

„MULTIPLIER EVENT“: UPORABNOST microMOOC TEČAJEV ZA IZBOLJŠANJE KOMPETENC

26. Januar 2023 na Univerzi v Mariboru,
Fakulteta za matematiko in naravoslovje

s pomočjo in podporo doc. dr. Janje Majer Kovačič in doc. dr. Brine Dojer



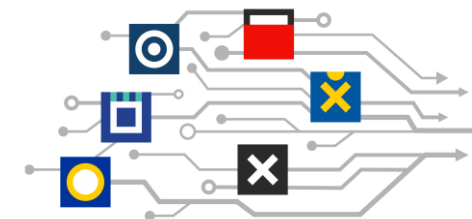
Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko



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Pomen mikroMOOC tečajev, razvitih v okviru STEM-CPD@EUni projekta za vseživljenjsko učenje pedagoškega kadra STEM fakultet

Krištof Kranjc*

Fakulteta za kemijo in kemijsko tehnologijo, Univerza v Ljubljani

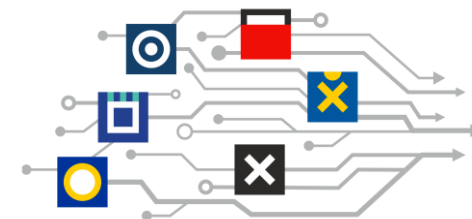
Večna pot 113, 1000 Ljubljana

* kristof.kranjc@fkkt.uni-lj.si



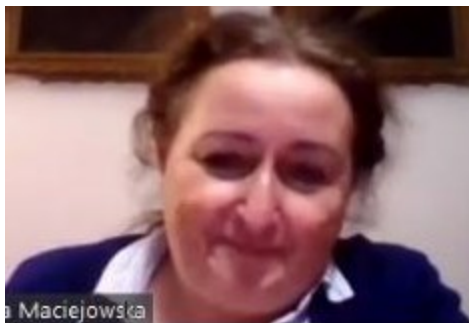
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predstavitev projekta STEM-CPD@EUni – sodelujoči partnerji

CPD = *continuous professional development*



Iwona
Maciejowska (JU)
(vodja projekta)



Univ. Napoli
Federico II



Jagiellonska
univerza (JU),
Kraków

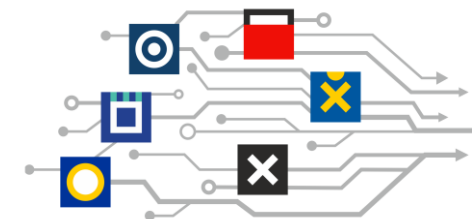


več informacij na: <https://ectn.eu/work-groups/stem-cpd/>



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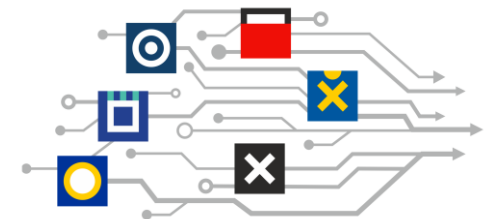
STEM-CPD@EUni – cilji delovnih skupin

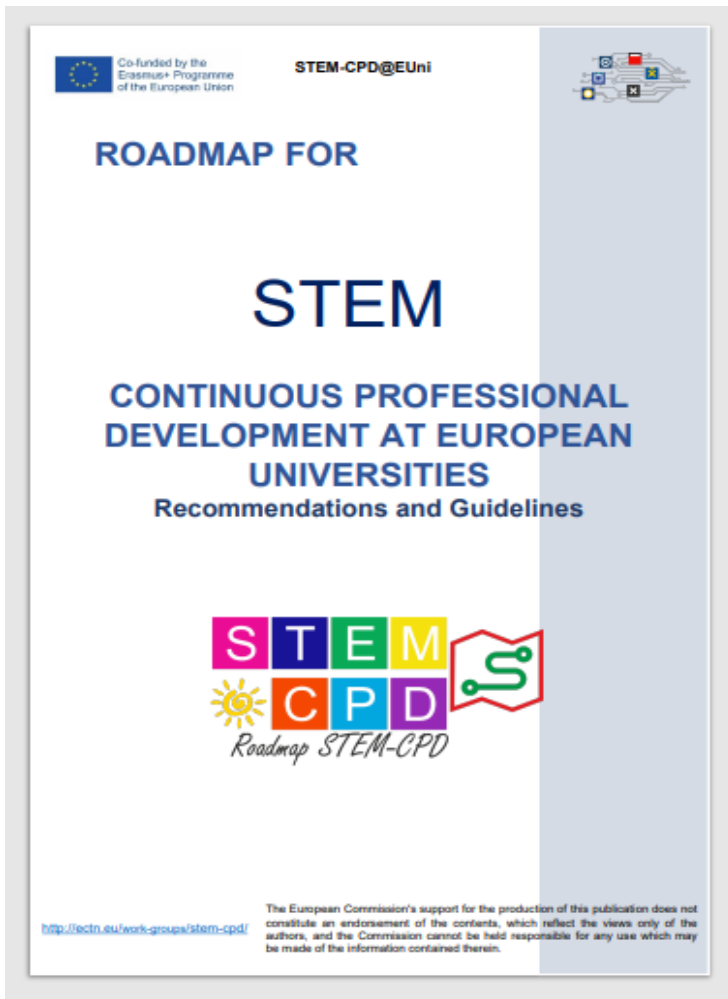
- IO1: *Roadmap* (Amsterdam)
- IO2: uvedba CPD ambasadorjev (Amsterdam)
- IO3: zbiranje in razširanje primerov dobrih praks in scenarijev, dostopnih na odprti platformi Starfish (Oulu) <https://starfish-education.eu>
- IO4: **mikroMOOC** tečaji – razvoj, zaledna podpora izdelave in vzpostavitve spletnega okolja za njihovo izvajanje (Ljubljana) <https://lms.ectnmoocs.eu/>
- IO5: organiziranje poletnih šol in drugih aktivnosti v zvezi s CPD ambasadorji (Napoli)
- IO6: evalvacija učinka in vrednotenje rezultatov (Kraków)



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osnovni podatki o delovni skupini (WG) IO1

- izvedba spletnega vprašalnika glede potreb po CPD aktivnostih
- vzpostaviti kriterije za izbor vsebin za CPD aktivnosti in **tematik za mikroMOOC tečaje**

Roadmap dokument dostopen na:

<https://ectn.eu/wp-content/uploads/2021/06/Roadmap-Recommendations-and-Guidelines-O1-April2021.pdf>

Nataša Brouwer-Zupančič

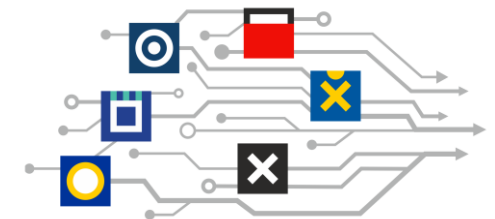


Ştefania Grecea



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osnovni podatki o delovni skupini (WG) IO2

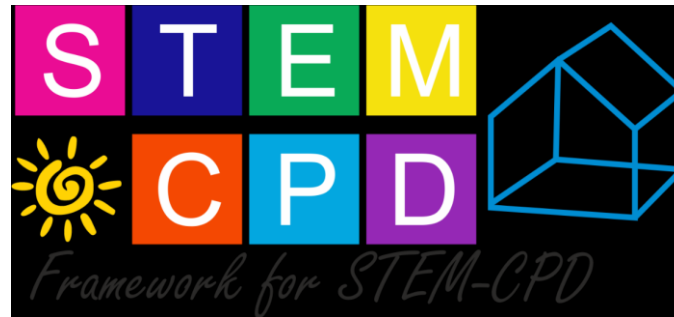
**SKLADNO S PRINCIPOM:
„TEACH-THE-TEACHER“**

- vzpostavitev omrežja CPD ambasadorjev
- izdajanje certifikatov CPD ambasadorjem (po udeležbi na poletnih šolah, npr. Kraków 2021, Napoli 2022).

