



Quality assurance strategy and monitoring

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Open Discovery of STEM Laboratories [ODL]

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Introduction

Quality assurance strategy and monitoring document is the reference document used in the project “Open Discovery of STEM Laboratories [ODL]” to describe and distribute quality assurance activities among project partners with the aim to ensure quality of ODL project progress, outcomes and deliverables.

The final report is prepared following the project Quality assurance strategy and monitoring document and covers the period of January, 2017 – April, 2018. This report is the final Quality assurance report in the project and continuation of intermediately submitted reports during partner meetings.

Background

“Open Discovery of STEM Laboratories [ODL]” is an Erasmus+ program multilateral project led by FUNDATION DEUSTO implemented in consortium with:

1. Ellinogermaniki Agogi (Greece)
2. Hariduse Infotehnoloogia Sihtasutus (Estonia)
3. Lietuvos nuotolinio ir e.mokymosi (LieDM) asociacija (Lithuania)
4. Università degli studi di Palermo (Italy).



All partners participate in quality assurance and monitoring activities and contribute to this report by filling in quality assurance tools, following success indicators and instruments established in quality assurance strategy documents.

Quality assurance report by type of activity and indicator

Success indicators of project activities

The following table 1 presents project activities in terms of the success indicators. This table was used as **a reference table** for development of quality assurance instruments and feedback generation from partners and project target groups:

Table 1. ODL project activities and their success indicators.

Activity code	Activity	Success indicators
Project management meetings		
M1	Project management meeting in Spain (Bilbao)	- meeting is implemented, - partners' feedback is positive, - consortium is aware on next activities and results to be achieved
M2	Project management meeting in Lithuania (Kaunas)	- meeting is implemented, - partners' feedback is positive, - consortium is aware on next activities and results to be achieved
M3	Project management meeting in Greece (Athens)	- meeting is implemented, - partners' feedback is positive, - consortium is aware on next activities and results to be achieved
M4	Project management meeting in Estonia (Tallinn)	- meeting is implemented, - partners' feedback is positive,



		- consortium is aware on next activities and results to be achieved
M5	Project management meeting in Italy (Palermo)	- meeting is implemented, - partners' feedback is positive, consortium is aware on next activities and results to be achieved
Project management, quality assurance and dissemination activities		
A1	Project management	- project reached its results - project is implemented according to Erasmus+ program financial rules - project Interim report receives positive evaluation - project Final report receives positive evaluation
A2	Dissemination strategy and dissemination material development	- dissemination plan/ strategy is developed - dissemination material/ tools are developed, including project logo and website
A3	Dissemination activities are carried out	- dissemination activities are carried out following dissemination plan - dissemination reports indicate evidence on qualitative and quantitative dissemination achievements implemented by partners - two dissemination reports are produced - local workshops are organized in each partner country as dissemination events reaching at least 60 teachers per country all in all (either as separate dissemination events per school/ institution or as 1 event per country with 60 participants) - o Spain (60 teachers)



		- o Greece (60 teachers) - o Lithuania (60 teachers) - o Italy (60 teachers) - o Estonia (60 teachers) - Content, templates for presentation, report, instructions and evaluation forms are prepared
A4	Quality assurance strategy development	- quality assurance strategy is developed with the quantitative and qualitative indicators
A5	Quality assurance activities are carried out	- quality assurance is carried out during the whole project implementation period - quality assurance monitoring reports ensure that activity leaders are assigned with the task implementation and monitoring - two quality assurance reports are produced (Feb 28, 2017 and Feb 28, 2018)
Development of intellectual outputs		
MOOC platform		
O1 - A1	MOOC platform Base system developed	MOOC platform base system is developed and ready for further activities, including: - font website - authoring modules - data base - analytics system
O1 – A2	MOOC platform specification and design developed	Specification and design developed and ready for further activities
O1 – A3	OER collection space	OER collection space module is developed including: - collection of scenarios



		- STEM laboratories - Educational material - videos
O1 – A4	Micro MOOC Data management and data visualization for analytics	Data management module is developed to: - register, aggregate and filter user data - interact with system and different resources
O1 – A5	Micro MOOC help and tutorial	Help module is developed and tutorial how to use MOOC platform. Tutorial is translated and recorded.
<u>Performance indicators are:</u> Established public website; Stable running platform, incorporated learning analytics tools, available social instruments. Platform translated into: EN, BASQUE, EL, IT, LT, ESTONIAN, ES		
IO4. Micro MOOC: from scenario to educational resource		
O4 – A1	Developing of practical materials	Text for video presentations Worksheets for students Practical exercises Tests Evaluation and assessment tools
O4 – A2	Video recording and MOOC production	Learning materials recorded, edited and assembled in MOOC standard. Video recordings subtitled and uploaded on ODL MOOC platform.
O4 – A3	Translation of 5 micro MOOCs (1 per country)	1 micro MOOC translated into English and all partner languages / per country



O4 – A4	Deployment of micro-MOOCs on the MOOC platform	All micro MOOCs piloted among EU teachers and students. 55 micro MOOCs open for teachers and students.
<u>Performance indicators are:</u> Total 55 micro-MOOCs prepared for integration in curricula: 5 transnational, presented in English and in all consortium national languages, 10 in each national language; subtitled video materials, set of exercises, assignments and tests (some of them presented in all national languages). 1 micro MOOC per country (5 micro MOOCs all in all) available in Basque, EN, Estonian, EL, LT, IT and ES.		
Multiplier events		
E1 – E5	National workshop: MOOC in school sector	150 participants (teachers) are reached 5 events are organized all in all: - Spain (30 teachers) - Greece (30 teachers) - Lithuania (30 teachers) - Italy (30 teachers) - Estonia (30 teachers) Content, templates for presentation, report, instructions and evaluation forms are prepared
E6 – E10	National workshop: micro-MOOC in your classroom	150 participants (teachers) are reached 5 events are organized all in all: - Estonia (30 teachers) - Spain (30 teachers) - Greece (30 teachers) - Lithuania (30 teachers) - Italy (30 teachers)



		Content, templates for presentation, report, instructions and evaluation forms are prepared
Teacher school		
C1	Teacher school	1 week (6 days) 35 participants
Video conference		

