



(Project Number: 945301)




DELIVERABLE D3.1

MEET-CINCH MOOC Editions

Lead Beneficiary: POLIMI

Due date: 30/09/2023

Released on: 30/09/2023

Authors:	Elena Macerata, Maddalena Negrin, Francesca Concia	
For the Lead Beneficiary	Reviewed by Work package Leader	Approved by Coordinator
Elena Macerata 	Elena Macerata 	Mojmír Němec 

Start date of project:

01/10/2020

Duration: **36 Months**

Project Coordinator:

Assoc. Prof Mojmir Nemecek

Project Coordinator Organisation: CTU

VERSION: 1.2

Project co-funded by the European Commission under the Euratom Research and Training Programme on Nuclear Energy within the Horizon 2020 Programme		
Dissemination Level		
PU	Public	X
RE	Restricted to a group specified by the Beneficiaries of the A-CINCH project	
CO	Confidential, only for Beneficiaries of the A-CINCH project	

Version control table

Version number	Date of issue	Author(s)	Brief description of changes made
1.0	14.09.2023	Maddalena Negrin, Elena Macerata, Francesca Concia	Draft
1.1	16/10/2023	Jana Peroutková	MST check
1.2	17/10/2023	Mojmír Němec	Coordinator's check and approval

Project information

Project full title:	Augmented Cooperation in Education and Training in Nuclear and Radiochemistry
33Acronym:	A-CINCH
Funding scheme:	Coordination and Support Action
ECGA number:	945301
Programme and call	H2020 EURATOM, NFRP-2019-2020
Coordinator:	Mojmír Němec
EC Project Officer:	Kateřina Ptáčková
Start date – End date:	01/10/2020 – 30/09/2023 i.e. 36 months
Coordinator contact:	+420 224 358 331, mojmir.nemec@fjfi.cvut.cz
Administrative contact:	+420 245 008 599, cinch@evalion.cz
Online contacts:	http://www.cinch-project.eu/

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“This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945301.”

EXECUTIVE SUMMARY

The deliverable “*MEET-CINCH MOOC Editions*” outlines the continuous maintenance and animation efforts invested in the “*Essential Radiochemistry for Society*” MOOC, encompassing three annual editions. Our commitment to promoting, animating, and sustaining this invaluable open educational resource has been realized through various activities and data analysis, shedding light on the MOOC's evolution.

Throughout the annual editions, a dedicated community manager conducted daily monitoring to promptly respond to user inquiries and forum interactions. Most user requests centred on access to missed webinar recordings, while occasional content errors were swiftly addressed through revision and modification. The collected data on user enrolment, gender distribution, and countries of origin for each edition underscores the global reach of the MOOC, with Italy, Finland, and the Czech Republic prominently represented.

To enhance the MOOC experience, live webinars known as “*CINCH Talks*” were organized for both students and teachers. These webinars allowed participants to interact with field experts and explore teaching methodologies, fostering engagement and deeper learning.

For students, a total of nine expert webinars covering various topics were conducted, each drawing substantial interest. The availability of webinar recordings on the MOOC Forum section and Politecnico di Milano's YouTube Channel catered to learners' diverse schedules and preferences. These recordings have been utilized in academic courses and research activities, validating their impact.

Furthermore, the Teacher training evolved into a series of online appointments, the “*CINCH Talks for teachers*”, adapting to the challenges posed by the pandemic. These sessions guided educators on maximizing the MOOC's potential to stimulate students with innovative teaching methods.

Moreover, the development of teaching toolkits facilitates the integration of the MOOC into academic courses, as explained in Deliverable D3.2. These toolkits are instrumental for both online and in-person teaching, providing flexibility and adaptability to various educational settings.

In conclusion, the 'Essential Radiochemistry for Society' MOOC has thrived due to continuous improvement and engagement initiatives. Even after the conclusion of the A-CINCH project, the MOOC will persist on the POK platform of POLIMI, ensuring its availability and ongoing monitoring in the years to come.

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2 INTRODUCTION

In an era characterized by rapid technological advancements and evolving educational paradigms, the importance of accessible and engaging educational resources cannot be overstated. Recognizing the critical need to address the scarcity of expertise in Nuclear and Radiochemistry, the "*Essential Radiochemistry for Society*" MOOC was conceived as a cornerstone of the MEET-CINCH Project. This high-quality resource stands as a beacon, illuminating the path to acquiring essential knowledge and skills in a field of paramount importance.

The MOOC's enduring relevance hinges on a meticulous strategy that involves continuous refinement, robust maintenance, and the cultivation of interactive learning experiences. To meet the ever-evolving demands of both students and educators, the MOOC undergoes a perpetual process of enhancement, grounded in the granular analysis of anonymized data sourced from user feedback, motivation assessments, satisfaction surveys, and comprehensive performance evaluations. This data-driven approach ensures that the MOOC remains a dynamic and responsive platform, attuned to the diverse needs of its users.

Central to this strategy are the orchestrations of webinars and forum discussions, thoughtfully curated and facilitated by dedicated community managers. These interactive sessions ignite stimulating dialogues among learners, fostering the sharing of knowledge and the collective growth. In essence, this concerted effort not only boosts the MOOC's content but also amplifies awareness of Nuclear and Radiochemistry, making it more accessible to society at large.

Furthermore, the development of adaptable usage patterns and the creation of associated toolkits have proven instrumental in promoting the MOOC's utilization. These resources have not only benefited students but have also been disseminated among educators through specialized webinars. These teacher-focused webinars serve as a conduit for equipping instructors with the knowledge and strategies to effectively incorporate the MOOC into their teaching methodologies.