Brošura oz. letak sta dostopna na:

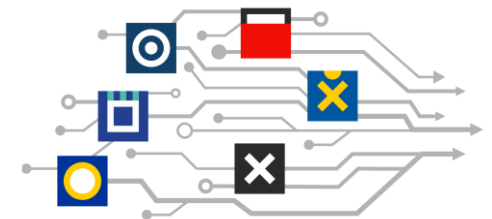
<https://ectn.eu/wp-content/uploads/2022/03/LeafletFramework-Fold-February2022.pdf> in

<https://ectn.eu/wp-content/uploads/2022/03/LeafletFramework-includingModels-February2022.pdf>



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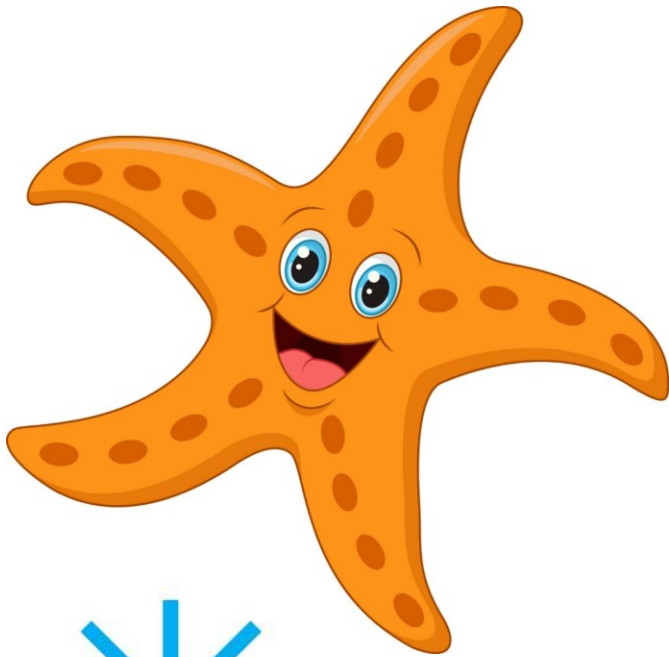
osnovni podatki o delovni skupini (WG) IO3

- „user cases“ in scenariji

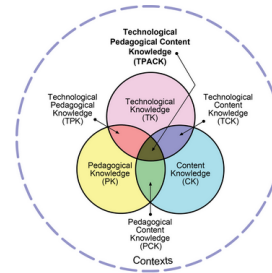
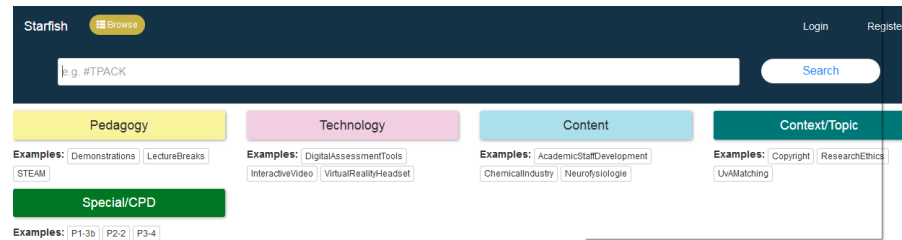
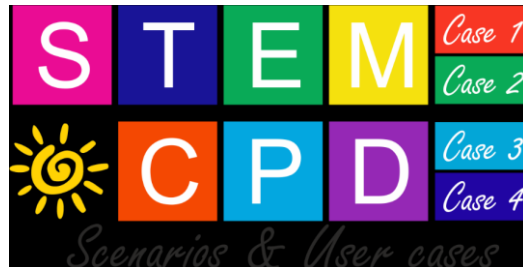
UC in scenariji so zbrani na spletni strani „Starfish“:

<https://starfish-education.eu/>

www.vecteezy.com



UNIVERSITY
OF OULU

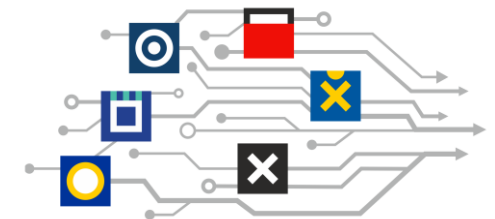


Matti Niemelä

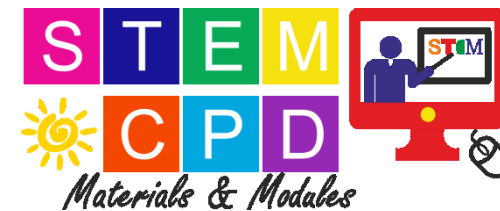


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osnovni podatki o delovni skupini IO4



doc. dr. Črtomir Podlipnik
vodja IO4



doc. dr. Krištof Kranjc
so-vodja IO4



Sebastian Pleško
tehnična podpora

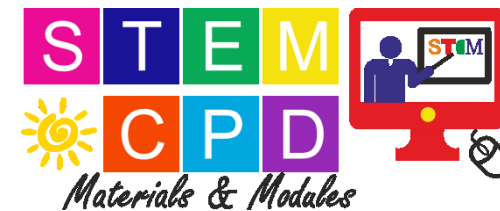
- načrtovanje in izdelava zbirke kratkih, prosto dostopnih, spletnih modulov (mikroMOOC tečaji), ki bodo uporabni za vseživljenjsko izpopolnjevanje (CPD) visokošolskih učiteljev na področju STEM. Rezultat projekta bo **25 modulov** v obliki (**mikroMOOC tečajev**).
- tematike so oz. bodo izbrane glede na prioritete, podane v *Roadmap IO1*.
- več informacij na (dostopen tudi model za izdelavo mikroMOOC): <https://ectn.eu/work-groups/stem-cpd-o4/>
- moduli so osredotočeni na vsakdanje izzive, s katerimi so soočeni visokošolski učitelji, npr.
 - Kako organizirati varno delo v laboratoriju?
 - Kako ravnati s študenti s posebnimi potrebami, npr. ASD?
 - Kako uporabljati specifična digitalna orodja na didaktično relevanten način skladno s principi poučevanja in učenja (TPACK).
 - Kako uporabljati rubrike za medvrstniško ocenjevanje študentov?

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tematike za STEM-CPD mikroMOOC tečaje



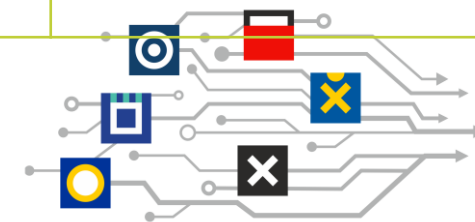
zeleno – končano, rdeče – načrtovano, modro – možna tematika, sivo – dodatne tematike

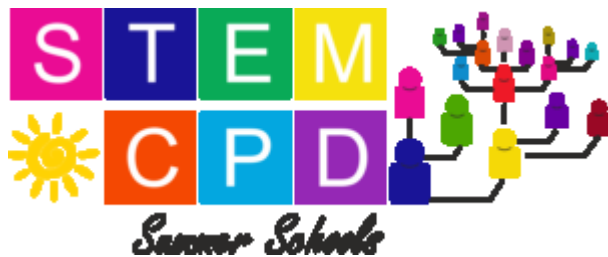
vseživljenjsko učenje	vrednotenje	vsebina/znanje PCK	„mehke veščine“ učiteljev	laboratorijske veščine
<ul style="list-style-type: none"> • Open science for CPD activities in high education • Mentoring lecturers in higher education <p>Methods/techniques/tools</p> <ul style="list-style-type: none"> • Is it possible to apply Problem Based Learning in STEM education? • How to organize field activities and/or internships in STEM education? • How to apply gamification in STEM education? • How to use mlearning in STEM education? (applications for students' mobile devices) 	<ul style="list-style-type: none"> • Better evaluation with students' peer assessment • How to design innovative on-line continuous self-evaluation tests • Continuous online assessment: Strategies for large classes • Feedback as a part of formative assessment • Constructing STEM multiple choice exams - the dos and don'ts • Motivating change towards authentic and continuous assessment • How to meaningfully apply Zosimos, Lab-buddy and similar tools to improve formative assessment in STEM HE courses • Assessment of personal and social competences (EQF) at STEM • Assessment of learning outcomes achieved due to group work at STEM faculties 	<ul style="list-style-type: none"> • Bridging pre-knowledge gaps • How to elicit misconceptions? • Teaching chemistry to non-chemists - challenging chemical misconceptions. • Visualization of molecular structures and their interactions • Cutting edge science as a context in STEM education <p>Study programme /others</p> <ul style="list-style-type: none"> • Aligning courses within a learning trajectory • High school to STEM BSc degrees: from a steep to a smooth transition • Cap-stone courses in STEM 	<ul style="list-style-type: none"> • Communication between students and academics • Working with autism spectrum disorder (ASD) students on STEM faculties • How to involve STEM students in remote classes? • How to develop independent learners and prepare STEM students to take responsibility for their own learning? • How to apply Kolb cycle in STEM education? 	<ul style="list-style-type: none"> • How to use pre-assignments to enhance students' learning in laboratory • Pre-assignments to enhance heterogeneous students' learning in laboratory • Laboratory reports for STEM students • How to teach lab safety? • How to achieve selected learning outcomes accomplished so far in student laboratories during distance learning? (virtual laboratories, interactive simulations etc).



