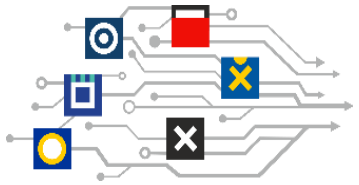

Co-funded by the Erasmus+ Programme of the European Union

STEM Continuous Professional Development at European Universities

01.09.2020-31.08.2023

ERASMUS PLUS

Strategic Partnership/ Higher Education/Innovation

Natasa Brouver, Stefania Grecea, Johanna Karkkainen, Kristof Kranjc, Iwona Maciejowska, Aleksandra Lis, Carlos Machado, Matti Niemelä, Crtomir Podlipnik , Sanjiv Prashar, Vincenzo Russo, Oreste Tarallo, Bartosz Trzewik, Michał Woźniakiewicz

Co-funded by the
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Partners

- **European Chemistry Thematic Network (ECTN)**
- **University of Amsterdam**
- **University of Oulu**
- **University of Naples Federico II**
- **University of Ljubljana**
- **Jagiellonian University in Krakow - coordinator**

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

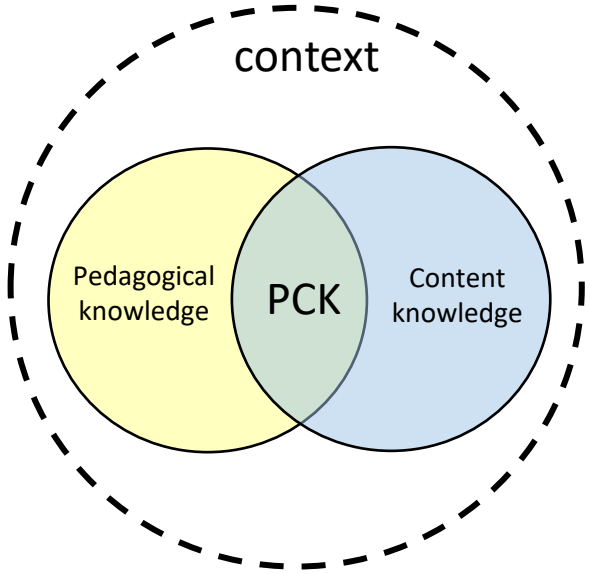
Discipline specific approach

Lindblom-Ylänne et al. (2006) and Lueddeke (2003) have performed studies that showed that **those teaching 'hard sciences'** such as health sciences, physics, chemistry and engineering **are more likely to take a teacher-focussed approach** than those teaching 'soft sciences' such as social sciences and humanities.

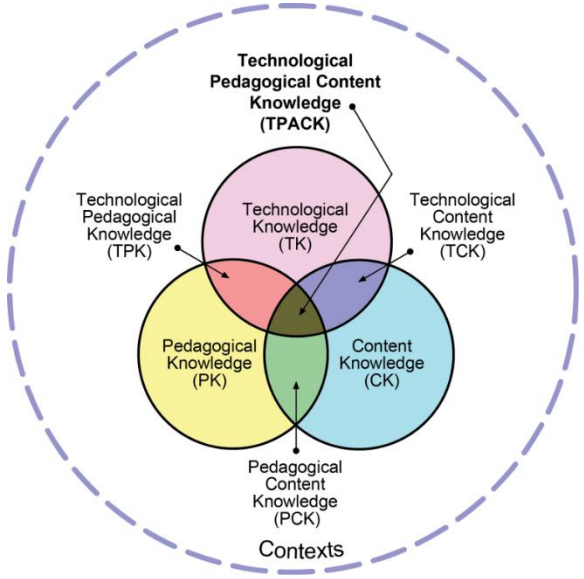
Lindblom-Ylänne, S., Trigwell, K., Nevgi, A., & Ashwin, P. (2006). How approaches to teaching are affected by discipline and teaching context. Studies in Higher Education, 31, 285-298
Lueddeke, G. R. (2003). Professionalizing teaching practice in higher education: A study of disciplinary variation and 'teaching scholarship'. Studies in Higher Education, 28, 213-228.