Quality assurance monitoring activities for the final report

Project quality assurance monitoring was implemented with different quality assurance tools during the phases of project activity implementation. The following table 2 presents the phases and the tools that have been used for the final quality assurance report:

Reporting due	Activity or output to be evaluated	Instruments to be used
Final	A1 - Project management	- project timeline - oral feedback from partners - regular physical and online partner meetings
Final	A2 - Dissemination strategy and dissemination material development	- partner written and oral feedback
Final	A3 - Dissemination activities are carried out	- dissemination strategy action plan - dissemination impact quality/ quantity indicators (where applicable)



Final	A4 - Quality assurance strategy development	- partner written and oral feedback
Final	A5 - Quality assurance activities are carried out	- quality strategy document - quality assurance instruments
Final	M3 - Project management meeting in Estonia	- oral feedback from partners - online survey questionnaire (anonymous) - collaborative feedback Google document
Final	M4 - Project management meeting in Italy	- oral feedback from partners - online survey questionnaire (anonymous) - collaborative feedback Google document
Final	IO4 – micro MOOC: from scenario to educational resource	- Oral and written feedback from partners - Oral and written feedback from target users in terms of: - o User – friendly solutions - o Pedagogical effective solutions - o Accessibility - o Openness - o ... - Pilots/ deployment of the MOOCs - Number of users/ participants in the platform - Collaborative evidences
Final	E6 – E10 - National workshop: micro-MOOC in your classroom	- Participant feedback (oral) and satisfaction survey (anonymous) - Partner feedback - Dissemination evidences



Final	Teacher school	- oral and written feedback from partners and consortium institutions - online survey - collaborative feedback Google online documents
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Project management

Quality assurance of project management has been evaluated using project timeline, collaborative online documents with partners, e-mail communication, oral communication and feedback from partners during physical and online partner meetings.

Overall partner evaluation is very positive towards project management, all project results have been achieved and communication with partners has been ensured.

As the final quality assurance indicator, the Final project report has to be developed and submitted to the Agency.

Dissemination

Dissemination strategy was closely followed through out the project implementation, published and available at [project Gdisk](#).

Dissemination activities have been carried out following dissemination strategy and reported in the joint collaborative document online. Project coordinator is responsible for dissemination implementation and reporting.

Project dissemination impact and quality indicators have been reached through project dissemination and multiplier events (to be reported at a later stage of this report).

Quality assurance

Project quality assurance strategy has been constantly implemented by discussing its improvements with project partners, getting partner written and oral feedback, and by providing quality assurance reporting during partner meetings. All slides are available at project Gdisk.

Partner meetings – Tallinn, Estonia

ODL project partner meeting in Tallinn took place on 21-22 September, 2017. Online questionnaire was used to evaluate partner meeting by asking partners to fill it in.

6 representatives from partner institutions filled in the survey. The results of the evaluation have been introduced in Palermo partner meeting <https://drive.google.com/drive/folders/OBznqrXLqXZeIRFNPb2VmRV9HaVE>



Partners agreed and strongly agreed that preparation for the meeting was good and well communicated, meet arrangements were good, partner collaboration and its efficiency was good, as well.

Partner meetings – Palermo, Italy

ODL project partner meeting in Palermo took place on 13th of March, 2018. Online questionnaire was used to evaluate partner meeting by asking partners to fill it in.

5 representatives from partner institutions filled in the survey. They agreed and strongly agreed that meeting preparation was good, as well as collaboration and communication among partners. The meeting evaluation was very positive. [The responses are available at Gdisk.](#)

IO4 – micro Mooc: from scenario to educational resource

Micro Moocs have been evaluated from several points of view.

First of all, written feedback and oral feedback from partners has been received. As the output has been described in the application, learning materials have been recorded, edited and assembled in MOOC standard. Video recordings were subtitled and uploaded on ODL MOOC platform, all outputs in numbers promised have been developed and piloted among EU teachers and students.

In addition to this, student and teacher feedback questionnaires have been developed (see Annex 1 and 2 to this report). Partners collected student and teacher feedback and provided summaries for the coordinator and for quality assurance report to be included (see Annexes **s 3 to 6**).

Multiplier events and National workshops

All dissemination events, national workshops and multiplied events have been implemented in the project. Following partner information, all targeted numbers have been reached. Multiplier events have been evaluated with a dedicated survey questionnaire for multiplier events. All partners reported on participant satisfaction with the multiplier events in the same overall reports Annexed to this report in Annexes **s 3 to 6**.



Annex 1. Feedback questionnaire for students

Your School _____

Your age _____

*Please rate from 1 to 5, where 1 is disagreed totally and 5 is agreed totally.**Circle your preference*

a) It was clear to me what I was supposed to do in this lesson.

1 2 3 4 5

b) The lesson was well organized and ran smoothly.

1 2 3 4 5

c) I could myself work in the lesson covered today.

1 2 3 4 5

d) I could generally work comfortably by myself in this platform.

1 2 3 4 5

e) It was easy to communicate/work with the parts of the lesson, no technical problems.

1 2 3 4 5

f) I was learning easily new topic in this virtual environment.

1 2 3 4 5

g) I enjoyed this lesson.

1 2 3 4 5

h) It was clear to me what was expected from me for this lesson.

1 2 3 4 5

i) It was easy to work with platform: no special technology/computing skills are needed.

1 2 3 4 5

j) I would like to have similar lessons in future.

1 2 3 4 5

k) I like to use online (remote and virtual) laboratory in my science lessons

1 2 3 4 5



Please provide your additional thought about this platform



Annex 2. Feedback questionnaire for teachers

Your School _____

Years of professional experience _____

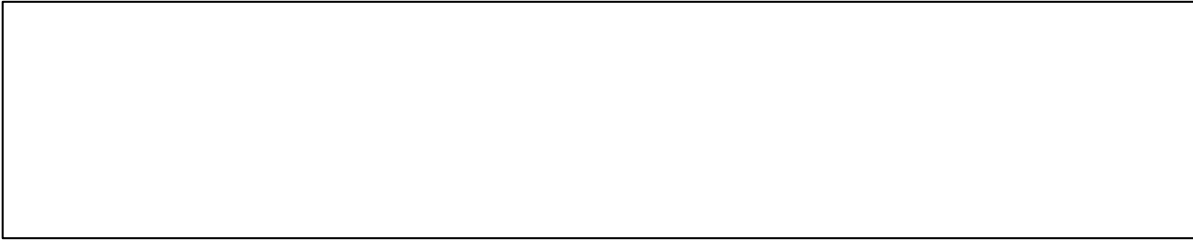
Subject _____

Please rate from 1 to 5, where 1 is totally disagree, 2 is disagree, 3 is neither agree nor disagree, 4 is agree and 5 is totally agreed.