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osnovni podatki o delovni skupini (WG) IO5

- „vzgoja“ ambasadurjev v okviru poletnih šol
- načrtovanje strukture tečajev/predmetov: ILO („intended learning outcomes“), učne aktivnosti, evalvacija učnega procesa (kriteriji za izdajo certifikatov)

poročilo o 2. poletni šoli (Napoli 2022):

<https://ectn.eu/wp-content/uploads/2022/11/2nd-summer-school-report.pdf/>

brošura kako načrtovati poletne šole:

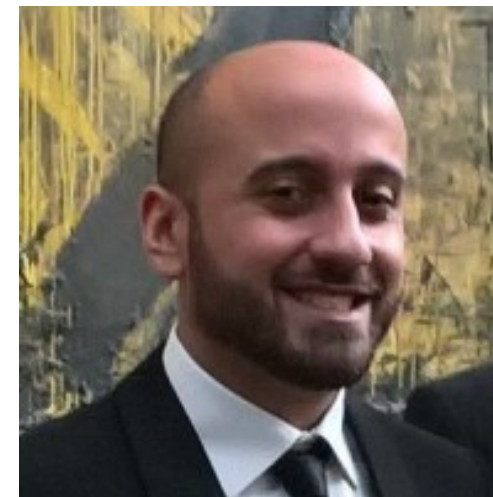
<https://ectn.eu/wp-content/uploads/2022/03/O5-design-a-summer-school-2021.pdf>



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II



Oreste Tarallo

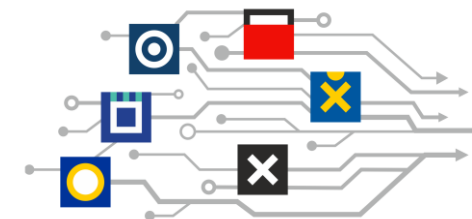


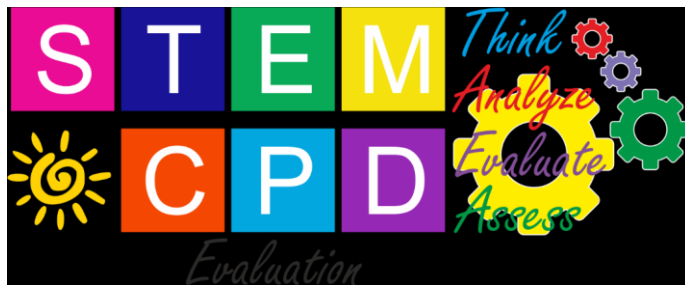
Vincenzo Russo



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osnovni podatki o delovni skupini (WG) IO6

- ocenjevanje učinkovitosti in doseganje ciljev

protokol vrednotenja („evaluation protocol“):

https://ectn.eu/wp-content/uploads/2021/06/Evaluation-Protocol_general-document_30.06.2021.pdf



Aleksandra Lis in
Iwona Maciejowska

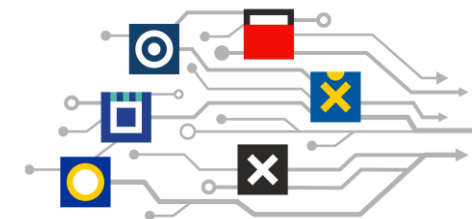


Jagiellonska univerza
(JU), Kraków



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trajnostna naravnost

- skrb, da bodo dosežki projekta uporabni tudi v prihodnosti (npr. mikroMOOC tečaji obdobjno dostopni zainteresirani javnosti)

razširjanje novic, objave,
diseminacija:

<https://ectn.eu/work-groups/stem-cpd-publications/>

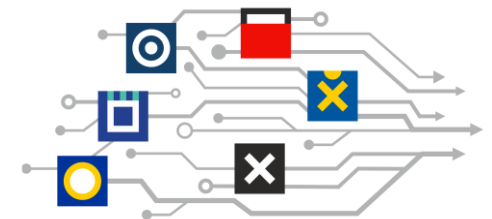


Sanjiv Prashar (Madrid),
predsednik ECTN



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Kaj je to MOOC?

M – Massive – množični

- omogoča hkratno udeležbo več 10 000 udeležencem
- avtomatski kvizi in vrstniško ocenjevanje

O – Open – odprti

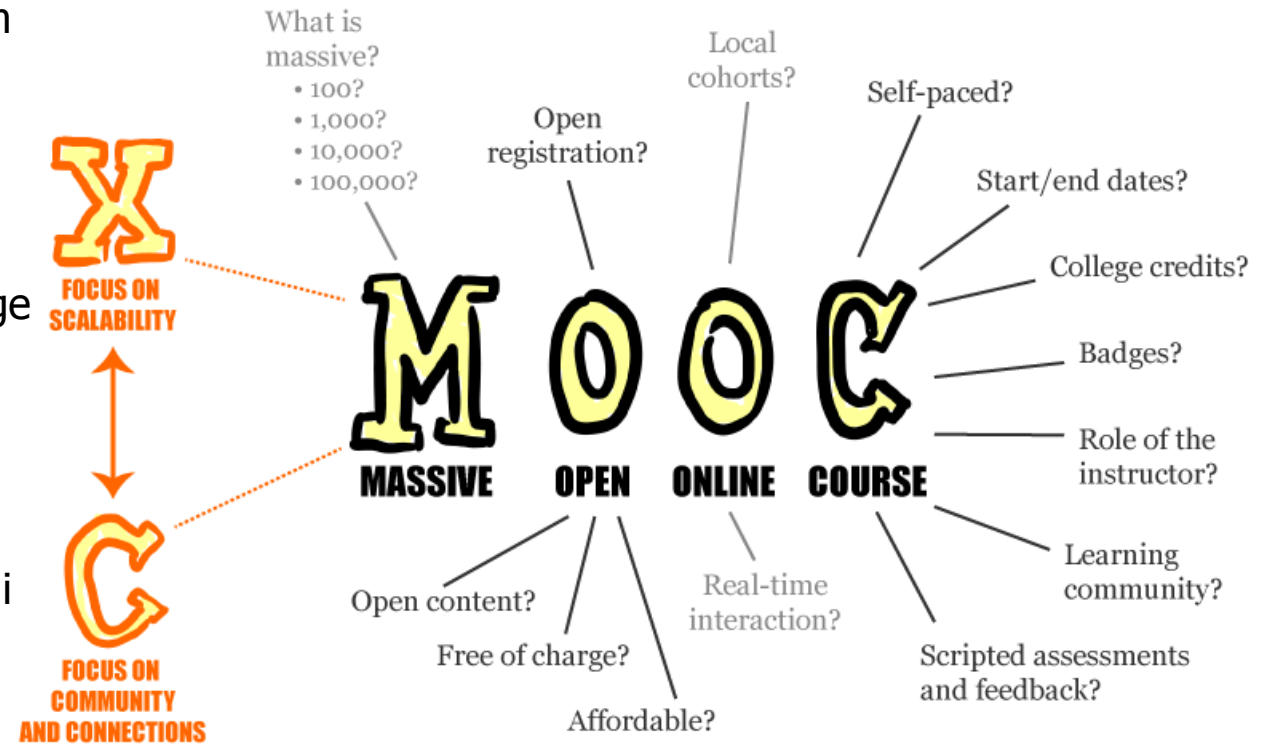
- prijavi se lahko kdorkoli
- izobrazba in socialnoekonomski status ne igrata vloge
- opravljanje tečaja v osnovi brezplačno

O – Online – spletni

- vsa vsebina dostopna na spletu
- videoposnetki, predstavitve, besedila, forumi, spletni kvizi...