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

Discipline specific approach to CPD



PCK: Pedagogical Content Knowledge



TPACK:
Technological Pedagogical Content Knowledge

http://ectn.eu/work-groups/stem-cpd/

Co-funded by the
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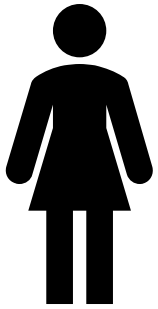
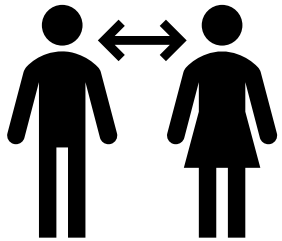
of the European Union

Professional development for academic staff in teaching and learning

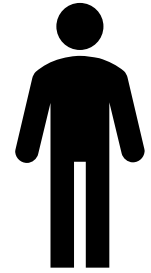
Support limited to training courses



The offer of courses arranged like goods on the shelves in a store



CPD organized from a pedagogical standpoint



Aims and goals

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

- to improve the quality of education in university STEM (science, technology, engineering, and mathematics) faculties
- to share the experiences in STEM CPD at European universities
- to develop a sustainable cooperation between people who organize TPACK oriented CPD activities
- to promote CPD at the EU universities

https://content.thriveglobal.com/wp-content/uploads/2018/08/health-goals.png

What have been done and why?

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

- WHAT is needed?
  - A roadmap of STEM CPD[1)]: define which competences, which attitudes, which CPD activities
- HOW to approach it?
  - STEM-CPD on the CPD-Ambassador principle framework
- HOW to support CPD-Ambassadors?
  - open online modules, the microMOOCs
  - summer schools with the aim of training future CPD-Ambassadors
  - exchange user cases

http://www.inncommerce.eu/uploads/io3.png

[1)] Grecea et al. (2021). Roadmap for STEM Continuous Professional Development at European Universities, Recommendations and Guidelines, STEM-CPD@EUni project:- https://ectn.eu/wp-content/uploads/2021/06/Roadmap-Recommendtions-and-Guidelines-O1-April2021.pdf

Who is CPD-Ambassador?

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

- HOW CPD-Ambassador works?
  - Defines needs, the challenges in local context (lecturers and managers)[1)]
  - Inspires and motivates fellow lecturers
  - Organize CPD activities for fellow lecturers (we call this User cases)
- WHERE?
  - Own teaching team, faculty
- WHY?
  - Improve quality of T & L
  - Counteracting professional burnout of lecturers

http://www.inncommerce.eu/uploads/io3.png

[1)] Grecea et al. (2021). Roadmap for STEM Continuous Professional Development at European Universities, Recommendations and Guidelines, STEM-CPD@EUni project:- https://ectn.eu/wp-content/uploads/2021/06/Roadmap-Recommendtions-and-Guidelines-O1-April2021.pdf

STEM-CPD@Euni –results of the survey

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

Teaching competences emerged as the most important

Likert scale 1 to 5	To develop **critical thinking** by students (4.7)
	To **engage students** and arouse interest for the discipline in the class (4.6)
	To give prompt **feedback and support** students during learning (4.5)
	To define **intended learning outcomes** in every course they teach (4.4)

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https://ectn.eu/work-groups/stem-cpd-o1/

STEM CPD

Framework for STEM-CPD

1

CPD-Ambassador

is involved in higher education and promotes awareness of university STEM teaching competence, defines CPD needs of teaching staff, organizes professional development activities, and promotes CPD as a requirement for a sustainable quality of higher education teaching and learning.

2

User Case

is a description of a CPD solution for a local teaching and learning challenge, a list of CPD goals, activities and materials, expected impact of the CPD solution on the quality of local educational practice, reflection / evaluation of the experiences, and a plan for possible follow-up.

3

Scenario

clusters different user cases related to the teaching competences and attitudes developed in the user case and the CPD activities used in learning environments.

4

Summer School

is a week-long event with the aim of professionalizing CPD Ambassadors in the three dimensions: teaching competences, attitudes and using different types of CPD activities. The final content of each summer school is determined by the needs of the participants.