Circle your preference

1. MicroMOOOs encourage and motivate students to learn.
1 2 3 4 5
2. MicroMOOOs are interesting to students as they enrich and enhance lessons.
1 2 3 4 5
3. MicroMOOOs develop students' and teachers' digital competences.
1 2 3 4 5
4. MicroMOOOs help me to raise students' interest in subject learning.
1 2 3 4 5
5. Remote and virtual laboratories are a perfect tool to improve subject visualization.
1 2 3 4 5
6. MicroMOOOs encourage students to solve real life problems.
1 2 3 4 5
7. Students like activities where they apply technologies, it makes lessons more attractive to them.
1 2 3 4 5
8. MicroMOOOs make students think and act creatively .
1 2 3 4 5
9. MicroMOOOs create modeling and simulations as learning methods.
1 2 3 4 5
10. MicroMOOOs help to apply and experiment innovations, to satisfy learners interests and to meet new challenges.
1 2 3 4 5
11. MicroMOOOs increase interest in subject learning even among those students who do not succeed in this subject well enough.
1 2 3 4 5

Please provide your additional thought about this platform





Annex 3. ODL @ EA

Piloting report.

During the realization of the ODL project in Greece a number of events have taken place, that they have been divided into three different categories: a. multiplier events, b. local events with teachers and last, c. school implementations.

a. ODL Multiplier Events

In Greece we have organized three multiplier events. For the first and the third we have designed a Google form collecting the registrations, while for the second as it took place in the framework of the Open Schools for Open Societies – Eden Conference 2017, we gathered the registrations through the official registration system set by the Conference.

All multiplier events lasted two hours and we followed the structure as seen below:

- Presentation of ODL and the pedagogical framework – 30 minutes
- Presentation of a good practice- an MOOC in Greek ready to be delivered in class – 30 minutes
- Participants work on the platform with our guidance- 60 minutes

We have provided supportive material that EA has specially developed in order to ease teachers to return to the platform by themselves. This material has been offered to ODL partners in English in an editable version in case they would like to localize it and, also, use it during their events. Also, we have provided to all participants the official certificate in print version. Also, we would contact them in the following days via email sending them the presentation and the useful for them links.

After the completion of each event a specially designed evaluation form has been distributed so that we can have an idea of what we should improve. That was an initiative we took and it helped us improve the second round of ODL local events, which are described below.

b. ODL Local Events

For the needs of the ODL local events we have distributed to our existing educational network an invitation describing in detail the content of each workshop. Those interested had to visit the Google forms we have created in each time in order to express their interest. Once, we had their registrations we were contacting them through the email they have provided confirming that a position has been held on their behalf. As for the location, the events were either hosted at the EA premises (1 out of 4) or if there was a specific demand from a school to host the event, we would visit the school premises (3 out of 4), In both cases, the workshop was taking place in the computer room of the schools and in case the number of the participants was exceeding the number of the available computers, participants were asked to bring their own laptops in order to guarantee that each participant could work independently on the ODL edX platform. All participants would get supportive material and certificate of attendance.

In total EA has managed to involve in ODL local events 70 in 4 events organized in the region of Attika in February and March 2018. The duration of the events was two hours and we have followed the structure of the ODL multiplier



events, when we first introduced to the participants ODL and the pedagogical framework behind it (30 minutes), then we were showing a good practice (30 minutes) and we devoted the last hour allowing participants to work by themselves on the platform in order to get familiarized.

c. School Implementation

For the school implementation we cooperated with teachers from our school, who have also been trained on the ODL products and on the micro MOOC development during the ODL Teacher Summer School, which took place in Catania in July 2017. Those teachers have created their own micro MOOCs which they were meeting the needs of their classes and at the same time they were in accordance with the Greek school curriculum. Three such pilot events have taken place in total. In total, 52 students have participated. Students and teachers have completed evaluation questionnaires after each completion and there are also participation lists with the

names of the students.

i. Students

Students' questionnaires were in Greek and they were consisted of 11 questions covering all the ODL aspects and space for an open answer about comments the students may have had. There was a scale of 1 to 5 with one representing what they agreed with the least and 5 what they agreed with the most.

The form is titled "ΕΛΛΗΝΟΓΕΡΜΑΝΙΚΗ ΑΓΟΓΗ" and "OPEN DISCOVERY". It contains 11 questions with a 1-5 scale. The questions are:

- Μου ήταν εύκολο να το έμαθα να κάνω κατά τη διάρκεια του μαθήματος. (1 2 3 4 5)
- Τα μαθήματα ήταν καλά οργανωμένα και εύκολα ορατά. (1 2 3 4 5)
- Μπορούσα να ερωτώ και μαθητές μου. (1 2 3 4 5)
- Γενικά, μπορούσα να παραγγείλω όσα μαθήματα μου ήταν χρήσιμα. (1 2 3 4 5)
- Μπορούσα να τηρήσω στην κλασίδα χωρίς τεχνικά προβλήματα. (1 2 3 4 5)
- Εξοικειώθηκα εύκολα με το θέμα μέσω του ψηφιακού περιβάλλοντος. (1 2 3 4 5)
- Διακρίνω τα μαθήματα με αυτόν τον τρόπο. (1 2 3 4 5)
- Μου ήταν ευχάριστο να βλέπω να κάνω. (1 2 3 4 5)
- Ήταν εύκολο να δουλέψω στην κλασίδα. (1 2 3 4 5)
- Οι φίλοι να πραγματοποιούνται οι μαθήματα με αυτόν τον τρόπο μελλοντικά. (1 2 3 4 5)
- Μου άρεσε να χρησιμοποιώ ψηφιακά εργαλεία στο μάθημα. (1 2 3 4 5)

There is a space for "Σημειώσεις" (Notes) and a "Συμπλήρωμα" (Supplement) section at the bottom.