C – Course – tečaj

- možnost asinhronega opravljanja
- kreditne točke za univerzitetne programe



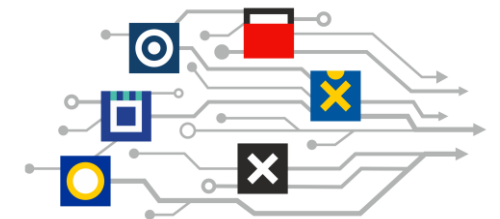
By Mathieu Plourde (Mathplourde on Flickr) -

<https://www.flickr.com/photos/mathplourde/8620174342/sizes/o/in/photostream/File:MOOC-Poster.png>, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=75937656>



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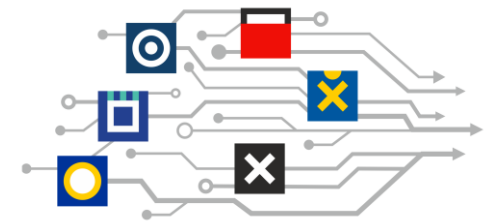
Kaj je to MOOC?

- MOOC omogoča vsakemu (?), da se „udeleži“ predavanj **najboljših univerz** na svetu
- MOOC **ne daje vedno formalnih izobraževalnih kvalifikacij**, ampak omogoča pridobitev znanj in kompetenc na različnih področjih
- MOOC lahko uporabite, da razvijete lastne **karijerne sposobnosti, se (pred)pripravite za nadaljnje izobraževanje ali raziskujete nova področja (skladno z lastnimi interesi)**



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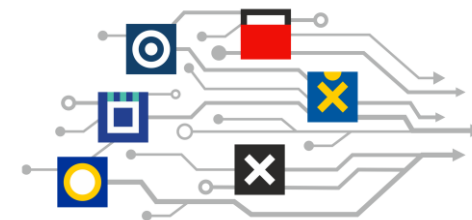
načrtovani učni cilji (ILO)

- **pokazati** razloge, zakaj uporaba mikroMOOC tečajev za vseživljenjsko učenje visokošolskega pedagoškega kadra prinaša koristi
- **predlagati** elemente mikroMOOC tečajev, ki zagotavljajo aktivno učenje preko spleta
- **načrtovati** strukture interaktivnih spletnih predstavitev z namenom vseživljenjskega učenja
- **opisati** ključne elemente mikroMOOC tečajev



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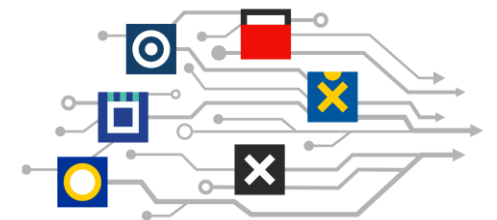
Kako deluje MOOC?

- MOOC ima običajno določen datum začetka in zaključka, poteka nekajkrat letno in traja **nekaj tednov**.
- **MOOC** vsebuje množico različnih spletnih in interaktivnih orodij, ki omogočajo stik z drugimi udeleženci in organizatorji („učitelji“). Možnosti so **video** (predavanja), **animirani diapozitivi**, **članki** (branje), **(asinhrono) diskusije**, **(interaktivne) naloge** in **mreženje**.
- Ker se MOOC tečajev pogosto udeleži veliko udeležencev, je običajna tudi **podpora s strani skupnosti** soudeležencev, kot tudi organizatorjev (učiteljev).
- Napredek v MOOC tečaju se lahko določa s pisnimi nalogami **z medvrstniškim ocenjevanjem** ali pa z **avtomatskim točkovanjem** (udeležba učiteljev v procesu vrednotenja je minimalna).



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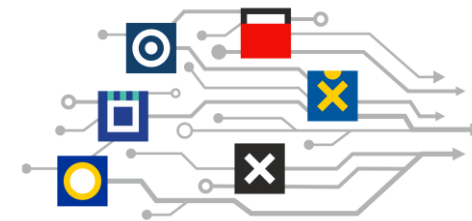
definicije MOOC, COOC, SPOC, xMOOC, cMOOC...

- **MOOC** = Massive Open Online Course (bistveno je, da je tečaj odprt hkrati za veliko število udeležencev)
- **COOC** = Corporate Open Online Course (za podjetja)
- **SPOC** = Small Private Open Course (narejen po meri, za manjšo skupino udeležencev)
- **xMOOC** = **eXtended MOOC** (podobni običajnim univerzitetnim predavanjem – predava učitelj, študenti poslušajo)
- **cMOOC** = **connectivist MOOC** (namesto posameznega učitelja, ki predava, kot je to pri klasičnih univerzitetnih predmetih, gre za skupino udeležencev, ki se izobražuje in izpopolnjuje skupaj in na ta način izboljšuje svoje kompetence)

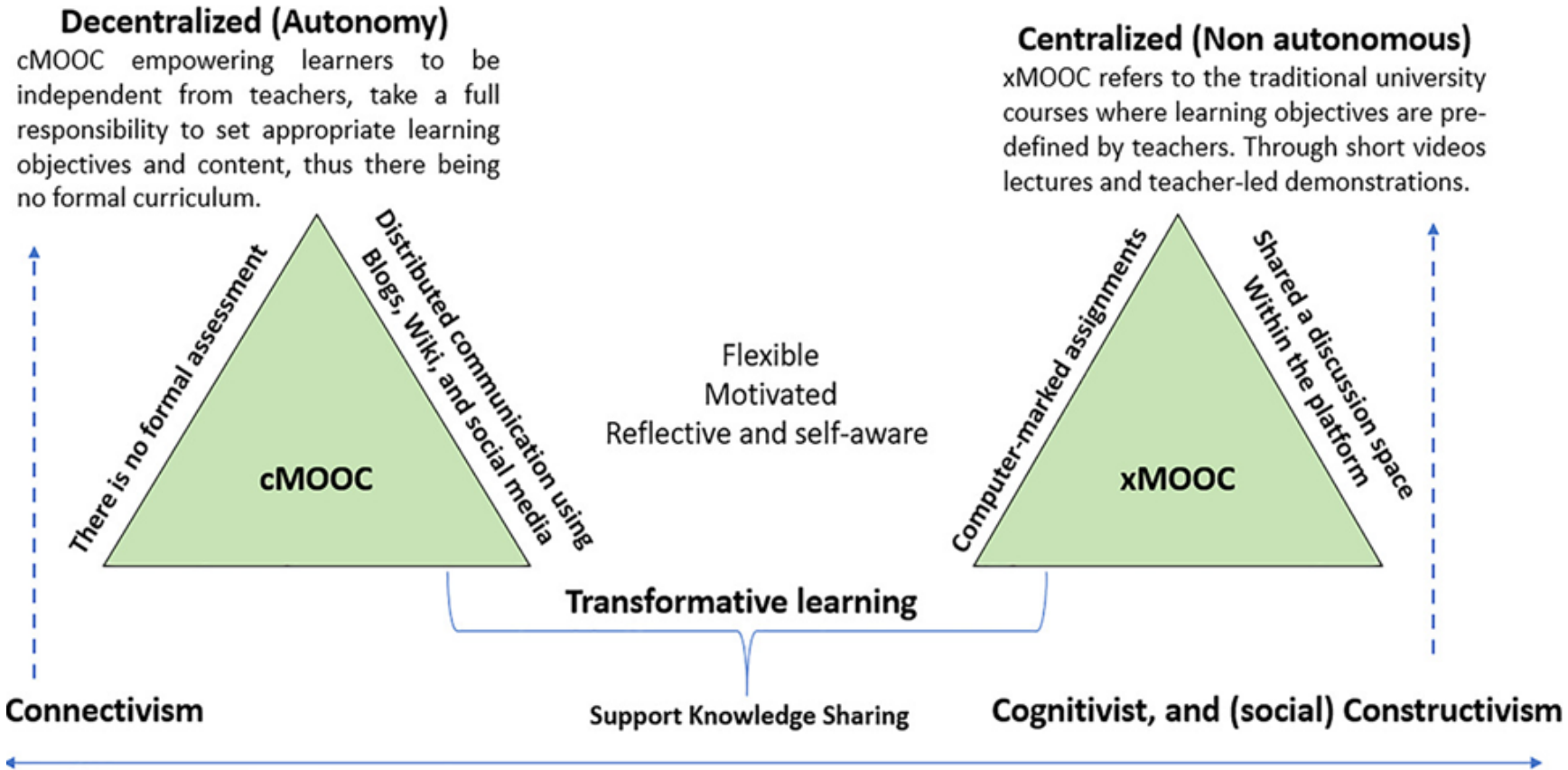


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cMOOC in xMOOC – razlike in podobnosti