5

STEM-CPD Community

is the community of CPD-Ambassadors. It encourages members to continue to share knowledge and experiences and to support each other in their continuous professional development. It gives input

https://ectn.eu/work-groups/stem-cpd-o2/

HOW to support CPD-Ambassadors?

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

- **development and exchange of user cases**
- open online modules, the microMOOCs
- summer schools with the aim of training future CPD-Ambassadors

http://www.inncommerce.eu/uploads/io3.png

USE CASE - a document that describes the boundary conditions and all actions that need to be taken to provide the end user with a relevant result.

USER STORY - a short description of selected functionalities presented from the point of view of the end user.

STEM-CPD@Euni

User case

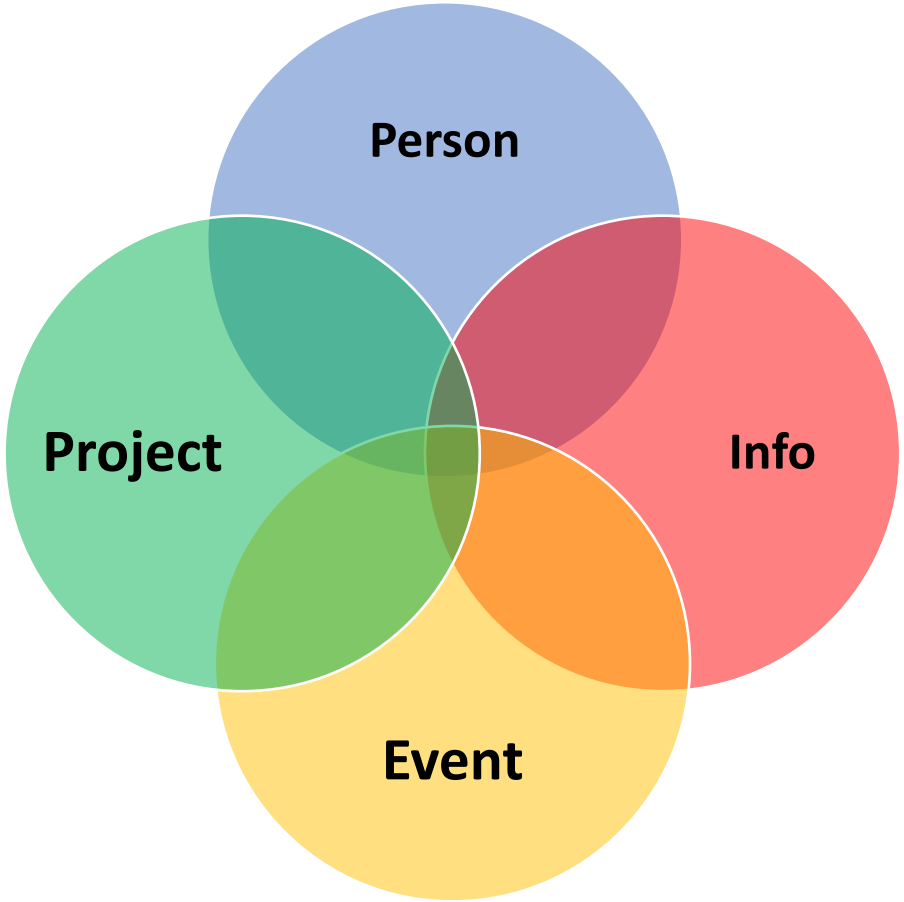
Co-funded by the Erasmus+ Programme of the European Union

include **CPD activities** designed to tackle **specific educational challenges** and share information about

- the goals,
- the university context,
- relevant experiences about how to organize the CPD activities bottom up by lecturers for fellow lecturers.