Figure 1 Students Evaluation Form



In total, the 52 16-year old students graded their experience with 4. As it is shown in Figure 1, students have been satisfied by the ODL products, in general, and almost all (4.7) agreed that they had very clear instructions by their teachers on what they were supposed to do. They also stated that the lesson was well organized and that it ran smoothly, and they graded with 4.1 the fact that they could generally work by themselves on this platform. Last, they graded with 4.5 that they enjoyed this lesson and that they were learning easily the new topic presented in this virtual environment. What seemed to be the weakest point, however, were the technical problems. Nevertheless, it is worth mentioning that during one of the pilots there were two power cuts and it comes as not surprise that students from that piloting have graded with lower grade the technical feature.

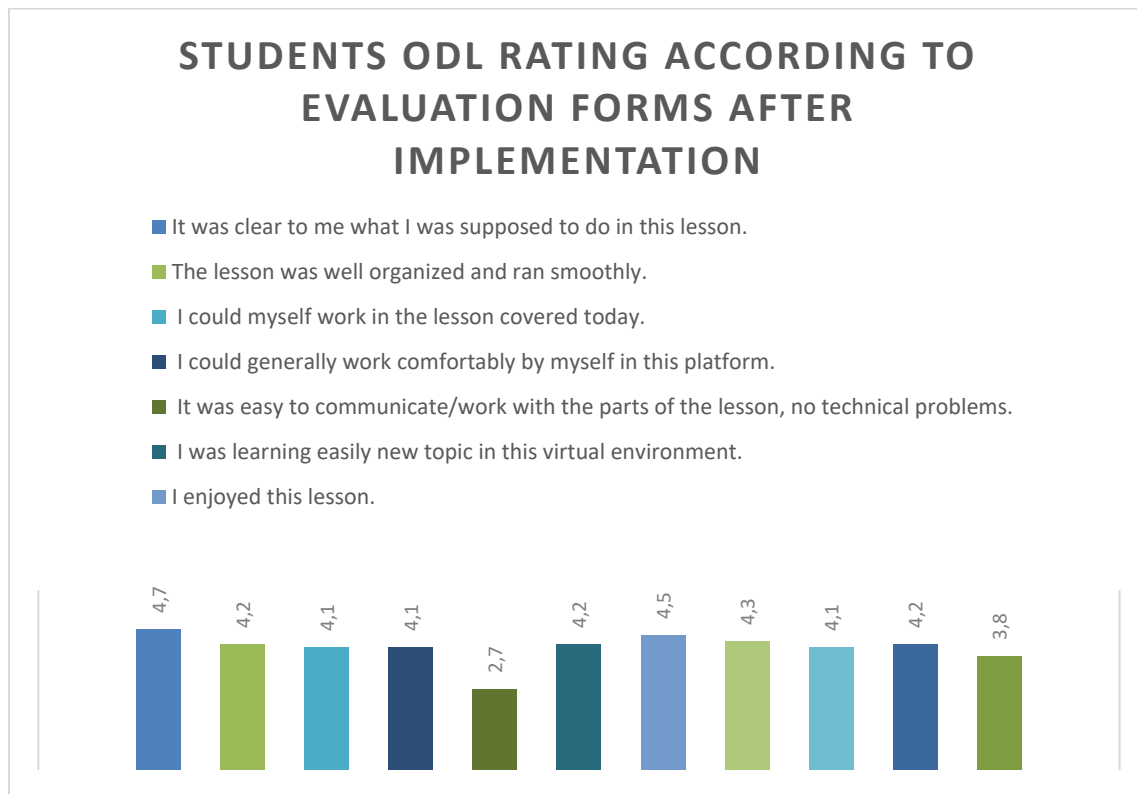


Figure 2 EA Students ODL rating according to evaluation forms after implementation

There were also some open answers, as shown below:

Very good (*platform*),
very good experience

It would be nice if all
modules were taught
in that way

It was very enjoyable!



Last, after the completion of the implementation the three teachers also had to complete a questionnaire. This questionnaire was consisting of 11 questions and space for an open answer about thought the teacher may have had about the platform and it was distributed to the teachers in English as they all are fluent in English both orally and in writing.

Your School: _____

Years of professional experience: _____

Subject: _____

Please rate from 1 to 5, where 1 is totally disagree, 3 is disagree, 4 is disagree, 5 is totally agree.

Circle your preference:

1. MicroMOOs encourage and motivate students to learn. 1 2 3 4 5
2. MicroMOOs are interesting to students as they enrich and enhance lessons. 1 2 3 4 5
3. MicroMOOs develop students' and teachers' digital competences. 1 2 3 4 5
4. MicroMOOs help me to raise students' interest in subject learning. 1 2 3 4 5
5. Remote and Virtual laboratories are a perfect tool to improve subject visualization. 1 2 3 4 5
6. MicroMOOs encourage students to solve real life problems. 1 2 3 4 5
7. Students like activities where they apply technologies, it makes lessons more attractive to them. 1 2 3 4 5
8. MicroMOOs make students think and act rationality. 1 2 3 4 5
9. MicroMOOs create problems and simulations as learning methods. 1 2 3 4 5
10. MicroMOOs help to apply and experiment innovations, satisfy learner's interests and to meet new challenges. 1 2 3 4 5
11. MicroMOOs increase interest in subject learning even among those students who do not succeed in this subject well enough. 1 2 3 4 5

Please provide your additional thought about this platform:

Figure 3 Teachers' Evaluation Form

According to their answers, in total the grade provided by teachers was 4.4. Amongst their strongest remarks were that the MOOCs encouraged and motivated students to learn and that students, in general, like activities where they apply technologies, as it makes lessons more attractive to them. Also, they agreed that MicroMOOs helped them to apply and experiment innovations, to satisfy learners interests and to meet new challenges and that they increased students' interest in subject learning even among those students who do not succeed in this subject well enough.



