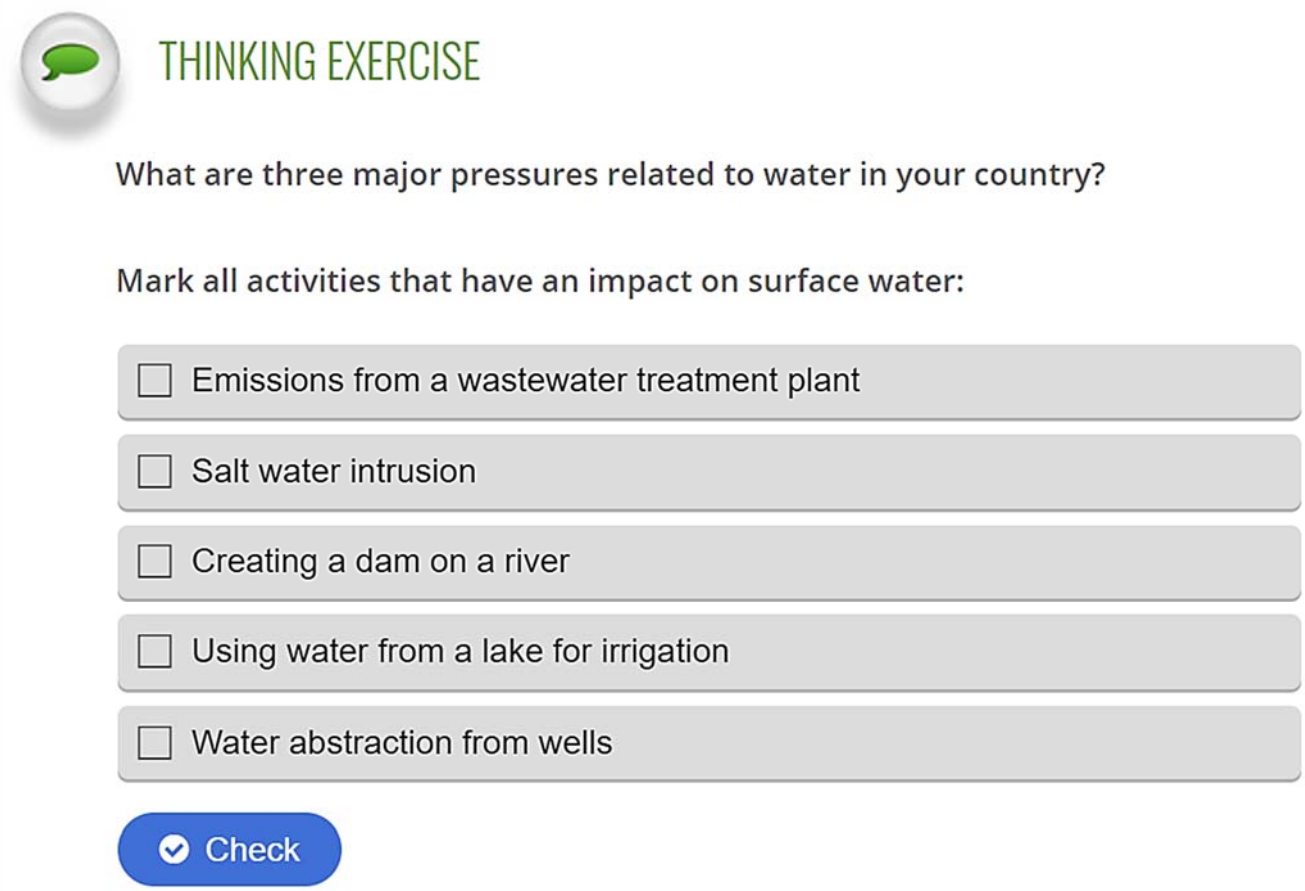
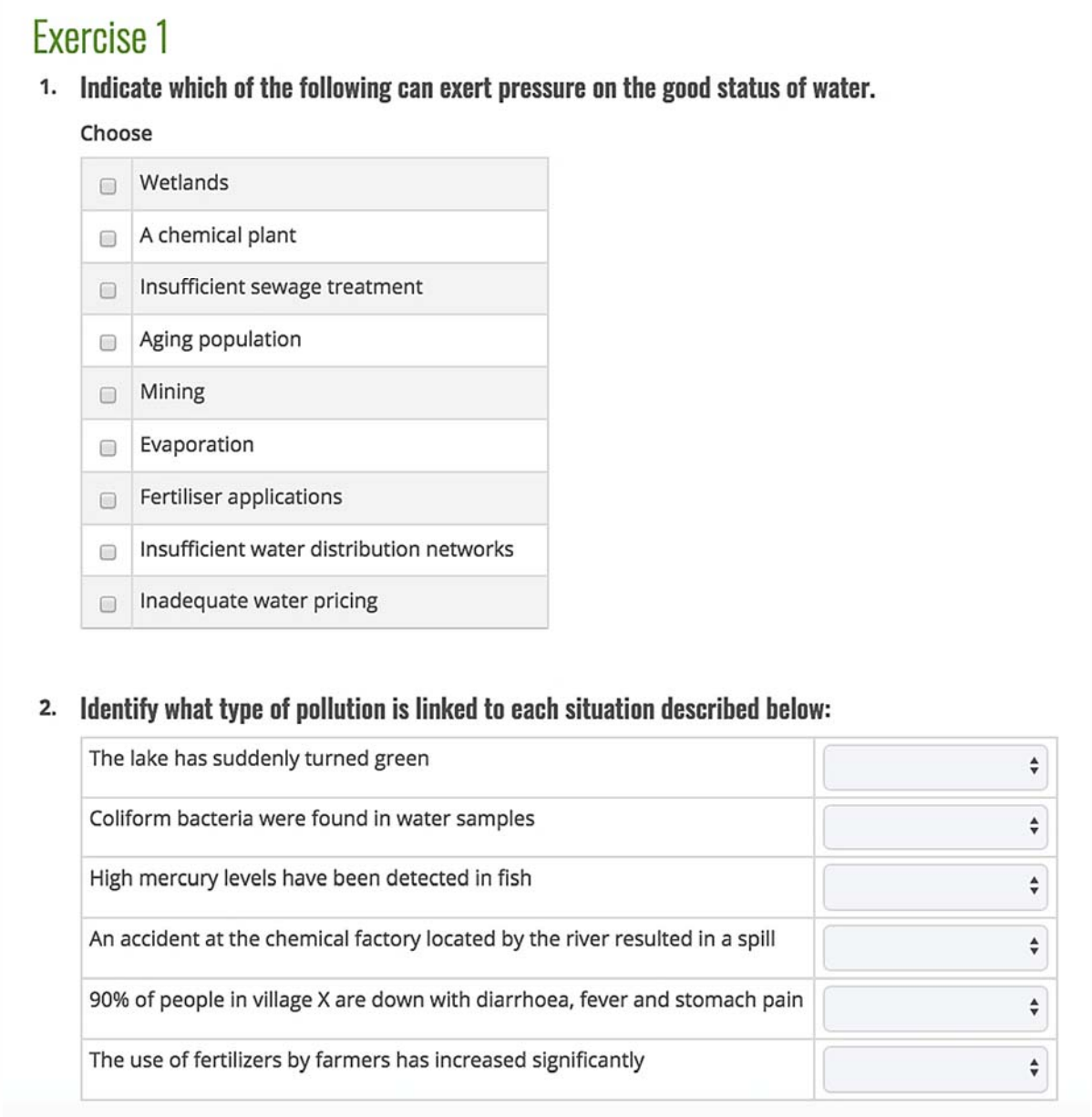