User cases published on Starfish

Starfish - platform designed based on the TPACK model, to connect lecturers and their knowledge about teaching and learning



Are you interested to join Starfish or to collaborate on development of Starfish? Please contact Natasa Brouwer
natasa.brouwer@uva.nl

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

User Cases

Sorting

Most recent

Categories

Continuous Online Assessments

Chemistry | MScChemistry | STEM-CPD@EUni | FormativeAssessment | SummativeAssessment | AssessmentTools | DigitalAssessment

Matti Niemelä, Johanna Kärkkäinen University of Oulu / Faculty of Technology / Chemistry degree programme Challenge and goal Assessment is a crucial part of both traditional and online e...

Bridging Pre-knowledge Gaps

AnalyticalChemistry | STEM | MScChemistry | STEM-CPD@EUni | ConceptMaps | KnowledgeGaps | PriorKnowledge

Stefania Grecea, Bob Pirok, Lotte Schreuders, Jocelyne Vreede, Natasa Brouwer Faculty of Science, University of Amsterdam, The Netherlands Challenge and goal Students enrolled in spec...

Encouraging implementation and improvement of peer assessment in university teaching

STEM-CPD@EUni | Evaluation | FormativePeerAssessment | PeerAssessment

Communication between students and academics

ExperimentalSciences | ScienceVocabulary | STEM-CPD@EUni | CommunicationModels | InformationOverload | InstructionsLaboratory | OnlineInteractiveBoard

High School to STEM BSc degrees: from a steep to a smooth transition

HighSchoolSTEM-BSc STEM-CPD@EUni TeachersWorkgroups AlternativeConceptions CommunicationModels PriorKnowledge

Martino Di Serio, Alessio Petrone, Vincenzo Russo, Oreste Tarallo, Italo Testa University of Naples Federico II, Italy Challenge and goal It is a common experience that BSc freshmen can ...

Mentoring Lecturers in Higher Education

JuniorLecturer STEM-CPD@EUni Community-engagedLearning Mentoring Peer-feedback

Lotte Schreuders, Bob Pirok, Stefania Grecea, Jocelyne Vreede, Natasa Brouwer University of Amsterdam, The Netherlands Challenge and goal In today's dynamic society, teaching in higher e...

Constructive Alignment Approach within Learning Trajectories and the Study Programme

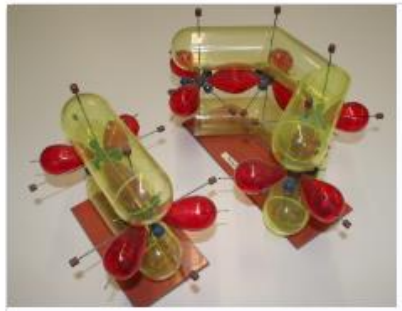
QualityAssurance STEM-CPD@EUni ConstructiveAlignment CurriculumDevelopment LearningThreads TrajectoryOverviewTool

Jocelyne Vreede, Stefania Grecea, Lotte Schreuders, Bob Pirok, Natasa Brouwer Faculty of Science, University of Amsterdam, The Netherlands Challenge and goal Today's fast-

Pre-assignments to enhance heterogeneous students' learning in laboratory

Chemistry GeneralChemistry LaboratoryCourses STEM-CPD@EUni KnowledgeGaps PriorKnowledge InteractiveVideo OnlineAssessmentToolEducation

Johanna Kärkkäinen, Katja Lappalainen, Matti Niemelä Faculty of Technology, University of Oulu, Finland Challenge and goal Students, attending chemistry laboratory courses have



Visualization of molecular structures and their interactions

Bio-organicChemistry Chemistry ComputationalChemistry ElectrostaticPotential MolecularInteractions MolecularStructures STEM-CPD@EUni InteractiveLecturing Modelling 3DVisualization

Franc Perdih, Krištof Kranjc* University of Ljubljana, Faculty of Chemistry and Chemical Technology, Večna pot 113, SI-1000 Ljubljana, Slovenia; * e-mail: kristof.kranjc@fkkt.uni-lj.si ...

Gauge the pre-knowledge gaps from high school to BSc level in STEM

STEM-CPD@EUni CommunicationModels SelfAssessment SelfAssessmentTools

Martino Di Serio, Alessio Petrone, Vincenzo Russo, Oreste Tarallo, Italo Testa University of Naples Federico II, Italy Challenge and goal Heterogeneous background in BSc fre...