This document describes all the actions taken for the continuous maintenance and animation of the "*Essential Radiochemistry for Society*" MOOC. In the following sections, we delve into the multifaceted activities that underpin our commitment to promote, animate, and sustain this invaluable open educational resource.

3 MOOC MAINTAINING AND MONITORING

The MOOC “Essential Radiochemistry for Society”, developed during the MEET-CINCH project, has been continuously maintained, updated and enhanced on the Polimi Open Knowledge platform (www.pok.polimi.it, see Figure 1).

The screenshot shows the MOOC page on the POLIMI platform. At the top, there is a navigation bar with 'POLIMI', 'ABOUT', 'REGISTER NOW', and 'LOGIN'. The main header features a large image of a laboratory with the title 'Essential radiochemistry for society' and an 'ENROLL NOW' button. Below the header, there is a section titled 'How much radiochemistry is involved in everyday life and human activities' with a text box stating: 'If you are a POLIMI student you have to log in using your Person Code. This is the only way to prove your participation in this course for official recognition.' To the right, there is a table with course details:

Classes Start	Aug 28, 2023
Classes End	Sep 01, 2024
Length	5 Weeks
Estimated Effort	5-6 hours/week
Language	English
Course Number	ERS101

Below the table, there is a 'MOOCs For Master of science' button. The 'COURSE DESCRIPTION' section explains that the MOOC was born within the European project MEET-CINCH: A Modular European Education and Training Concept In Nuclear and radioChemistry (2017-2020) to engage people discovering an unknown discipline and convey them its fascination and relevance. It is addressed to Bachelor students in chemistry, physics, engineering and in general scientific areas, who are interested in realising the involvement of Nuclear- and Radiochemistry in everyday life and understanding the advantages it could introduce. The course content includes nuclear medicine, diagnostic tools such as PET and SPECT imaging, and radiotherapy.

Figure 1 – Screenshot of the home page for the MOOC „Essential radiochemistry for society“

The course was promoted periodically by sharing a flyer designed ad hoc and reported in Figure 2. The direct link by QR code to the current edition of the MOOC was added to the flyer to enable a prompt access to the course.

The flyer features a background image of laboratory glassware. It includes the following sections:

- AUDIENCE:** The course is addressed to Bachelor students in scientific areas, who are interested in realising the involvement of Nuclear- and Radiochemistry in everyday life and understanding the advantages it could introduce.
- PREREQUISITE:** Scientific background knowledge deriving from high school and higher education, in particular on chemistry, physics and math.
- ACTIVITIES:** During the course participants are involved in live webinars with experts and professionals from prestigious institutions. The webinar's recordings are available at this Youtube link.
- COURSE SYLLABUS:**
 - Week 1 - Radiochemistry for the environment
 - Module 1 - Natural radioactivity
 - Module 2 - Radioactivity from anthropogenic activities
 - Module 3 - Environmental remediation
 - Week 2 - Radiochemistry for health
 - Module 1 - Nuclear medicine
 - Module 2 - Sterilization by ionizing radiation
 - Week 3 - Radiochemistry for industry
 - Module 1 - Tracer technology
 - Module 2 - Radiation processing
 - Week 4 - Radiochemistry for nuclear energy
 - Module 1 - Reprocessing of spent fuel
 - Module 2 - Containment and waste management
 - Module 3 - Decommissioning of nuclear facilities
 - Week 5 - Radiochemistry for society
 - Module 1 - Cultural heritage
 - Module 2 - Nuclear forensics and proliferation
- Workload:** 5-6 hours/week
- Enroll on the course:** <https://www.pok.polimi.it>
- QR Code:** Links to the course page.
- Funding:** The project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No. 101017714 and from the Norwegian Research Council under grant agreement N° 314053.

Figure 2. Flyer designed for MOOC promotion.

In total, three yearly editions have been delivered. A monitoring activity on a daily basis was carried out by a community manager to reply to possible emails and check the Forum. Few activities have been reported during the three annual editions provided so far: few warnings about errors or unclear definitions were received and promptly addressed by content revision and modifications; most of the requests of the MOOC users were about the availability of the webinars recordings which they missed.

In the following paragraphs, the data analysis of each edition is provided.

3.1 Pilot Edition

A 3-months Pilot Edition was delivered in the last months of the MEET-CINCH project, from 15th June 2020 until 29th August 2020, and edition data could be collected and analysed at the beginning of the A-CINCH project.

3.1.1 Data analysis

POLIMI has completed the analysis of data already collected during the pilot edition:

- the quantitative data automatically collected by the platform,
- qualitative data, collected through customer satisfaction,
- personal data, collected through the initial survey.

The limited duration of the pilot edition and the peculiar period in which it has been proposed (June-August) made it necessary to select an audience that would complete the whole course. To this purpose, all the Partners were requested to promote the MOOC by their institutional channels and among their students, as members of the target group (bachelor students from scientific areas), guaranteeing more heterogeneous feedback from all over Europe.

The first Pilot edition of the MOOC has been followed by 203 users from 20 different Countries all around the world, 67 belonging to Politecnico di Milano, while 47 did not declare their provenance (See Table 1).

Table 1- MOOC users from Project Partners Countries.

Project Partner Country	Users
Czech Republic	6
Finland	2
Germany	10
Great Britain	3
Cyprus	1
Italy	67
Norway	8
Slovenia	38
Sweden	0

Among the 203 users, **52 users (22 female and 30 male)** completed the MOOC and obtained the Certificate of Accomplishment: despite the short duration of the MOOC edition, achieving 25% of users that have completed the course is a very good result with respect to the percentage usually observed for such kind of course. This could be explained with the great interest raised by NRC.