TEACHERS ODL RATING ACCORDING TO EVALUATION FORMS AFTER IMPLEMENTATION

- MicroMOOs encourage and motivate students to learn.
- MicroMOOs are interesting to students as they enrich and enhance lessons.
- MicroMOOs develop students' and teachers' digital competences.
- MicroMOOs help me to raise students' interest in subject learning.
- Remote and virtual laboratories are a perfect tool to improve subject visualization.
- MicroMOOs encourage students to solve real life problems.
- Students like activities where they apply technologies, it makes lessons more attractive to them.
- MicroMOOs make students think and act creatively .
- MicroMOOs create modeling and simulations as learning methods.
- MicroMOOs help to apply and experiment innovations, to satisfy learners interests and to meet new challenges.
- MicroMOOs increase interest in subject learning even among those students who do not succeed in this subject well enough.

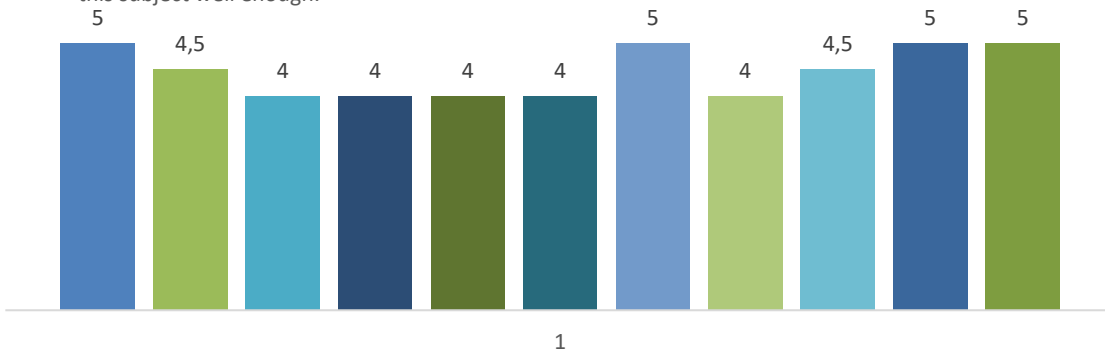


Figure 4 Teachers ODL rating according to evaluation forms after implementation



Annex 4. ODL @ FD

Implementation of ODL at Foundation of Deusto

The Foundation of Deusto integrated the outputs of the project in several ways:

- (1) Multiplier events;
- (2) Local events/Dissemination workshops;

d. ODL Multiplier Events

During project period, three multiplier events were organized. Each of them has own implementation agenda. The multiplier events were organized in follow dates:

- 1) 9-10 February 2017, Tenerife
- 2) 20 March - 03 April 2017, Bilbao
- 3) 19 March 2018, Bilbao

TENERIFE, Febr.2017:

The multiplier events were delivered 09 and 10 February 2017. 27 teachers participated. These multiplier events lasted two hours. The agenda the same for both events was as following:

- Experimental learning in STEM through microMOOCs: Example of microMOOC (15 min)
- Advantages of using Open edX for the design of MOOCs (15 min)
- Design of microMOOCs: high on the platform and design instructions (75 min)
- Sharing and discussion about the contributions and limitations of microMOOCs in the classroom (15 min)

BILBAO, March-Apr.2017:

This multiplier event was organized in format of the 3-day workshop in the period from 20 March to 03 April. The 40 teachers were registered; 28 of them participated. They should participate in all of these 3 sessions. The workshop was organized in cooperation with Berritzegune, department of the professional development of the school teachers. The workshop covers 20 hours of work: 10 hours of lecture and 10 hours of the individual practical work.

- 20-03-2017 New methodologies and tools for the teaching of STEM areas. Creation of explanatory MOOC videos and tutorials with POWTOON.
- 27-03-2017 Design of μ MOOCs with the edX platform.
- 03-04-2017 Presentation of μ MOOCs and discussion about the use of μ MOOCs in the classroom.

We created and provided the tutorial in pictures. The supportive material has been available in English as well. After session, we supported them in microMOOCs mastering. The presentations, link to the platform, guides and instruction of use were send them over the email. These materials are also available on the website.



In general teachers are satisfied with the multiplier event presented (Fig.1). It was evaluated on several categories: Presentation, Design and structure of the microMOOC, Work and discussion in a group, Application in the classroom (if it applicable in her/his classroom), Agenda (Timing), classroom and technical support during the event, and multiplier event instructor(s).

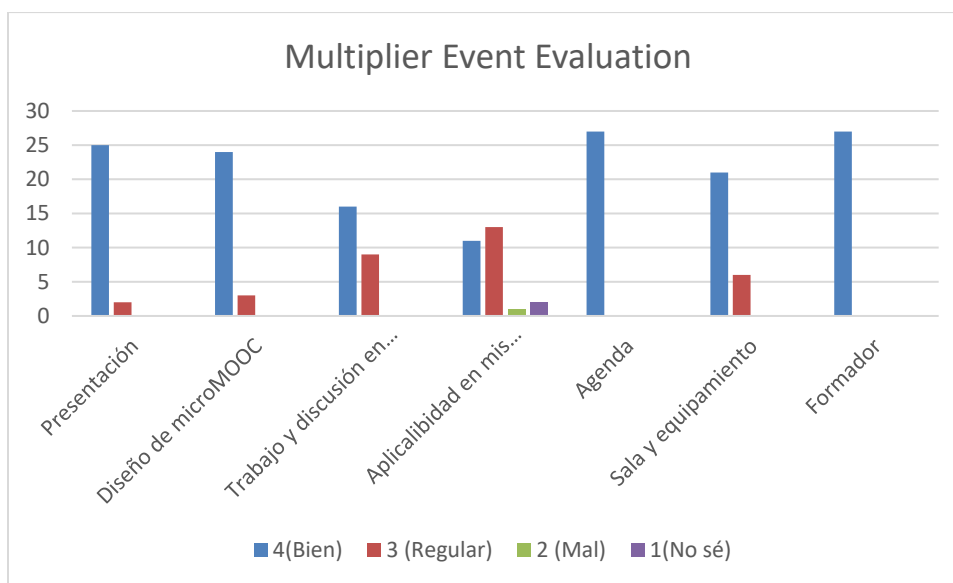


Fig.1 Evaluation of Multiplier Event (E1)

BILBAO, 19 March 2018:

The multiplier event was organized in 2 session – 3 hours each:

- Presentation of the ODL project. What is microMOOC; Inquiry-Based Learning in Glance (pedagogical framework) (30 min)
- ODL platform as a technological tool for the use and creation of microMOOC (90 min)
- Catalog of microMOOCs on ODL microMOOCs space platform, best practices (30 min)
- Discussion & collection of the feedback (30 min)

Overall 43 (21 +22) teachers participated in these sessions. The presentations, guide, and instruction are sent to participants by email. The evaluation feedback was collected to improve the project results.