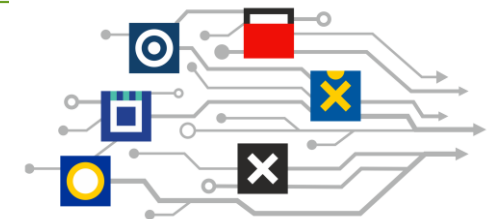


A. M. F. Yousef, T. Sumner *Comput Appl Eng Educ.* **2021**, 29, 648–665. <https://doi.org/10.1002/cae.27334>

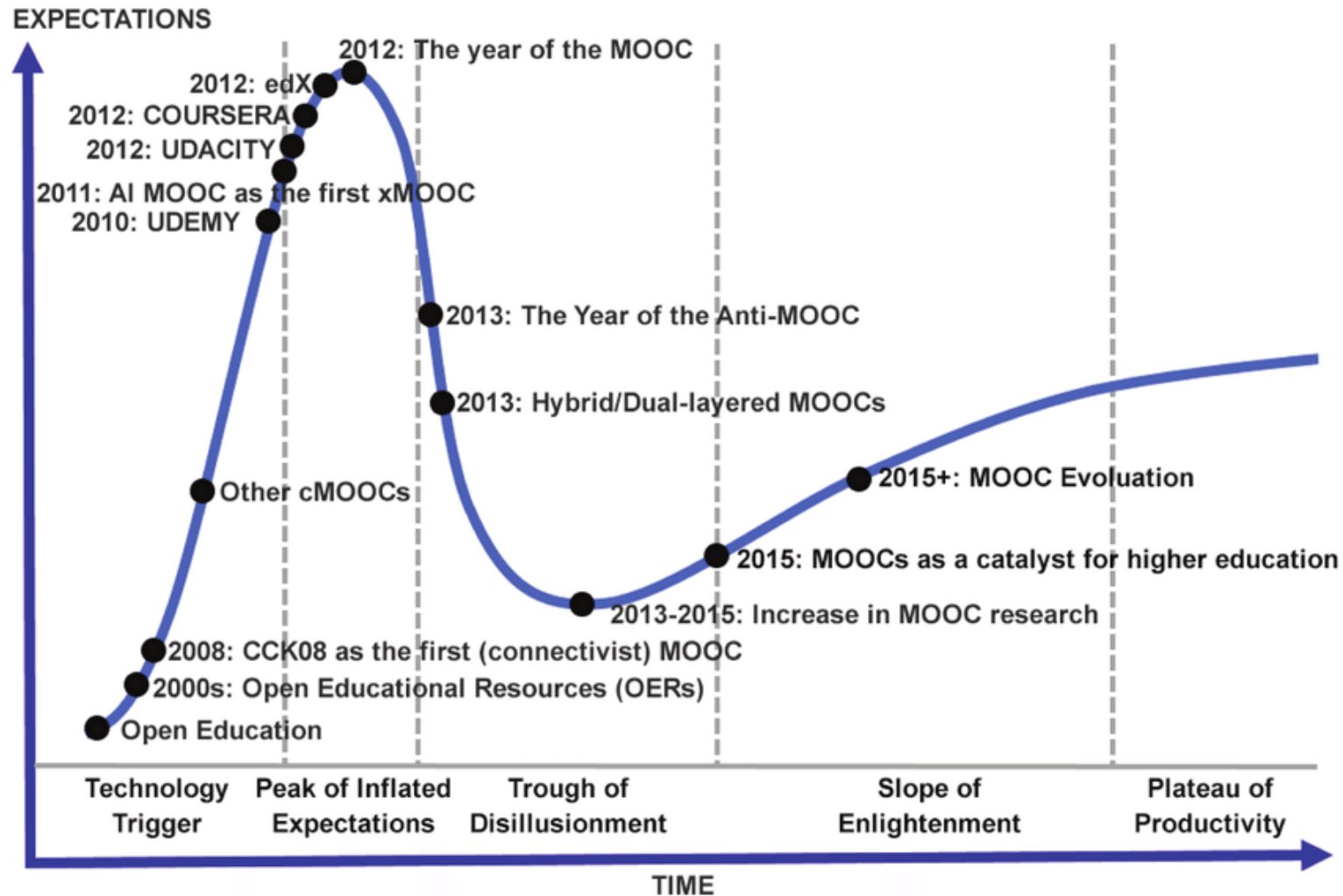


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ključni dogodki v razvoju MOOC tečajev: Gartnerjev cikel









What is Gartner Hype Cycle? (the definition)

The hype cycle is a branded graphical presentation developed and used by the American research, advisory and information technology firm Gartner to represent the maturity, adoption, and social application of specific technologies. The hype cycle claims to provide a graphical and conceptual presentation of the maturity of emerging technologies through five phases.

from Wikipedia:

https://en.wikipedia.org/wiki/Gartner_hype_cycle

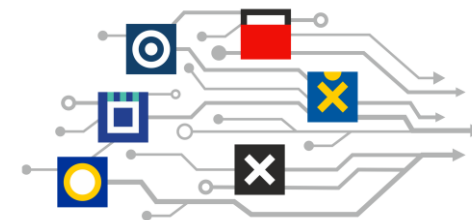
glavne spletne platforme, ki gostije MOOC tečaje

	https://www.udemy.com/		https://www.futurelearn.com/
	https://www.coursera.org/		https://www.udacity.com/
	https://www.edx.org/		https://www.mooc.org/ an EdX site



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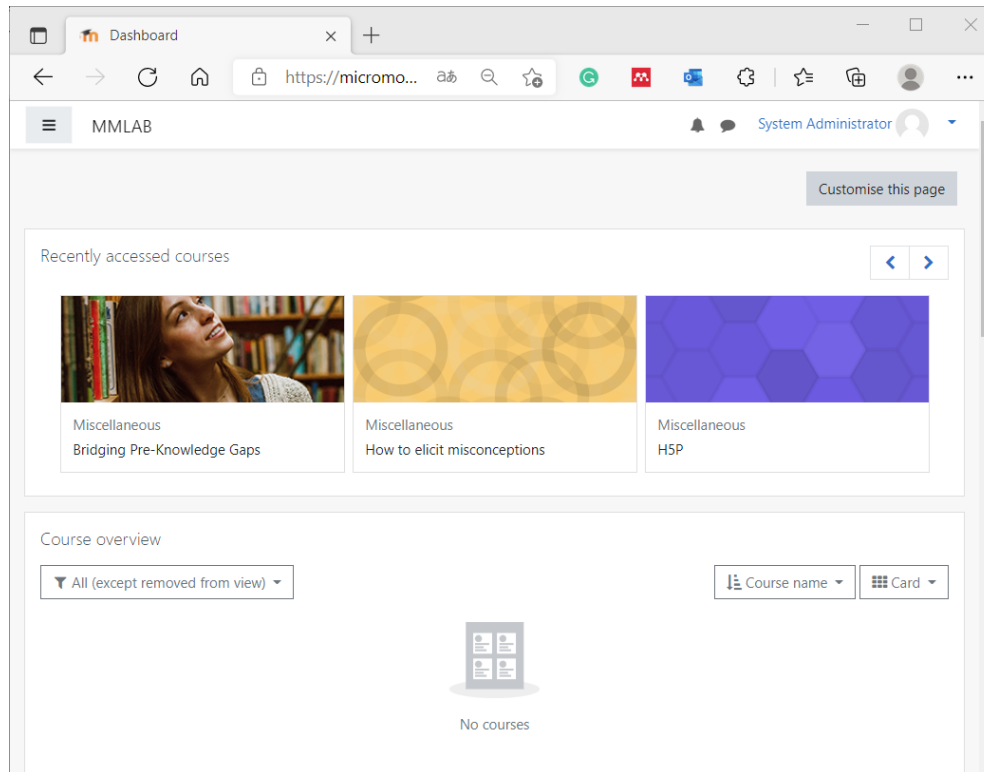


najbolj obiskani MOOC tečaji (podatki za 2021)