In addition, the **average score** achieved in the final exam is equal to **0.91/1**.

At the beginning of the MOOC users are asked to answer an **initial survey**, that is not mandatory, aiming at collecting data about place of origin, age, gender, employment status, study subject and information source. Only **37 people answered**, and the results are shown in Figure 33. The low number of answers could be due to the fact that a lot of people consider it a loss of time or decide to postpone the task and then forget it.

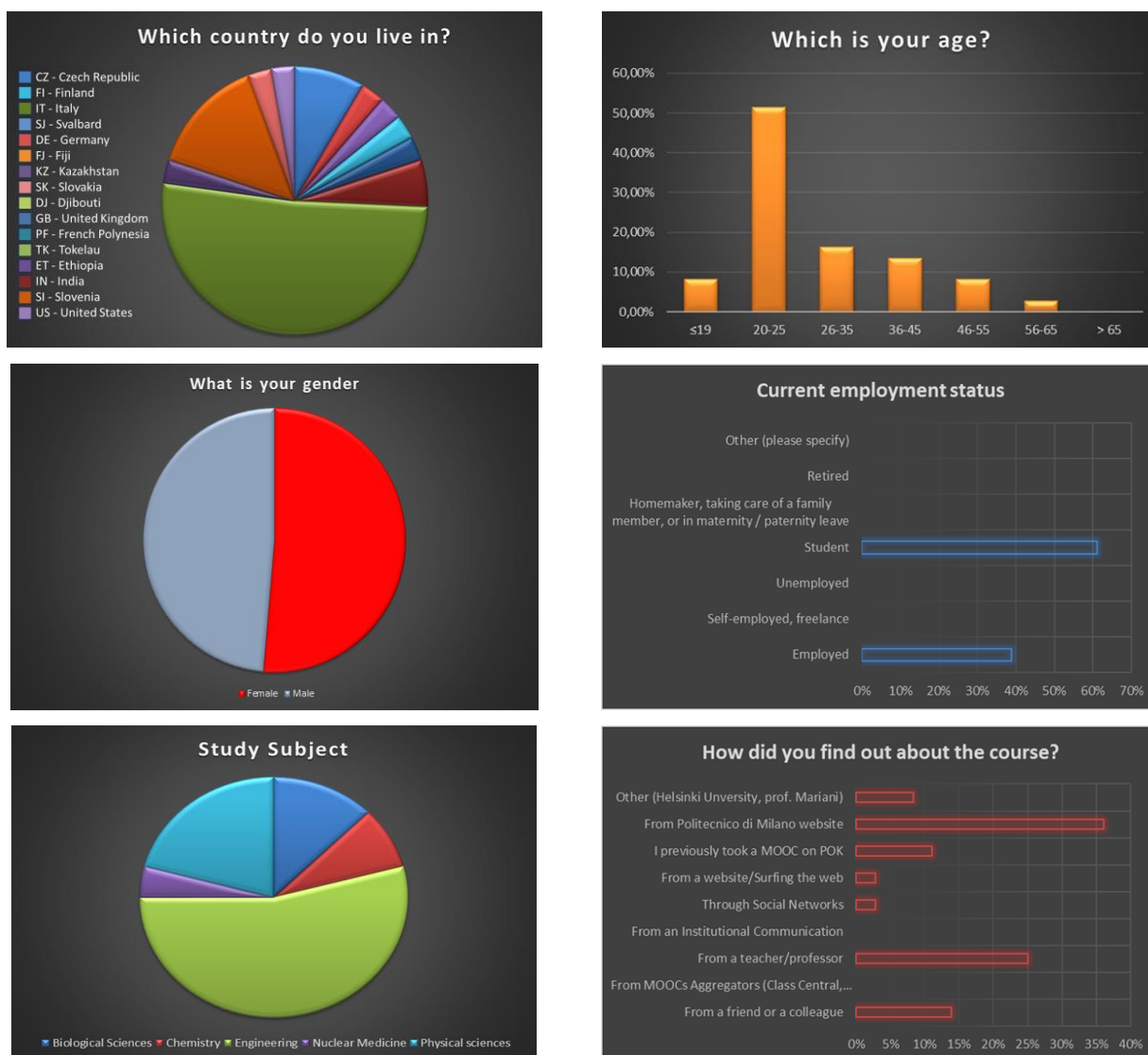


Figure 3 – Overview of the results of the MOOC initial survey.

Interestingly, the users are mainly **20-25 year old students in scientific areas**, as the selected target group, and web and social networks were not the most used promotion channels. **Institution’s websites or teachers were the most preferred way to get information.** It is worth to note that, among those who responded, women are the majority and that also some employed people choose to have a look to MOOC.

At the end of the MOOC, users were invited to fill in a **customer satisfaction questionnaire**. Even if they received the reminder by email, the number of people who answered to customer satisfaction was still lower. Only **27 answers** were collected. As shown in the following Figures, **the course experience has been judged positive or completely positive** (Figure 44) and the most favourite aspect resulted to be the presence of **several practical examples** (Table 2).