Laboratory report for STEM students

LaboratoryReport STEM-CPD@EUni InstructionsLaboratory Rubrics SelfAssessment

Martino Di Serio, Alessio Petrone, Vincenzo Russo, Oreste Tarallo, Italo Testa University of Naples Federico II, Italy Challenge and goal Teachers are often frustrated by t...

How to design innovative on-line continuous self-evaluation tests

STEM-CPD@EUni FormativeAssessment SelfAssessment SelfAssessmentTools

Sanjiv Prashar, José M. Méndez-Arriaga, Josefa Ortiz-Bustos, Diana Díaz-García, Miguel Díaz-Sánchez, Santiago Gómez-Ruiz, M. Noelia Faginas-Lago University Rey Juan Carlos, Spain, University of...

Pedagogy	CommunicationModels, InformationOverload, InstructionsLaboratory
Technology	OnlineInteractiveBoard
Content	ExperimentalSciences, ScienceVocabulary
Context/Topic	STEM-CPD@EUni

Iwona Maciejowska, Michał Woźniakiewicz, Bartosz Trzewik, Katarzyna Zięba, Aleksandra Lis
Jagiellonian University, Krakow, Poland

Challenge and goal

The investigation and discussion on the communication issues between students and teachers revealed problems that draw particular attention to this matter. Following the interviews with teachers we identified an increased frustration related with communication with students. From one side, the expectation of the teachers willing their students to directly copy all the knowledge given to them during lectures is not realistic nor valuable.

Topic of the user case

Interpersonal communication

Context and Goals | CPD Activities | Evaluation | CPD Scenario

Local context (specific)

Effective communication is always the key to success. Not surprisingly, it is of great importance whenever the interchange of instructions and opinions between students and academic teachers takes place. Once the communication is efficient it supports the teaching process in STEM disciplines at several levels: stress reduction, speeding up the achievement of learning outcomes, helps in avoiding unnecessary repetitions of exercises, and increases safety in the laboratory area.

CPD activities at the local university

Stage 1

Interviews with coworkers on most frequent and frustrating problems related to teaching at the university.

The microMOOC development team meets every two weeks.

A meeting with the Dean of the Faculty of Chemistry and deputy Dean for students affairs as well as with a Dean's plenipotentiary for the quality assurance takes place to discuss the problems reported to faculty authorities.

microMOOC developed as a product ready for testing.

Stage 2

Test of the microMOOC on a limited cohort of volunteers recruited among peers.

The MOOC is promoted by its authors and Science faculties authorities.

Stage 3

A follow-up discussion meeting/webinar will be organised.

Teaching and learning materials

- microMOOC (link to the MOOC)
- Recommended reading: A. H. Johnstone, *Chemistry Teaching—Science or Alchemy?* J. Chem. Educ. 1997, 74 (3), 262.

Sustainable implementation

At the first stage of this user case, the lecturers who are developing the MOOC learn collaboratively and the increased awareness is shared with fellow lecturers, doctoral students/teaching assistants.

A session during the Quality Teaching Week at JU will be organized to promote the MOOC and present their developments.

HOW to support CPD-Ambassadors?

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

- development and exchange of user cases
- **open online modules, the microMOOCs (EdX)**
- summer schools with the aim of training future CPD-Ambassadors

http://www.inncommerce.eu/uploads/io3.png

STEM-CPD@EUni

MicroMoocs of STEM-CPD@EUni

ECTNMOOC.EU is a website that offers a series of short, open online modules designed to enhance STEM-CPD (Continuing Professional Development) for educators. These modules cover a variety of topics, including lab safety, rubrics for assessing lab work, and effective use of digital tools for teaching and learning (TPACK). The modules follow a microMOOC format, with a solid active learning course design that focuses on a single teaching/learning concept and takes about a couple of hours per student. They consist of engaging, media-rich reading material, short video clips, and assignments. The online modules are designed with an active learning approach and a constructivist orientation using the ADDIE developmental model.