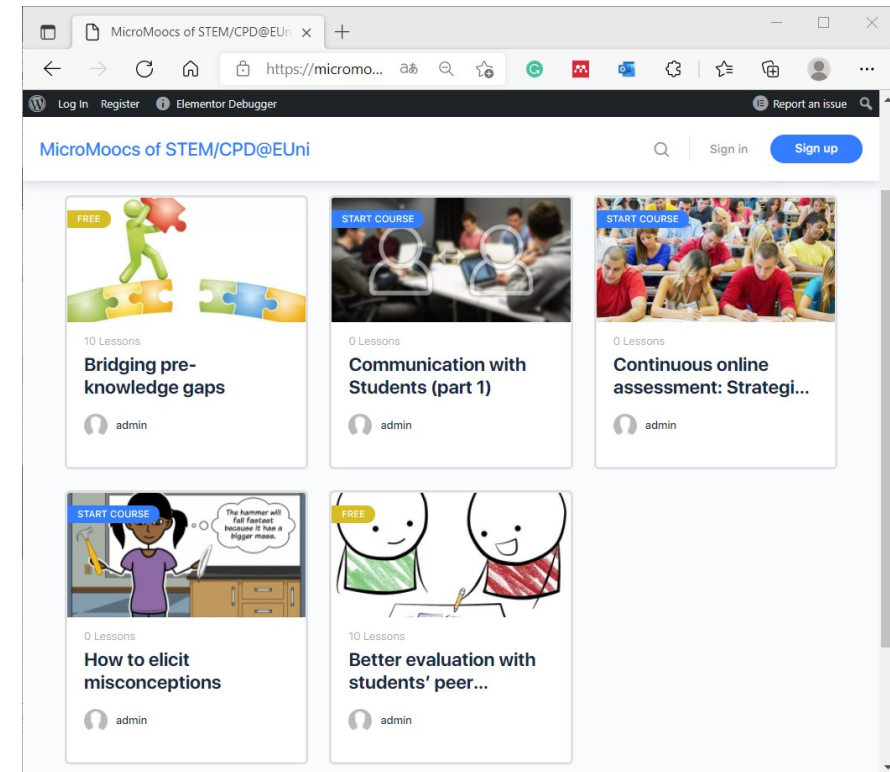
	tečaj	institucija	platforma	št. udeležencev
1.	Machine Learning	Stanford University	Coursera	3,739,475
2.	The Science of Well-Being_	Yale University	Coursera	3,120,269
3.	Learning How to Learn: Powerful mental tools to help you master tough subjects	UC San Diego	Coursera	2,633,758
4.	Programming for Everybody (Getting Started with Python)	University of Michigan	Coursera	1,975,581
5.	English for Career Development	University of Pennsylvania	Coursera	1,123,603
6.	COVID-19 Contact Tracing	John Hopkins University	Coursera	1,026,926
...				
12.	Understanding IELTS	British Council	FutureLearn	690,567

<https://www.onlinecourserereport.com/the-50-most-popular-moocs-of-all-time/>

platforme, ki omogočajo izdelavo lastnih MOOC (DIY)



<https://micromooocs.eu/moodle>
Moodle



<https://micromooocs.eu/wp>
Wordpress with Learndash plugin

naša platforma za gostovanje MOOC

ECTNMOOCS Discover New Help Kristof

Viewing 13 courses

Search for a course

Refine Your Search

modes	13
audit	
org	
ECTN	3
UNILJ	3
JU	2
OULU	2
UvA	2
UniversityofPerugia	1
language	13
en	

UNILJ UNILJ002 How to Create MicroMoc Course Starts: Jan 1, 2030

UNILJ UNILJ004 MicroMococs with Open edX Starts: Jan 1, 2030

OULU OU002 Pre-assignments to enhance students' learning in laboratory Starts: Jan 1, 2030

ECTN ECTN001 Introduction to General chemistry Starts: Jan 1, 2030

UvA UvA007 Learning trajectories Starts: Jan 1, 2030

UvA UvA007 How to improve active learning Starts: Jan 1, 2030

UniversityofPerugia 1287300 Tools different than Power Point to teach chemistry Starts: Jan 1, 2030

OULU STEM05 Continuous online assesment for large classes Starts: Dec 27, 2021

UNILJ STEM001 Better evaluation with students' peer assessment Starts: May 15, 2022

<https://lms.ectnmoocs.eu/courses>

prednosti in slabosti MOOC

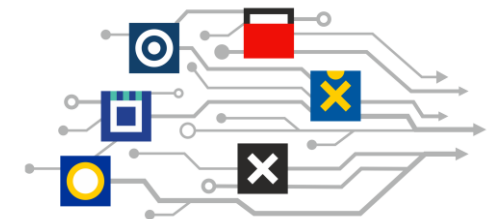


- **brezplačni** – omogočajo dostop do znanja vsem
- **asinhrono učenje** – opravljanje vsebin z lastnim tempom

- **zagotavljanje kvalitete**
- **zahtevajo samoiniciativnost** → majhen delež udeležencev, ki tečaj uspešno zaključijo
- omejitev na **avtomatizirane kvize in naloge**



**vrstniško
ocenjevanje**



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LTT dogodek „v“ Ljubljani (februar 2021)

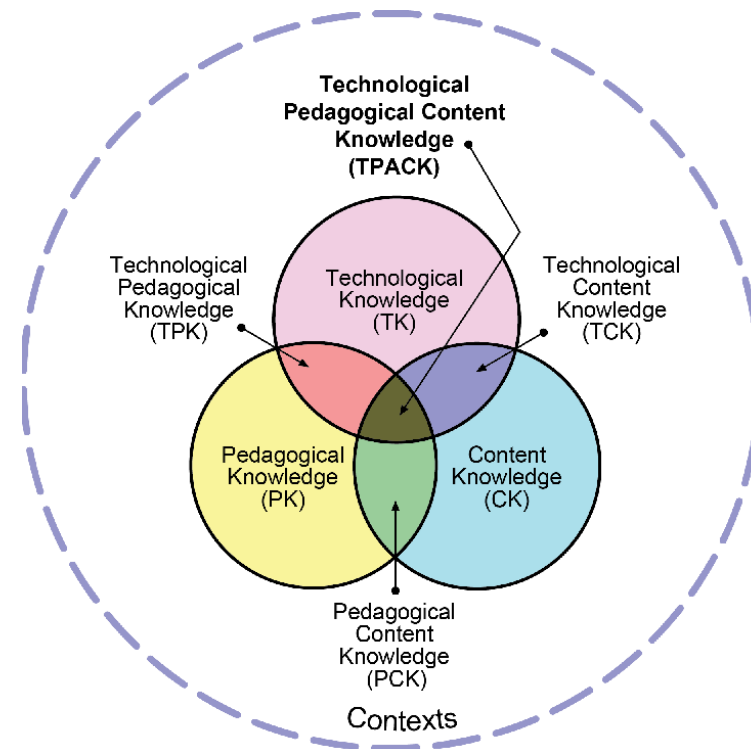
<https://micromoocs.eu/moodle/course/view.php?id=2>

(dostop tudi do zbirke povzetkov)

How to design a MOOC?