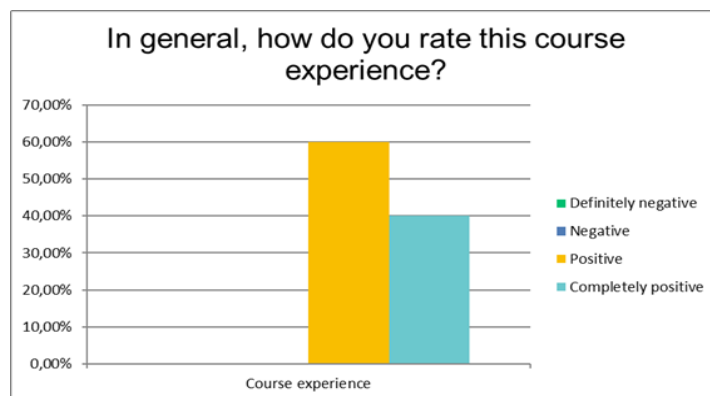


Figure 4 - Evaluation of the learning experience.

Table 2 - Answers to the question “Which aspects of the course did you enjoy the most?”

Favourite aspect	
The theoretical aspects	8%
The practical examples	40%
The communication style	4%
Additional materials	4%
Subtitles and the possibility to browse videos	12%
Alternation of lessons and exercises	16%
Video quality and materials	8%
Other (modularity)	8%

The majority of the users who answered the customer satisfaction questionnaire (See Figure 55 and Table 3) stated that they had enrolled in the course because of a **personal or a professional interest, studied almost all the learning resources, working more than 4 hours per week**. 44% users think that the commitment in the MOOC was more than they expected, 52% the same they expected (See Table 4). The questionnaire asks the respondents to express an evaluation on some aspects (See Figure 66), 88% of users answering the questionnaire completed the MOOC.

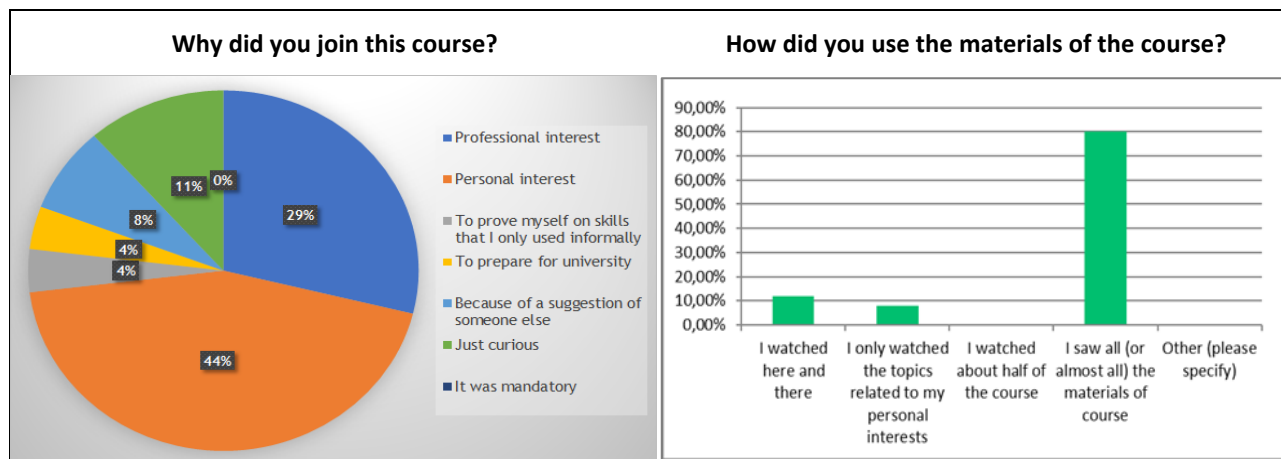


Figure 5 - Answers to the question „Why did you join this course?“ (left) and „How did you use the materials of the course?“ (right).

Table 3 - Answers to the question: „How many hours did you work on this course per week?“

I just went surfing around	4%
Less than 1 h per week	12%
1h-2h per week	16%
3h-4h per week	12%
More than 4 h per week	40%
Other (please specify)	16%

Table 4 - Answers to the question: „How many hours did you work on this course per week?“

Less than I expected	4,00%
The same I expected	52,00%
More than I expected	44,00%

	Absolutely disagree	Disagree	Fairly agree	Agree	Absolutely agree
I acquired new skills	0,00%	4,00%	20,00%	52,00%	24,00%
I improved my existing skills	0,00%	4,00%	28,00%	36,00%	32,00%
I acquired new knowledge on the topic	0,00%	0,00%	0,00%	36,00%	64,00%
I improved my existing knowledge on the topic	0,00%	0,00%	8,33%	29,17%	62,50%
I went through a new way to learn	0,00%	8,00%	32,00%	40,00%	20,00%
I will follow other MOOCs of similar themes	4,00%	8,00%	16,00%	52,00%	20,00%
I will follow another MOOC on Polimi Open Knowledge	0,00%	4,00%	32,00%	40,00%	24,00%
I would recommend this course to my colleagues	0,00%	4,00%	20,00%	52,00%	24,00%
I will insert the participation in this course in my CV	0,00%	8,00%	20,00%	44,00%	28,00%
The online platform POK is user friendly	0,00%	0,00%	4,00%	36,00%	60,00%
I did not have any technical problem in using POK	0,00%	8,00%	8,00%	20,00%	64,00%
Team POK provided a useful support	4,17%	4,17%	16,67%	41,67%	33,33%

Figure 6- Answers to the question: „Now that the course has ended, how much do you agree with the following statements?“.

3.1.2 Passion in action initiative

A focus group involving 25 students from Politecnico di Milano was organized: the students divided in 5 teams analysed a MOOC's macro-theme and proposed hints and ideas to involve the general public in NRC. They suggested to avoid “Long, verbose texts explanation of how” and to exploit:

- Quick not assessed quizzes
- Explanation of why
- Engagement through social networks (Instagram quizzes)
- General issue: ethical implication, international rules, costs
- Pictures, drawing, diagrams
- External links
- Focus on practical aspects
- Free jumping among resources with some proposed paths
- Gamification.