NEW! Five new pilot microMOOCs

MOODLE | problem-based learning | project-based learning

Facilitating project-based and problem-based learning with the use of Moodle

This course is about Project-based and Problem-based learning, how it can benefit both you and your students.

Pilot microMOOC - Jun 1 2023 - Jan 1 2025

Launch Course

Flipped Classroom | Active-Learning | Higher Education

Mastering the Flipped Classroom: The Power of the Guide on the Side

In this course, you will learn about the flipped classroom instructional approach.

Pilot microMOOC - Mar 22 2023 - May 1 2023

Launch Course

Feedback | Assessment | Motivation

Assessment for learning - providing feedback

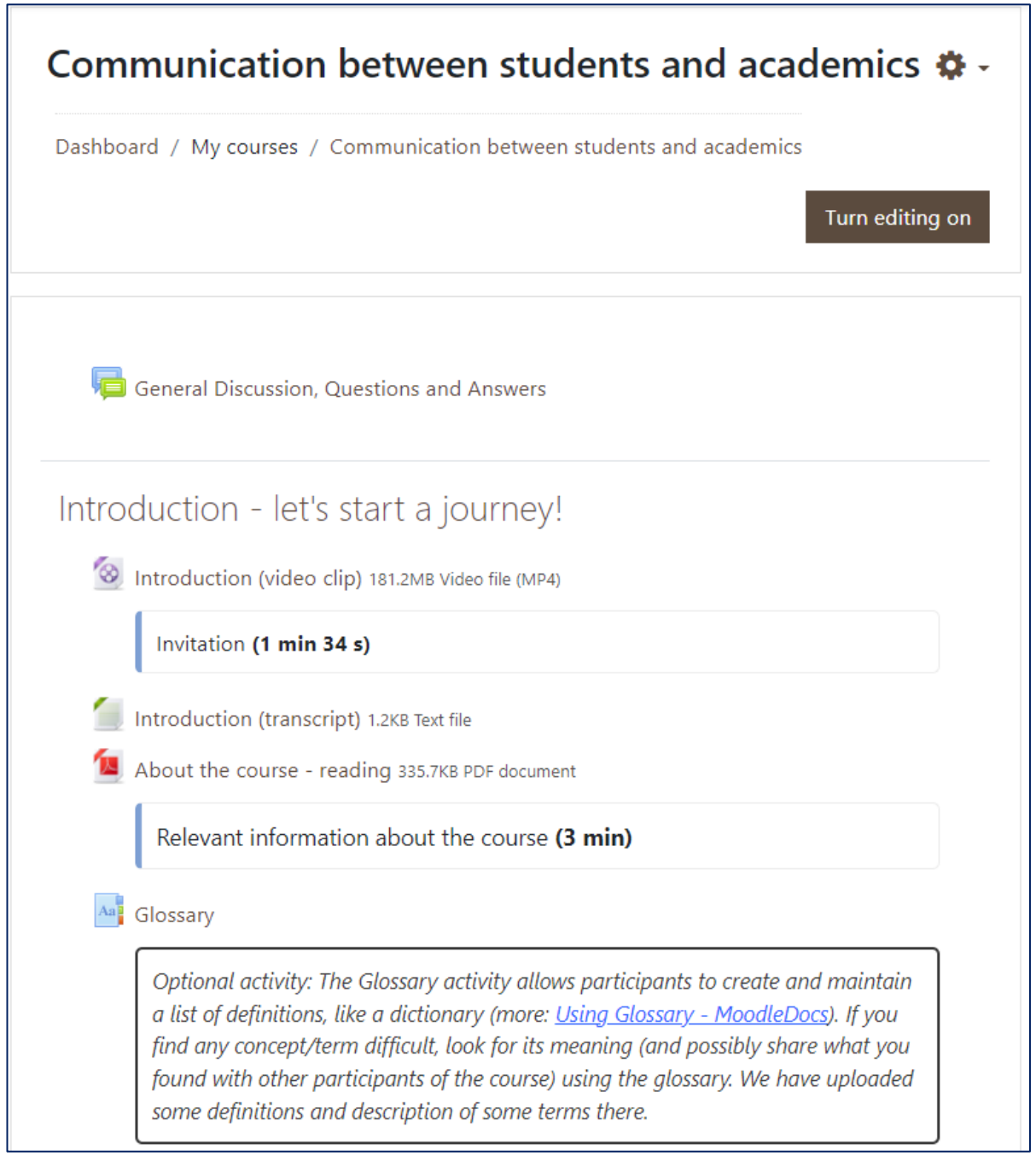
This course is intended to improve STEM teachers' ability to provide feedback that supports students learning.