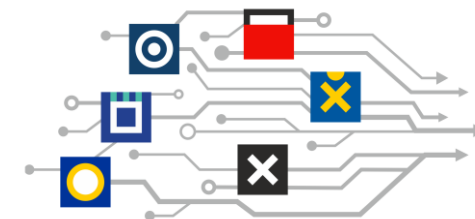
Postavili smo si naslednje cilje (ILO):

- opisati pedagoške značilnosti MOOC
- spoznati načela in težave v zvezi z odprtostjo in dostopnostjo tečajev MOOC (GDPR)
- uporabljati H5P za ustvarjanje interaktivnih video gradiv za uporabo v MOOC
- izbrati primerne tematike za izdelavo MOOC z namenom CPD
- načrtovati mikroMOOC za razvoj pedagoškega kadra v visokem šolstvu
- izbrati načrt, ki bo omogočal aktivno udeležbo in pri uporabnikih vzbudil vseh pet čutil



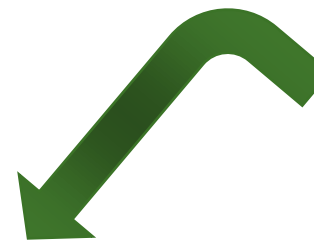
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mikroMOOC tečaji – že pripravljene

- Bridging the pre-knowledge gaps (Amsterdam)
- Communication between students and academics (part 1 of communication difficulties) (Kraków)
- Better evaluation with students' peer assessment (Ljubljana)
- (ECTN/Madrid)
- How to elicit misconceptions (Napoli)
- Continuous online assessment: Strategies for large classes (Oulu)



ta mikroMOOC je bil že uspešno izveden v praksi

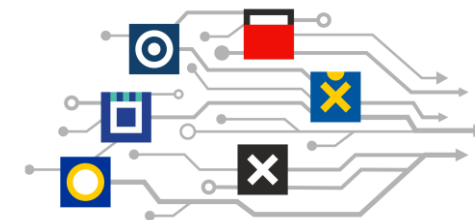
mikroMOOC tečaji v delu

- Providing quality feedback to students (Kraków)
- Working with autism spectrum disorder (ASD) students (Kraków)
 - Open-science for CPD activities in high education (Ljubljana)
 - 3D visualization of chemical processes (Ljubljana)
 - Constructing STEM multiple choice exams (ECTN/Madrid)



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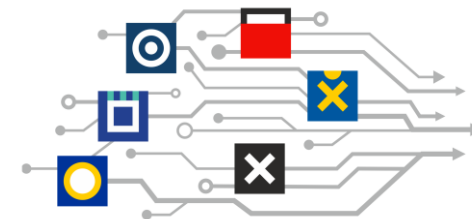
pot do našega prvega mikroMOOC...

1. stopnja – načrtovanje UC (*user case*):
spodbujanje uvedbe in izvedbe
medvrstniškega ocenjevanja z namenom
ocenjevanja v visokošolskem poučevanju



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zasnove in izhodišča UC

peer-to-peer assessment

izziv (težava)

Kako oceniti znanje študentov?

strah (učiteljev) pred...

pomanjkanje ustrezne povratne informacije (pri ocenjevanju)...

izhodišča na poti do rešitve...

- učinkovitost
- pravilnost
- natančnost
- poštenost
- ponovljivost

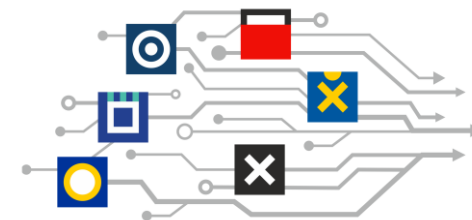
- Bo objektivno?
- So študenti kvalificirani za to nalogo?
- Bodo sploh želeli sodelovati?

klasično ocenjevanje velikega števila kompleksnih nalog – nemogoča izvedba v realnem času

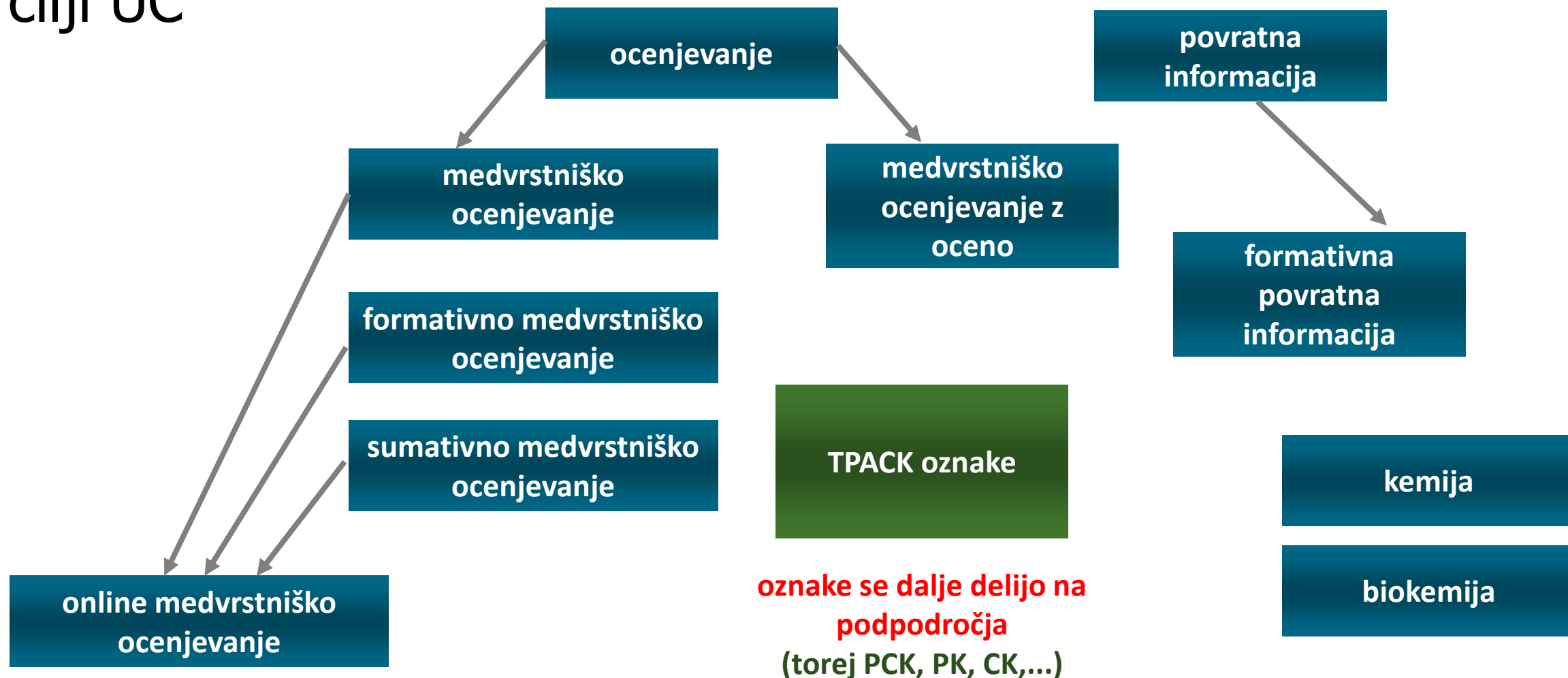


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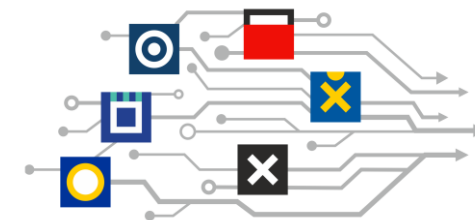


cilji UC



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cilji in prihodnost...

lokalno
okolje (specifično)

konstruktivistični način
poučevanja na UL FKKT



- pomanjkanje vrednotenja in/ali želja, obdržati popolni nadzor nad vrednotenjem (ocenjevanjem)
- pomanjkanje ustrezne povratne informacije