3.2 First Edition Data

The first full-year edition of the MOOC, started on 29th August 2020 until 27th August 2021, garnered significant global interest, attracting a total of 193 users from various corners of the world. These participants hailed from 32 different countries, showcasing the international reach of the "Nuclear-Radiochemistry for Society" MOOC. A breakdown of user distribution by country, highlighting those with multiple participants, is provided in Table 5 Table 6. Notably, Italy led the way with 72 enrolled users, followed by Finland with 15, Slovenia with 11, and several others with varying numbers of participants.

In this full year edition, 19% of the students enrolled achieved the Certificate of Accomplishment with an average grade of 0.914/1. The birth years of the majority of users fell within the range of 1996 to 1999, reflecting a diverse demographic of learners. Additionally, among those who provided gender information, 41% identified as women.

Table 5 – Country distribution of the users enrolled in the first annual edition.

Italy	72
Finland	15
Slovenia	11
Kazakhstan	7
Germany	6
Great Britain	5
India	5
France	4
Brazil	3
Norway	3
Pakistan	3
Australia	2
Belgium	2
Turchia	2
Greece	2
Cyprus	2

The graph of the trend of actions (Figure 7) performed by users on the platform during the MOOC edition (videos watched, quizzes answered) shows a higher activity in the period from 1/11/20 to 1/03/21: in this period the most active users come from Finland, Slovenia and Kazakhstan. There are no Italians among the users of the MOOC in this period, but they increase significantly in the second semester, when the MOOC was proposed to the students within the Applied Radiochemistry course at Politecnico di Milano.

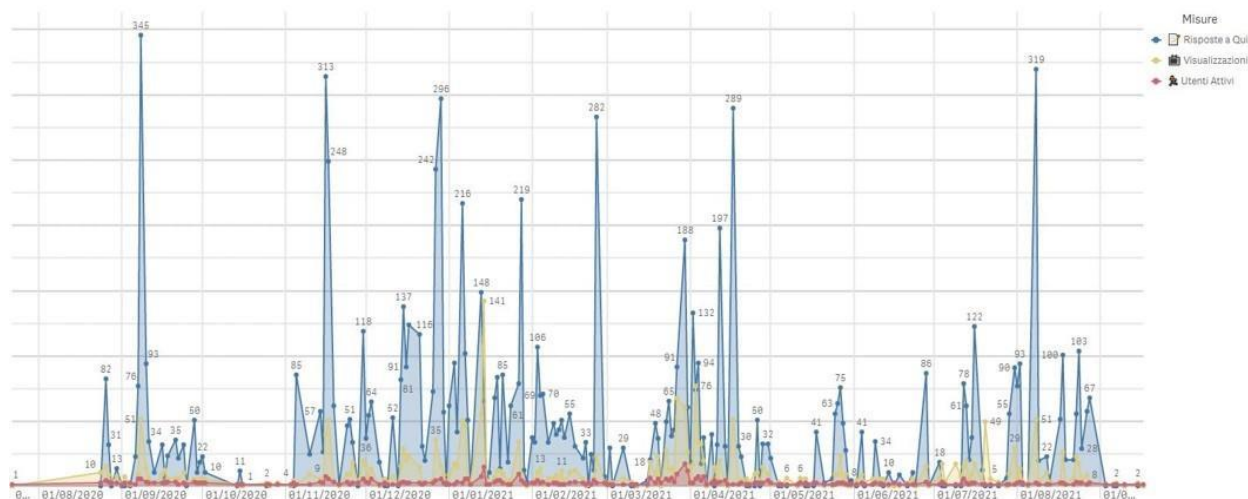


Figure 7 - Graph of the trend of actions performed by the MOOC users on the YouTube platform.

3.3 Second Edition Data

The second edition of the MOOC started on 29th August 2021 and ended on 27th August 2022. 118 users were enrolled in this annual edition from 20 different countries all around the world. Table 6 reports the country distribution. Similar to the previous editions, the users are quite well balanced in gender: 39% of the declared were women, 47% were men, while the remaining did not declare the gender. Concerning the results, 17% of the users has obtained the Certificate of Accomplishment with an average score in the final exam of 0.825/1.

Table 6 – Country distribution of the users enrolled in the second annual edition.

Czeck Republic	2
Finland	8
France	2
Germany	4
Great Britain	2
India	3
Italy	55
Slovenia	11
Spain	1
Sweden	2

3.4 Third Edition Data

The third annual edition, from 29th August 2022 until 27th August 2023, has been followed by a larger number of users, 246, among which 36% were women, 40% were men and the remaining did not declare their gender. As in the previous editions, 17% of the students achieved the Certificate of Accomplishment with an average grade of 0.890/1.

In general, the higher number of users in this annual edition compared to previous ones can be attributed to the promotion achieved by participating in the *Second International Conference on Applications of Radiation Science and Technology (ICARST-2022)*, organized by the IAEA in Vienna in August 2022. An oral presentation titled “*How to Attract New Students to NRC: The MOOC Experience*” was delivered. This increase in user participation is particularly evident in the larger presence of users from countries in Africa, the Middle East, the Far East, and South America, as shown in Table 7.

Moreover, by monitoring the number of users enrolled, a significant increase in enrolments can be observed at the beginning of the academic semesters, in Autumn and in Spring, when the MOOC course is used within the academic activities.