Most of the participants have more than 10 years professional experiences.

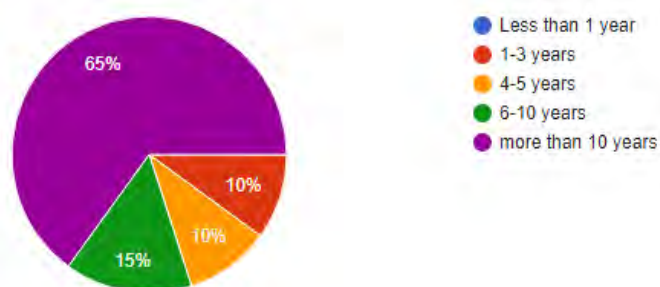


Fig.2 Years of experience of the participated teachers (E6)

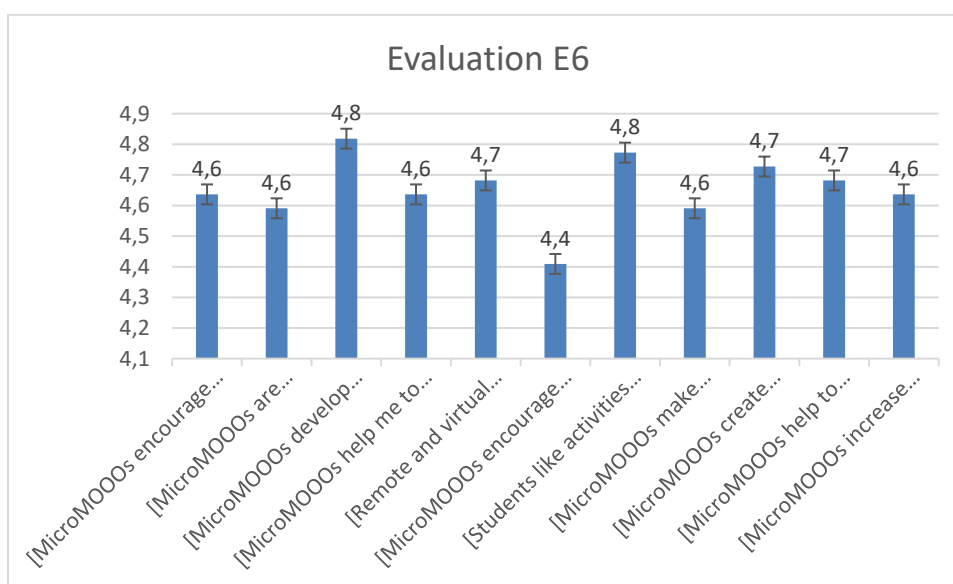


Fig.3 Teachers rating of ODL usage according to evaluation form

e. ODL Local Events/Dissemination Workshops

The local events were held in a frame of the activities organized by FD in cooperation with University of Deusto – life-long partner and collaborator. The duration of these events are usually between 1h30 min and 2h30 min. A scenario includes presenting the project, creating the inquiry scenarios using 5E steps structure, testing the platform, developing draft microMOOCs on the platform, introducing best practices from the microMOOCs catalogue.



Annex 5. ODL @ UniPA

ODL @ UniPA

During the realization of the ODL project in Italy, several events involving teachers have taken place. They can be divided into three categories: local multiplier events, national multiplier events and implementations at school.

f. ODL Local Multiplier Events

In Palermo, we have organized two local multiplier events. The first took place on November 25, 2016; the second one on January 17, 2018. For the needs of the ODL local events, we have distributed to our existing educational network an invitation describing in detail the content of each workshop. Those interested had to visit the Google forms we have created each time in order to express their interest. Once, we had their registrations we were contacting them through the e-mail they have provided confirming that a position has been held on their behalf. For the location, both events were hosted at the Aula Magna and in the computer room of the Department of Physics and Chemistry of the Palermo University. In case the number of participants was exceeding the number of available computers, participants were asked to bring their own laptops in order to guarantee that each participant could work independently on the ODL edX platform. After the completion of each event, the specially designed ODL evaluation form has been distributed so that we can have an idea of what we should improve. This initiative helped us improve the second round of ODL local events and the multiplier national events, described below.

In particular, the first local multiplier event lasted five hours (from 15:00 to 20:00), with the following structure:

- Presentation of the "Open Discovery of STEM laboratories" (ODL) project– 30 minutes
- Presentation of the Inquiry methodology in the teaching of Sciences– 30 minutes
- Presentation of the ODL pedagogical framework – 30 minutes
- Presentation on the use of STEM virtual / in-remote laboratories – 30 minutes
- Presentation of scenarios and "recipes" for the creation of micro-MOOCs – 30 minutes
- Presentation of the ODL platform- 60 minutes

Group Work

- A possible scenario for a multidisciplinary micro-MOOC– 30 minutes
- Examples of micro-MOOCs on STEM topics for the 10-14 years target – 30 minutes
- Examples of micro-MOOCs on STEM topics for the 14-18 years target – 30 minutes

The second round of local multiplier event lasted eight hours (from 11:00 to 19:00), with the following structure:

- Brief presentation of the ODL project milestones for the second year– 30 minutes
- Presentation of the ODL platform- 60 minutes
- Presentation of good practices- microMOOCs in Italian ready to be delivered in class – 60 minutes
- Lunch break – 60 minutes

Group work (14: 30-19: 00)

- Participants work on the platform with our guidance in the activity "micro-MOOC & Inquiry: plan together our micro-MOOC"



In each workshop we have provided to all participants supportive material that UniPA has specially developed in order to ease teachers to return to the platform by themselves and the official certificate of attendance. Also, we contacted them via email sending them the presentations and useful links. In total UniPA has involved 80 teachers in ODL local events, from Palermo and its province.

g. ODL National Multiplier Events

In Italy, we have organized two rounds of national multiplier events. In the first round we organized three workshop: Catania (January 16, 2017), Milano (February 6, 2017), Udine (April 7, 2017); in the second round two events: Caltanissetta (September 1, 2017), Catania (February 16, 2018). The event in Caltanissetta took place in the framework of the II Summer Schools for Talented Students – EUSO 2018. As for the location, all events were hosted in the Aula Magna and in the computer room of the host Departments or Schools. In case the number of the participants was exceeding the number of the available computers, participants were asked to bring their own laptops in order to guarantee that each participant could work independently on the ODL edX platform. After the completion of each event, the specially designed ODL evaluation form has been distributed so that we can have an idea of what we should improve.