medvrstniško ocenjevanje
omogoča

poučevanje, osredotočeno
na učitelja

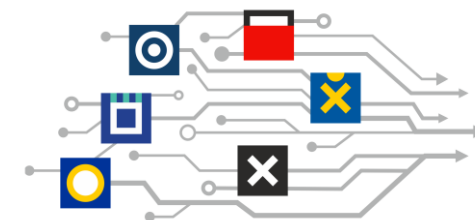


poučevanje, osredotočeno na
študenta

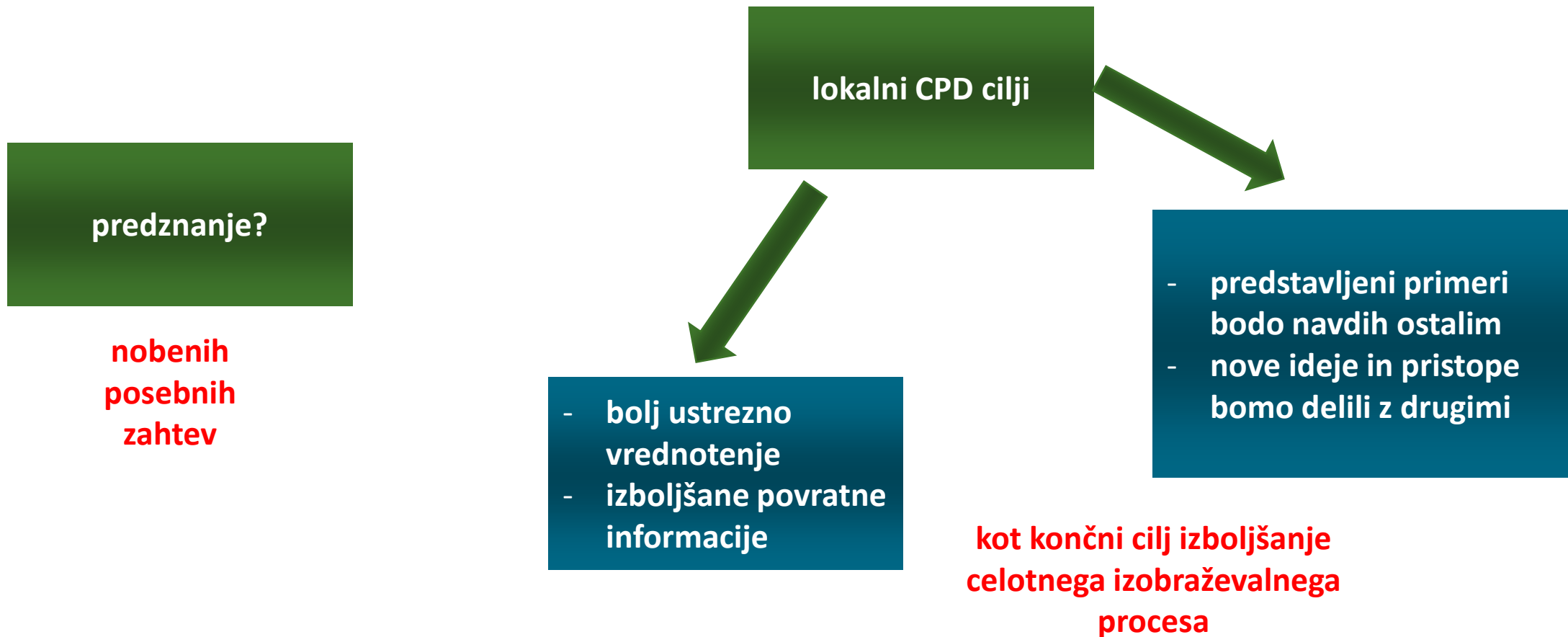


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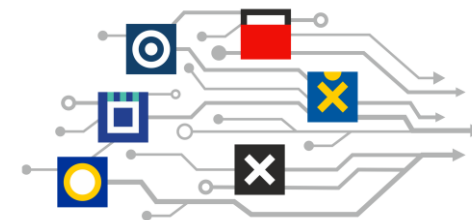


cilji in prihodnost...



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pot do našega prvega mikroMOOC...

*izdelal David Titovšek v okviru
magistrskega dela na štud.
prog. Kemijsko izobraževanje
(FKKT)*

2. stopnja – izdelava mikroMOOC: spodbujanje uvedbe in izvedbe medvrstniškega ocenjevanja z namenom ocenjevanja v visokošolskem poučevanju



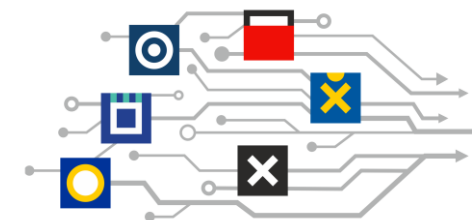
Davidov magisterij je dostopen na:

<https://repozitorij.uni-lj.si/IzpisGradiva.php?id=131562&lang=eng>



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mikroMOOC – učni cilji (ILO) in vrednotenje

učni cilji
(*intendend learning outcomes*)

ILO1
udeleženci znajo opisati
prednosti medvrstniškega
ocenjevanja (*peer review*)

ILO2
udeleženci znajo zasnovati
izvedbo in aktivnosti za
medvrstniško ocenjevanje
(vrednotenje)

ILO3
udeleženci znajo izdelati
rubrike, ki jih študenti
uporabijo za
medvrstniško
ocenjevanje

vrednotenje

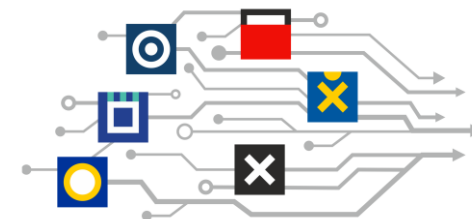
orišite aktivnost za
medvrstniško ocenjevanje za
predmet, ki ga predavate

izdelajte rubrike za vašo aktivnost
za medvrstniško ocenjevanje



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Kje smo (bili)? – vsebina mikroMOOC tečaja

	trajanje	naslov (ime)	aktivnost	Stanje (stopnja)
1.	2 min	Uvod v tečaj	video	v teku
2.1	10 min	Kaj je medvrstniško ocenjevanje? + kratek kviz	Interaktivna predstavitev	končano
2.2	5 min	Glavne prednosti medvrstniškega ocenjevanja.	branje / predstavitev	v teku
2.3	5 min	Prednosti in izzivi medvrstniškega ocenjevanja.	vprašalnik	končano
2.4	10 min	Kako izvesti medvrstniško ocenjevanje: primeri dobrih praks medvrstniškega ocenjevanja; kako premostiti izzive (težave).	branje / predstavitev	v teku
2.5	30 min	Skicirajte aktivnost za medvrstniško ocenjevanje za predmet, ki ga predavate.	medvrstniško ocenjevanje z ocenami	končano
	15 min	Ocenjevanje drugih udeležencev.		
3.1	5 min	Uvod v rubrike .	video	končano
3.2	10 min	Kako uporabljati rubrike za medvrstniško ocenjevanje?	predstavitev / branje	v teku
3.3	30 min	Izdelajte rubriko za vaš primer medvrstniškega ocenjevanja (uporabite 2 kriterija).	medvrstniško ocenjevanje z ocenami	v teku
	15 min	Ocenjevanje drugih udeležencev.		
4.	15 min	Refleksija in ocenjevanje mikroMOOC tečaja	vprašalnik	v teku
cca. 150 min				

za razmislek...

Nekateri izzivi med izdelavo mikroMOOC tečaja

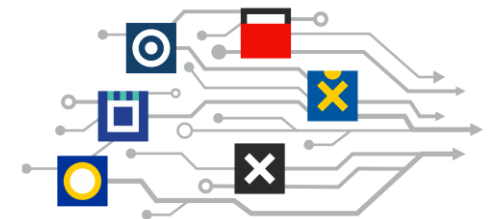
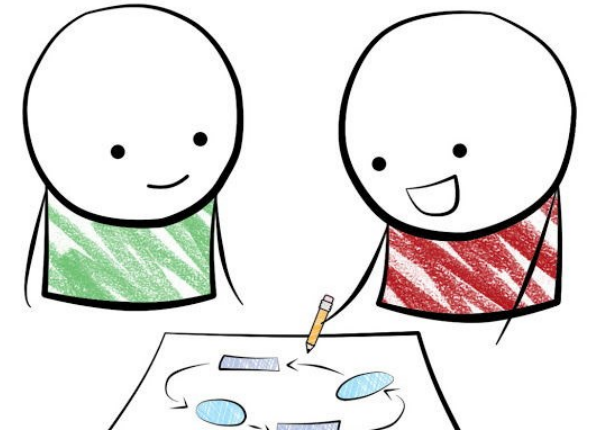
- Kako narediti vsebino čim bolj interaktivno?
- Kako doseči, da se pisne, slušne in vidne informacije ustrezno dopolnjujejo?
- Kako pripraviti kvalitetna video in avdio gradiva?

Izzivi pred nami

- Načrtovanje in izvedba medvrstniškega ocenjevanja s pomočjo rubrik.
- Izdelava ocenjevalnega vprašalnika s katerim bomo dobili čim večji vpogled v mnenje udeležencev o koristnosti mikroMOOC tečaja.

(Skoraj) končni izdelek

dostopen na: https://apps.lms.ectnmoocs.eu/learning/course/course-v1:UNILJ+STEM001+2022_T3/home



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zahvala – vsem partnerjem

UNIVERSITY
OF AMSTERDAM



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

... in še posebej Davidu Titovšku



ter Univerzi v Mariboru za izvedbo dogodka
(doc. dr. Janja Majer Kovačič in doc. dr. Brina Dojer)



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