Table 7 – Country distribution of the users enrolled in the third annual edition.

Australia	1
Belgium	1
Brazil	1
Czech R.	34
Germany	2
Finland	36
France	4
Great Britain	1
Hungary	1
Indonesia	2
Italy	68
Netherlands	2
Norway	2
Saudi Arabia	12
Slovenia	14
Slovakia	11
Senegal	1
Turkey	1

3.5 Data Comparison among MOOC editions

Table 8 provides a comprehensive overview of key data points pertaining to the four editions of the "Essential Radiochemistry for Society" MOOC. This comparative analysis allows us to discern notable trends and variations across the editions, shedding light on the evolving landscape of the proposed educational initiative.

- Enrolled Users:** Across the four editions, a total of 772 users have enrolled in the MOOC. This figure underscores the sustained interest and growing reach of the educational resource.
- Gender Distribution:** Examining the gender distribution as a percentage of the total enrolled users reveals interesting insights. Notably, the third edition boasts the highest representation of female participants at approximately 36%, while the pilot edition recorded around 28% female participation. These percentages highlight the evolving diversity in gender participation across different editions, showcasing the MOOC's inclusive appeal.
- Country of Origin:** The geographical diversity of our user base is highlighted by the number of originating countries. The user base continues to reflect global engagement, with participants hailing from various countries. While specific countries such as Italy (POLIMI), Finland (UH), and Slovenia (JSI) consistently contribute to each edition, it is noteworthy to observe shifts in the relative representation of users from other countries. These shifts underscore the MOOC's ability to attract participants from diverse geographical regions, further contributing to its global impact.

This paints a compelling picture of the MOOC's growth and impact across its various editions. This information serves as a valuable resource for evaluating the effectiveness of the educational outreach efforts and tailoring future editions to cater to the diverse needs of the global audience.

Table 8 – Recap of the number of users of the MOOC editions.

	Enrolled users	Females	Males	Not declared	Origin Countries	From Italy	From Finland	From Czech R.	From Slovenia
Pilot edition	203	57	75	71	24	65	2	6	38
First edition	193	59	84	50	32	72	15	0	11
Second edition	130	46	56	28	27	55	8	2	11
Third edition	246	89	99	58	18*	68	36	34	14
TOTAL	772	251	314	207	-	260	61	42	74

*Several users did not declare their provenience.

4 MOOC ENHANCING

Different activities allowed to enhance the MOOC, to animate it.

For students, a series of live webinars dealing with different topics presented in the MOOC at different degrees of detail has been organised, to let them meet experts in the field.

For teachers, a training activity was created to help them apply the MOOC by means of specific live webinars.

4.1 Live Webinars

To engage MOOC participants, the “**CINCH Talks**” have been launched in April 2021. “CINCH Talks” are webinars (online seminars) organized in two different series:

- “CINCH Talks” for students, aimed at offering to MOOC participants some focused live-lessons, followed by off-line discussions;
- “CINCH Talks” for teachers, dedicated to teaching methodologies and didactical innovation, to stimulate the teachers to think about teaching and learning.

The structure reported in Figure 88 was proposed for the “CINCH Talks” for students.

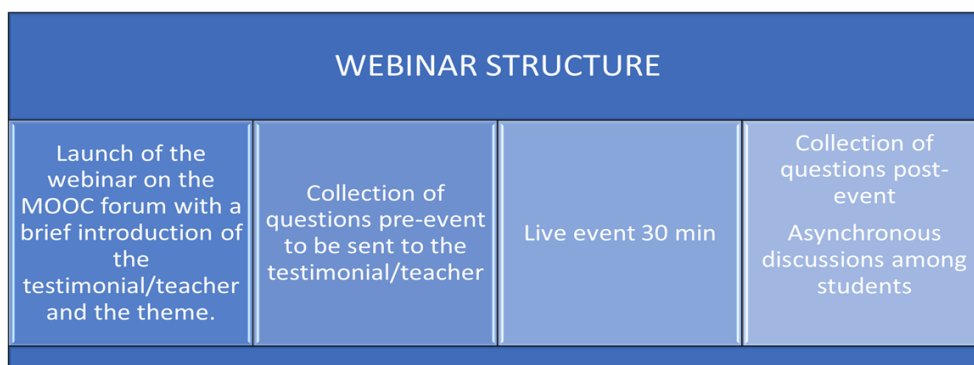


Figure 8 - Structure of the “CINCH Talks” for students.

It consists of four moments: the launch on the MOOC Forum, the collection of questions before the event, the live moment, and the collection of questions after the event. For the webinars proposed, no questions were received before and after the event, however fruitful discussions among the speaker and the students were done during the synchronous session.

During the three annual editions of the MOOC, nine webinars were organized by the support of experts within the A-CINCH partnership or by exploiting active collaborations with other institutions outside the Partnership. Details about the webinars proposed are reported in



Table 9.

Table 9 – List of the MOOC webinar delivered during the three MOOC annual editions.