Pilot microMOOC - Apr 16 2023 - Jan 1 2025

Launch Course

https://ectnmooc.eu

Would you like to help us?
– pilot them



Our (JU) first baby!
microMOOC piloted on the JU Moodle platform
In the form of as a **SPOC**

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

Reading

A. H. Johnstone, Chemistry Teaching—Science or Alchemy? *J. Chem. Educ.* 1997, *74 (3)*, 262. **(20–40 min)**

An interesting approach to university teaching is given here, proposing to treat teaching like scientific research – with an appropriate theoretical backgroud, an apparatus, and clearly formulated conclusions. In the author's opinion such appoach leads to better effects and lower comsumtion of time during teaching. Many examples are provided that can be useful in your own educational practice. The paper is concise and not overloaded with theory.

Interactive presentation - Part 1

Communication models (PK, theory). **(20–30 min)**

Knowledge clip for personal reflection

The key to successful communication *- This short movie presents the essence of communication, from different perspectives: lecturers, students, and industry representatives. They pay attention to the communication skills, that are the most important at university.* **(4 min)**

Interactive presentation - Part 2

Communication with STEM students (PCK, practice). **(20–30 min)**

Introduction to peer assessment using rubrics - knowledge clip

RUBRICS. When you submit **a peer-reviewed assignment**, other learners in the course will review your work and submit feedback. You'll also need to give feedback to other learners. The knowledge clip presents an evaluation criteria matrix called rubrics that will be used to peer-review the work of the participants in this module. **(3 min 40 s)**

Presentation of a piece of instruction (peer assessment)

This assigment is intended to share your **example of a written instructions**, which **should be intentionally unclear** for students **and lead to serious problems or a fail of the experiment**. It is not a question of language or facts, but lack of clarity in communication with students. You should upload your own example (150–250 words), and review one example of the other's by pointing weaknesses of the instructions provided by them. *An example of such an instructions, with weaknesses shown, is given.* Have fun! Consider, reflect the feedback you received. **(20–40 min + 10–20 min)**

The deadline for uploading the instructions is ***10 January 2022, 23:59 (CET)*** – obligatory for completing the course

Peer assessment will start ***11 January 2022, 0:00 (CET)*** and last **till *17 January 2022, 23:59 (CET)*** (peer assessment) – obligatory for completing the course

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Summary - we also need your feedback

Take home message

Thank you for all your efforts. This forum is to sum up your experience and impressions. Please, consider the following points in your comment. Participation in this forum is a part of the module – learning need to be wrapped-up. **(10–15 min)**

- What is your 'take home' message?
- What new things did you learn in this module and how will you use it in your teaching practice?
- What were you missing, if any? What else would you like to learn in this topic? Where will you look for this knowledge in the future?

If you prefer not to receive notifications about new posts, you could unsubscribe from the discussion. You will still be able to follow the discussion directly on the forum.

Your feedback to this Module (questionnaire) - even if you did not complete all activities

Finally, after finishing the course, you are kindly requested to give your opinion about this Module. Please provide answers to as many questions as possible. Be fair – both positive and negative answers and comments are relevant and welcome. Please, fill in the questionnaire even if you did not complete all the activities. The questionnaire consists of about 20 questions. ***If you need more time, you could save your work and come back to the questionnaire later. Please, check your answers carefully before sending the questionnaire. The deadline is 17 January 2022, 23:59 (CET).*** **(30 min)**

Evaluation is a key!
1st…2nd…3rd version … ready, go!