Figure 1: Thinking exercise in learning materials created with H5P tool (https://h5p.org)
https://sisu.ut.ee/water/book/11-pressures-affecting-good-status-water



Exercise 1

1. **Indicate which of the following can exert pressure on the good status of water.**

Choose

☐	Wetlands
☐	A chemical plant
☐	Insufficient sewage treatment
☐	Aging population
☐	Mining
☐	Evaporation
☐	Fertiliser applications
☐	Insufficient water distribution networks
☐	Inadequate water pricing

2. **Identify what type of pollution is linked to each situation described below:**

The lake has suddenly turned green	
Coliform bacteria were found in water samples	
High mercury levels have been detected in fish	
An accident at the chemical factory located by the river resulted in a spill	
90% of people in village X are down with diarrhoea, fever and stomach pain	
The use of fertilizers by farmers has increased significantly	

Figure 2: Self-assessment exercise at the end of study module https://sisu.ut.ee/water/water

During the four-week course period the work is organized using the Moodle online environment. All registered participants receive information on how to access Moodle and how to work in it. For every week a set of tasks is given – which sections of the material should be studied, and which exercises should be passed. The exercises can be taken an unlimited number of times (preferably, until the answers / solutions are fully correct) and their outcomes will not influence the final grade.

At the end of each week there is a graded test in the Moodle environment and at the end of the course there is a final test. Weekly tests and final test are counted towards assigning the final result - pass or fail. The participants can choose for themselves how they spend their time during the week. This enables them to organize their time the way that is most suitable for them.

During the course period the participants are welcome to ask questions from tutors and discuss the topics with other participants using the forums. There are several forums: News, General Questions, and Technical Problems, as well as separate specific forums for each of the four weeks. Participating in at least one module forum is compulsory for passing the course.

Whenever one sees a question asked in the forum, they are most welcome to answer it, not waiting for explanations from tutors. Helping others to understand the material is the best way to learn!

CERTIFICATES

After completing the course, an electronic certificate of completion is issued to the learner from the SIS. The University of Tartu has issued electronic certificates since 2016. Every certificate is accompanied by a supplement providing the description of topics, volume of work, learning outcomes, lecturers, and the form and result of assessment. If required, additional information about funding, cooperation, or any other relevant information is also included. Our learners have given very appreciative feedback about the certificates, which contain more detailed data about the course which they have passed.