Title	Week	Module	Date	Speaker, Company/Institution
Tracking immune cells using PET	2	Nuclear medicine	30 April 2021	Prof. Mirkka Sarparanta, University of Helsinki, Finland
Molecular imaging and translational research: from molecules to man	2	Nuclear medicine	25 June 2021	Dr. Antero Abrunhosa, Institute for Nuclear Sciences Applied to Health - ICNAS, Portugal
Basics of Nuclear Fuel Cycle and generation of Radioactive Waste	4	Reprocessing of spent fuel	28 July 2021	Dr. Vladimir Petrov, Moscow State University, Russia
Safety of future reactors (Gen IV) – A story from the past to the present	4	Reprocessing of spent fuel	8 October 2021	Prof. Teodora Retegan Vollmer, Technical University of CHALMERS, Sweden
Neutron activation analysis	5	Nuclear forensic	31 March 2022	Prof. Borut Smodis, Jozef Stefan Institute, Slovenia
Radiation chemistry and technology as a basis for environmental protection technologies	3	Radiation processing	7 November 2022	Prof. Andrzej G. Chmielewski, Institute of Nuclear Chemistry and Technology, Poland
Gamma radiation for Cultural Heritage preservation at the Calliope Facility (ENEA Casaccia R.C., Rome, Italy)	5	Cultural heritage	21 December 2022	Dr. Alessia Cemmi, ENEA, Italy
Radiotracers – the singing detectives	3	Radiotracers	6 June 2023	Prof. Tor Bjørnstad, University of Oslo, Norway
Nuclear Investigators: Tracing back the origin of radioactive findings	5	Nuclear forensic	22 May 2023	Prof. Clemens Walter, Leibniz University of Hannover, Germany

All webinars have been recorded and made available on the YouTube Channel of the Radiochemistry and Radiation Chemistry Labs of the Politecnico di Milano at the following link (see Figure 9):

<https://www.youtube.com/channel/UCKh-HxSAWYhhNX076uuvTOA>.

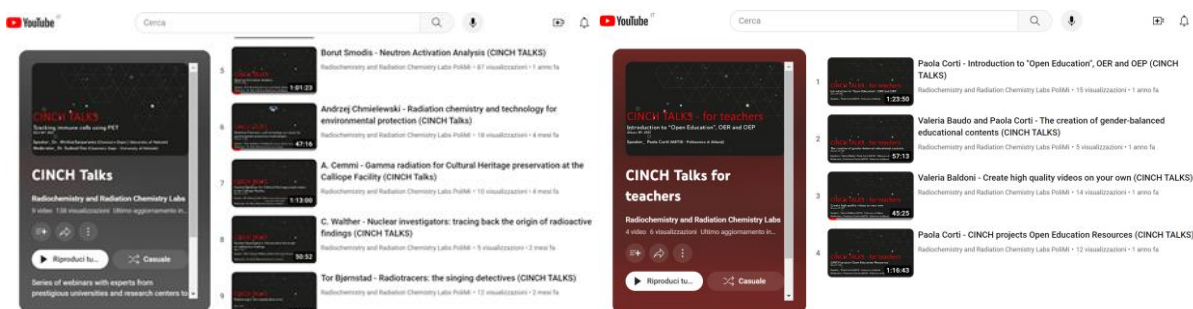


Figure 9. CINCH Talks Playlists from Polimi Youtube channel.

The MOOC webinars were advertised:

- by a written message on the MOOC Forum;
- by means of a flyer (designed ad hoc, as example Figure 1010) shared by email to students and interested people within each Partner institution;
- by publishing on the institutional websites of each Partner (among which ENEN) and the project website.

AUGMENTED
CINCH

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MILANO 1863

CINCH TALKS SERIES

NINTH WEBINAR

Radiotracers - the singing detectives

Professor Emeritus Tor Bjørnstad
University of Oslo

Here is the speaker's [cv](#)
Have a look to the [abstract](#)
Participation [form](#)
To attend the [live event](#)

June 6th 2023
at 12 p.m. (UTC)

The recordings of all the webinars are available [here](#)

CINCH TALKS are part of the MOOC "Essential Radiochemistry For Society" Enroll on the course: <https://www.pok.polimi.it>

This project has received funding from the European Union's Horizon research and training programme 2019–2020 under grant agreement No. 945301 and from the Norwegian Research Council under grant agreement N° 313053.

Figure 10 – Flyer of the ninth webinar by Professor Emeritus Tor Bjørnstad, UiO.

4.2 “CINCH TALKS” for Students

During the launch of the MOOC webinars users were asked to fill in a registration form, just to have an indication about the interest in the event. Each webinar has seen from 30 to 60 enrollees and an average of 25-30 participants to the live event. One of the feedbacks collected by the registration form has been that, due to work commitments, a lot of people thought not to participate in the live event but are interested in the topic and plan to use the recording of the webinar at his/her own pace. For this reason, webinar’s recordings were made available on the MOOC Forum section and

on the YouTube Channel of the Radiochemistry and Radiation Chemistry laboratories of Politecnico di Milano. YouTube enables us to monitor the asynchronous exploitation/usage of the webinars by checking the visualisations. Up to now, besides the live events, some webinars have collected tens of visualizations thanks to their usage in academic courses as follow-up meeting or research materials. Participation in the live webinars and online visualizations give back the real feedback on the MOOC webinar impact in terms of the number of people that have been reached.

4.3 “CINCH Talks” for Teachers

“CINCH Talks” for teachers series was devoted to let teachers understand how they can fruitfully exploit the MOOC to create new lasting knowledge by stimulating students with non-traditional methodologies.

Originally designed to be an in-presence activity, because of the pandemic the Teacher Training has evolved into a series of online short appointments, each dedicated to a specific topic.