All first round multiplier events lasted four hours (15:00-19:00), with the following structure:

- Presentation of the "Open Discovery of STEM laboratories" (ODL) project– 30 minutes
- Presentation of the Inquiry methodology and of the ODL pedagogical framework – 30 minutes
- Presentation on the use of STEM virtual / in-remote laboratories – 30 minutes
- Presentation of scenarios and "recipes" for the creation of micro-MOOCs – 30 minutes
- Presentation of the ODL platform- 30 minutes
- *Group Work*
- A possible scenario for a multidisciplinary micro-MOOC– 30 minutes
- Examples of micro-MOOCs on STEM topics for the 10-14 years target – 30 minutes
- Examples of micro-MOOCs on STEM topics for the 14-18 years target – 30 minutes

The second round of national multiplier event lasted seven hours (from 11:00 to 18:00), with the following structure:

- Brief presentation of the ODL project milestones for the second year– 30 minutes
- Presentation of the ODL platform- 60 minutes
- Presentation of good practices- microMOOCs in Italian ready to be delivered in class – 60 minutes
- Lunch break – 60 minutes
- *Group work (14: 30-18: 00)*
- Participants work on the platform with our guidance in the activity "micro-MOOC & Inquiry: plan together our micro-MOOC"

For what concerns the multiplier event held in Caltanissetta, the teachers attended the standard workshop with the same structure described above. We first introduced the ODL project and the pedagogical framework behind to the



participants to the Summer School (students 14-18 years old) (30 minutes), then we were showing a good practice (30 minutes) and we devoted the last hour allowing the students to explore by themselves the platform.

In each workshop, we have provided to all participants supportive material that UniPA has specially developed in order to ease teachers to return to the platform by themselves and the official certificate of attendance. In addition, we contacted them via email sending them the presentations and useful links. In total UniPA has involved 102 teachers in ODL national events.

h. School Implementation

For the school implementation, we cooperated with teachers of our national network trained on the ODL products and on the micro-MOOC development during the multiplier events and the ODL Teacher Summer School, which took place in Acicastello (CT) – Italy in July 2017. These teachers have created their own micro-MOOCs in order to meet the needs of their classes, in accordance with the Italian school curriculum. Three such pilot events have taken place in total. In total, 108 students have participated. All students and teachers involved have completed evaluation questionnaires after each experimentation. A participation lists with the names of the students has been compiled.

Students

Students' questionnaires were in Italian and they were consisted of 11 questions covering all the ODL aspects and space for an open answer about comments the students may have had. There was a scale of 1 to 5 with one representing what they agreed with the least and 5 what they agreed with the most. Below you can find the English version of the questionnaire. The feedback from students was very positive, in particular for what concern the exploration phase by the use of online virtual/remote laboratories. Globally, the students enjoyed very much the MOOC-based class, wishing to attend similar lessons in the future.

Your School _____

Your age _____

Please rate from 1 to 5, where 1 is disagree totally and 5 is agree totally.

Circle your preference

a) It was clear to me what I was supposed to do in this lesson.
1 2 3 4 5

b) The lesson was well organized and ran smoothly.
1 2 3 4 5

c) I could myself work in the lesson covered today.
1 2 3 4 5

d) I could generally work comfortably by myself in this platform.
1 2 3 4 5

e) It was easy to communicate/work with the parts of the lesson, no technical problems.
1 2 3 4 5

f) I was learning easily new topic in this virtual environment.
1 2 3 4 5

g) I enjoyed this lesson.
1 2 3 4 5

h) It was clear to me what was expected from me for this lesson.
1 2 3 4 5

i) It was easy to work with platform: no special technology/computing skills are needed.
1 2 3 4 5

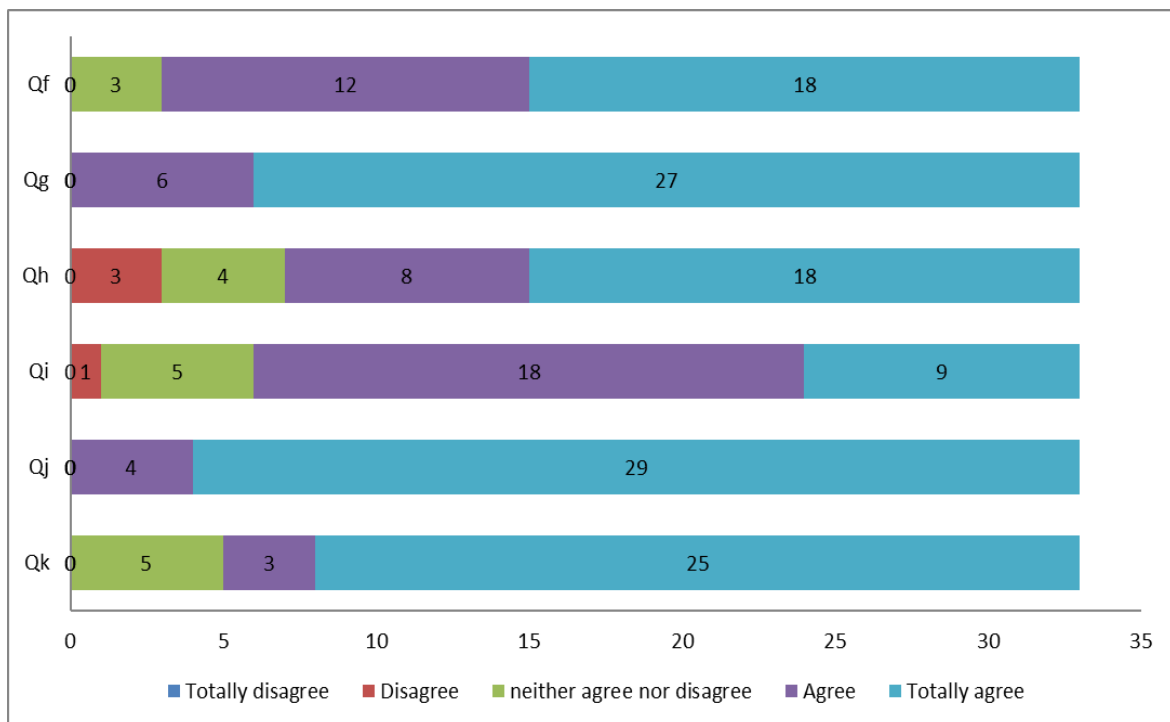
j) I would like to have similar lessons in future.
1 2 3 4 5