HOW to support CPD-Ambassadors?

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

- exchange user cases
- open online modules, the microMOOCs
- **summer schools with the aim of training future CPD-Ambassadors**

http://www.inncommerce.eu/uploads/io3.png

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1st Summer School (Krakow, Poland) 10th-15th October 2021
2nd Summer School (Naples, Italy) 2nd-7th October 2022

Goals of the STEM-CPD@EUni summer school – join us to:

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

- gain knowledge to empower your personal TPACK
- receive relevant material
- produce your own material to organize CPD activities at your home universities.
- stay in contact with summer school staff and peers and get (peer) feedback.

3rd STEM-CPD Summer School, 15-19 October 2023, Aveiro, Portugal

How can you and your institution benefit from the project?

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

You may

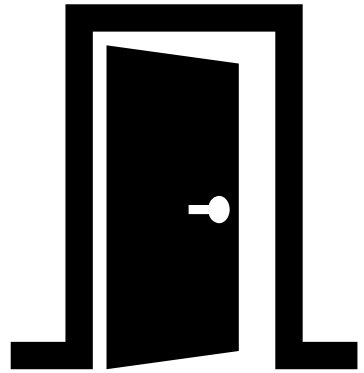
- **read/describe a user case** that meets the needs of your department (quality of teaching and learning)
- **participate/design a microMOOC** that will support the development of lecturers' competences in your faculty
- participate in **the next intensive school** – Aveiro 15-19. 10. 2023

https://runforthecall.files.wordpress.com/2014/03/ambassadors.jpg

Open access

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

- All outputs capable of existing in digital form will be freely accessible on the ECTN **website** https://ectn.eu/work-groups/stem-cpd/.
- **MicroMOOCs** are available on the OpenEdx platform via its cooperation with the ECTN and Ljubljana University. https://ectnmoocs.eu/
- STEM-CPD scenarios shared on **Starfish platform -** https://starfish-education.eu/



https://ectn.eu

Activities ELA | EU Project | Publications | Online Course for Lecturers | Online Courses for Lecturers | Contact us

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ECHEMTEST | LABELS | STEM-CPD@EUNI | DISTINCT | SUMMER SCHOOL

Latest News

3rd STEM-CPD Summer School, 15-19 October 2023, Aveiro, Portugal

STEM-CPD@EUni final conference – Registration now open

DISTINCT Project: TPM1 event in Riga, May 11-13, 2023

NEWS

Co-funded by the
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N. Brouwer, I. Maciejowska, A. Lis, C. Machado, S. Grecea, J. Kärkkäinen, M.Niemelä, K. Kranjc, Č. Podlipnik, S. Prashar, V. Russo, O. Tarallo, *VIRT & L- COMM*, 21 (2020)

http://services.chm.unipg.it/ojs/index.php/virtlcomm/article/view/253

N. Brouwer, I. Maciejowska, A. Lis, S. Grecea, J. Kärkkäinen, M. Niemelä, K. Kranjc, Č. Podlipnik, S. Prashar, V. Russo, O. Tarallo, *VIRT&L-COMM*, 23 (2022)

http://services.chm.unipg.it/ojs/index.php/virtlcomm/article/view/272

N. Brouwer, Grecea, Ş., Kärkkäinen, J., Maciejowska, I., Niemalä, M., & Schreuders, L. (2022). Roadmap for Continuous Professional Development of STEM Lecturers. In I.Devetak (Ed.), *University Chemistry Teaching in the 21. Century* (pp. 85-111). University of Ljubljana, Faculty of Education, 2022, DOI: https://doi.org/10.26529/9789612532970/ch5, Chapter available at: https://zalozba.pef.uni-lj.si/index.php/zalozba/catalog/view/198/458/481-1,


Thank you for your attention.
Time for questions & comments.

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STEM-CPD @ EUni

STEM Continuous Professional Development
at European Universities

Acknowledgement

Co-funded by the Erasmus+ Programme of the European Union: STEM Continuous Professional Development at European Universities 2020-1-PL01-KA203-081802.

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