These webinars are different for:

- target group: university and high school teachers, instructors, lecturers
- general goals: to involve the project partners in a training experience aimed at developing the dimension of experimentation with new teaching formats
- topics: teaching methodologies, didactical innovation
- learning outcomes, among them:
 - ◆ to be able to recognize the wealth of content and materials available online,
 - ◆ to be able to select them on the basis of specific learning needs and learning outcomes,
 - ◆ to be able to release a learning resource as OER,
 - ◆ to be able to offer students different perspectives,
 - ◆ to be able to organize the teaching time, devoting synchronous lessons (in presence or online) to discussion, activities, team-working and in-depth study,
 - ◆ to be able to offer various study formats and not forcing students to be always synchronously present,
 - ◆ to be able to display the course syllabus, with the assignments and the effort for each week, where it's easy for students to find the resources and the deadlines,
 - ◆ to be able to adopt rubrics to grade the assignments,
 - ◆ to be able to give people multiple ways to demonstrate their knowledge, assessing in multiple ways (by doing a project, creating a video, doing a PowerPoint) or taking an online test,
 - ◆ to be able to provide multiple communication options,
 - ◆ to be able to design gender-balanced courses, lessons, curricula.

The *CINCH Talks for teachers* webinars proposed are reported in detail in Figure 1111.

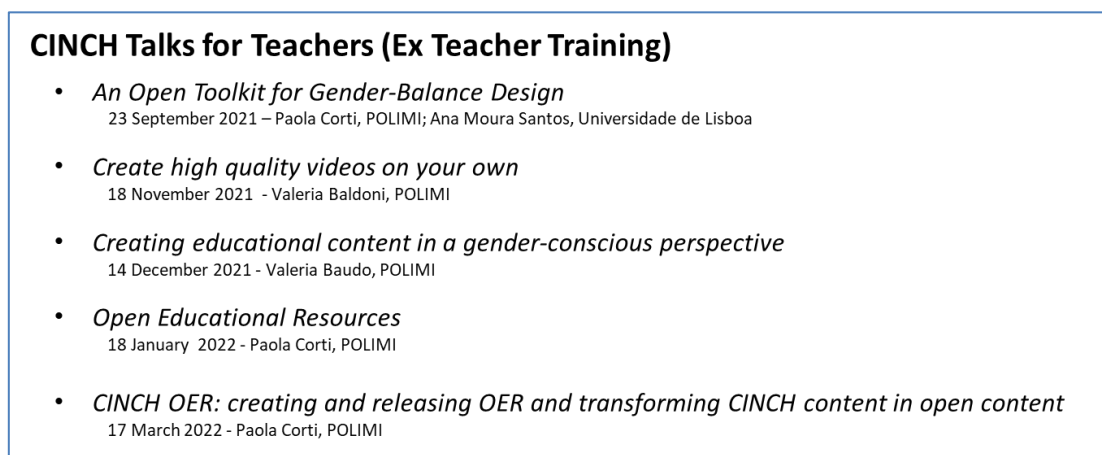


Figure 11 - List of the CINCH Talks for Teachers.

The topics' selection aimed to develop teachers' awareness of certain issues (gender-balance, inclusion, open education) but also to collect the training needs that have arisen in the last period, such as the use of online resources, self-production of videos.

4.4 MOOC Usage Models

The 'Essential Radiochemistry for Society' MOOC is a valuable online resource that transcends its utility beyond lockdown periods. It serves as a versatile tool capable of enhancing various teaching activities across different educational contexts. As part of our efforts to enhance the MOOC's usability and integration into teaching practices, we embarked on a significant endeavour: the development of teaching toolkits meticulously designed to facilitate the seamless integration of the MOOC into diverse educational settings.

These teaching toolkits are not simply a product of isolated efforts but are the culmination of collective insights from our diverse partnership. Collaborators who have successfully integrated the MOOC into their teaching have provided invaluable experiences and unique approaches. These contributions have played a pivotal role in shaping these innovative teaching resources. Through this collaborative process, three distinct usage models have been carefully crafted. These models empower educators to leverage the MOOC in its entirety, utilize specific sections for a flipped-classroom approach, or select individual lessons to introduce specialized topics to less experienced learners.

For a comprehensive understanding of these innovative teaching toolkits and practical guidance on their effective implementation, please refer to **Deliverable 3.2** "*Report on "Nuclear-Radiochemistry for Society" MOOC Usage Models and toolkit pilots*". Within this document, it is possible to find an exhaustive account of the MOOC usage models, along with detailed instructions and insights on their application. We believe that these resources will equip teachers with the means to harness the full potential of the "*Essential Radiochemistry for Society*" MOOC across different educational contexts.

5 CONCLUSIONS

The journey of the "*Essential Radiochemistry for Society*" MOOC has been marked by commitment, adaptation, and a steadfast dedication to open education. The annual editions, as well as the pilot edition, have proven to be a good success, reaching a diverse audience across multiple countries. The responsive daily monitoring by the community manager and swift content revisions have ensured the MOOC's reliability and user satisfaction.

The "*CINCH Talks*" webinars have been instrumental in enriching the MOOC experience. These sessions have connected students with experts in the field and provided valuable insights into innovative teaching methodologies. The use of webinar recordings, both as follow-up materials and in academic courses, underscores their enduring impact.

In the face of pandemic-related challenges, the Teacher training was transformed into a series of online appointments, the "*CINCH Talks for teachers*". This shift allowed educators to explore creative teaching methods and harness the MOOC's potential, irrespective of physical constraints. Moreover, the creation of teaching toolkits aids educators in seamlessly integrating the MOOC into their curricula, whether for online or in-person teaching. These toolkits ensure that our educational resources remain relevant beyond the confines of the A-CINCH project.

In conclusion, POLIMI will continue to host and maintain the "*Essential Radiochemistry for Society*" MOOC on the POK platform even after the conclusion of the A-CINCH project. This enduring commitment guarantees continued accessibility and monitoring, enabling us to contribute to open education and the dissemination of radiochemistry knowledge for years to come.