Electronic certificates are verified with the digital stamp of the University of Tartu. The stamp confirms that the document has been issued by the University of Tartu. The certificate is in PDF format, digital verification is in BDOC format.

The documents are created and sent to the learners automatically, so the use of various information systems greatly facilitates the work of the organizers.

PARTICIPANTS

MOOCs are advertised in the University of Tartu's MOOCs list at https://moocs.ut.ee/ and through various communication channels of INTOSAI and EUROSAI Working Groups on Environmental Auditing such as websites, newsletters, meetings, and e-mail correspondence. Notifying participants of earlier MOOCs about new courses has also proved an effective advertising method.

In total, these three courses have been conducted seven times, with 1,357 attendances by 879 different participants from 98 countries.105 people have participated in all three courses, 236 in at least two courses and 538 in at least one course. The average completion rate is 60%.

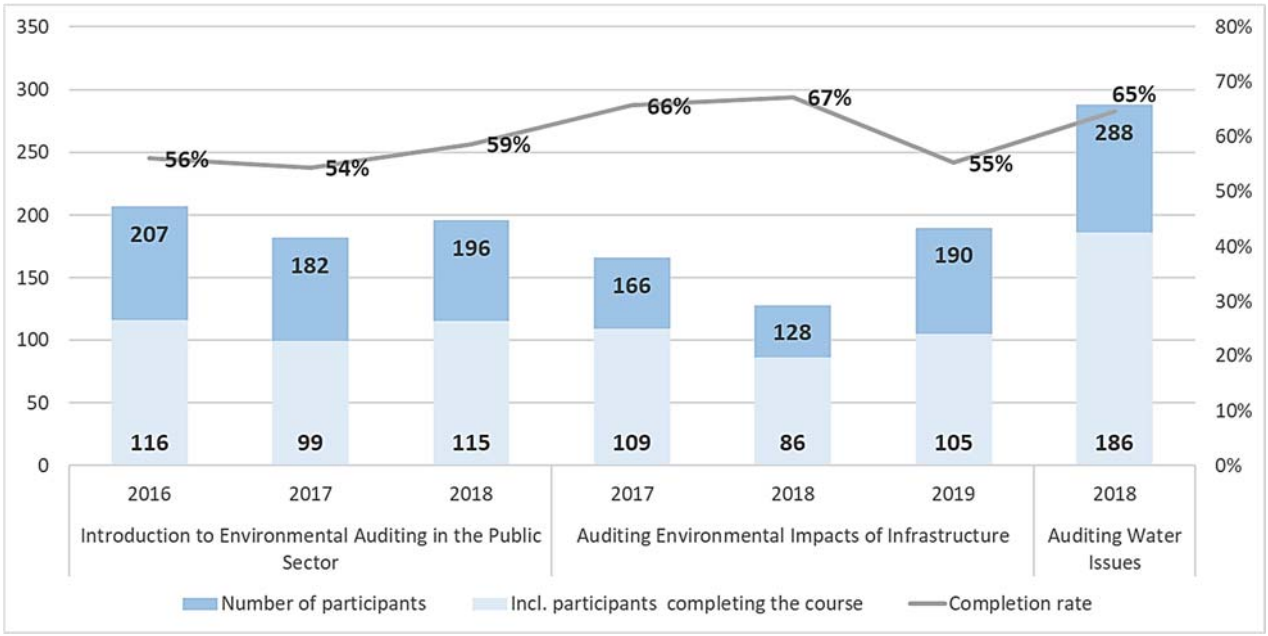


Figure 3: The numbers of participants and the completion rates

Each of the following countries have had at least 10 participants on the MOOCs: Albania, Argentina, Australia, Austria, Botswana, Cameroon, Czech Republic, Estonia, Fiji, Indonesia, Iran, Jamaica, Kuwait, Latvia, Lesotho, Namibia, Nigeria, Thailand, Romania, Samoa, Serbia, South Africa, Spain and Zambia.

Figure 4: Countries of origin of the participants

QUALITY ASSURANCE AND FEEDBACK

These three MOOCs meet the quality criteria for the e-course and applied for the Estonian e-University quality mark (Varendi, Villems, Pilt, Kusmin & Plank, 2018) in 2019. All three MOOCs have received the e-course quality mark and one of them was also nominated for the title “E-course of the year 2019”.

In their feedback, the students said they appreciated the well-planned structure: materials which are well sectioned and easy to work through, and every chapter has a video. The construction and layout are user-friendly and logical. The learners have also pointed out the value of the discussion questions and reflections, and the flexible time-frame that is needed when studying while working full-time.

Learners have highly valued that study materials are freely accessible and easy to print, resourceful and easy to comprehend, with good exercises and topics which have been explained clearly and concisely and included lots of case studies and plenty of audit tips. The content has been relevant and applicable in their work environment.

Learners have also given very positive feedback to teachers who are supportive and of assistance and reply promptly to queries.

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