k) I like to use online (remote and virtual) laboratory in my science lessons
1 2 3 4 5



Pilot-study 1: “What do we know about radioactivity?”

The micro-MOOC “Conosciamo la radioattività” has been tested by 33 students (9 males, 24 females) from 7 classes (4/5 students per class), 13-15 years old belonging to the first year of the Technical School for Economics and Tourism “Pio La Torre” – Palermo, last February. Each group of 4/5 students separately experienced the ODL microMOOC about radioactivity.



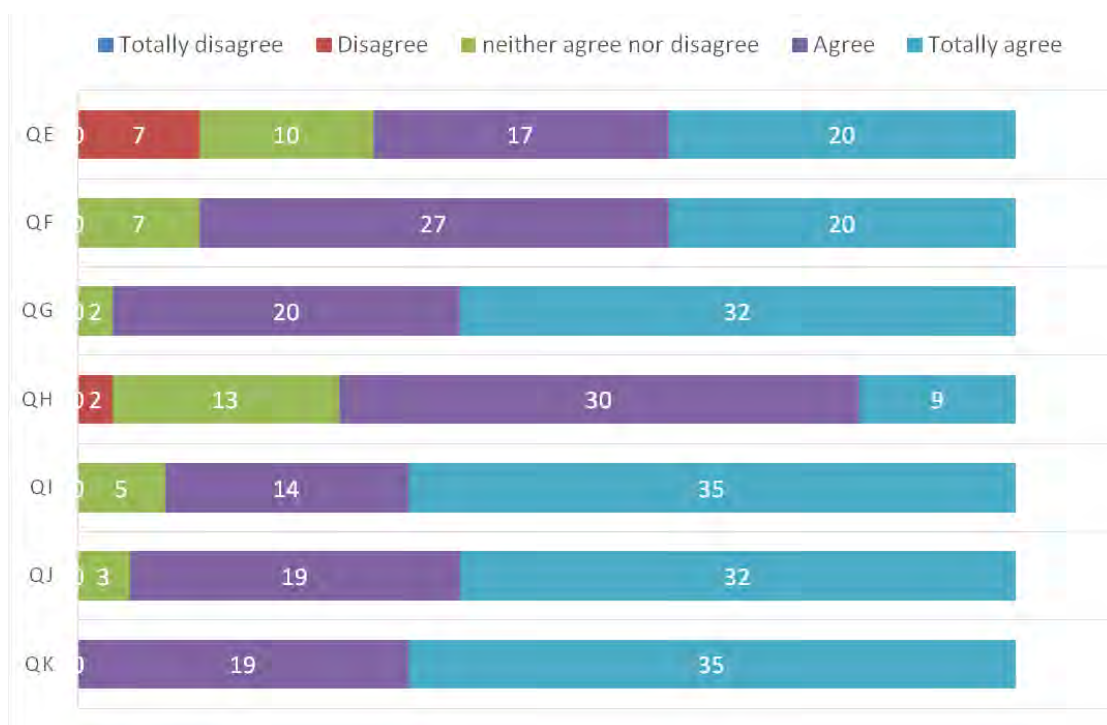
• *Figure 2- Pilot Study 1 students rating according to evaluation forms after implementation.*

In general, the 33 students granted their experience with high scores. ODL products satisfied almost all students, who agreed that they had very clear instructions by their teachers on what they were supposed to do (4.24). They also stated that the lessons were well organized. Finally, they granted with 4.06 the fact that they could generally work by themselves on this platform and that no special technology skill was needed. As shown in Figure 2, they granted with scores greater than 4.60 that they enjoyed this lesson, the fact they would like to have similar lessons in future and that they liked to use online (remote/virtual) laboratory in the science lessons. They also agreed that they were learning easily the new topic presented in this virtual environment (4.45). The only reported points of weakness were the technical problems related to the ODL platform use.

Pilot-study 2: “A small journey into matter”



The micro-MOOC “Gli stati della materia e la densità” has been tested by 54 students (29 males, 25 females), 13-14 years old belonging to the first year of the Scientific Lyceum “Benedetto Croce” of Palermo. 3 lessons were spent in the classroom in which the first 3 sections of the micro-MOOC, namely Introduction, Engage and Explore, were discussed together. The student impressions were positive. Then, two types of homework have been assigned: a. “answer to the questionnaires and write in the discussion form”; b. “Work with the virtual laboratory to discover the properties of matter (Exploration phase)”. Students very actively participated to the discussion and correctly answered, trying several times and asking for help with the "check" and "show answer" functions. Even some student parents have expressed their positive opinion to the teacher noting the increased involvement of their sons during the study through the micro-MOOC.



• Figure 3- Pilot Study 2 students rating according to evaluation forms after implementation.

In general, the 54 students granted their experience with very good scores (Purple and cyan are predominant in Fig.3). The ODL products satisfied almost all students. They also stated that the lessons were well organized. Finally, they granted with 4.55 the fact that they could generally work by themselves on this platform and that no special technology skills were needed. As shown in Figure 3, they granted with scores around 4.60 that they enjoyed this lesson, that they would like to have similar lessons in future and that they liked to use online (remote/virtual) laboratory in the science lessons. They also agreed that they were learning easily the new topic presented in this virtual environment (4,24). Some problem are evident only in the answers QE (3.92) and QH (3.85).

We registered also some open answers, as shown below:



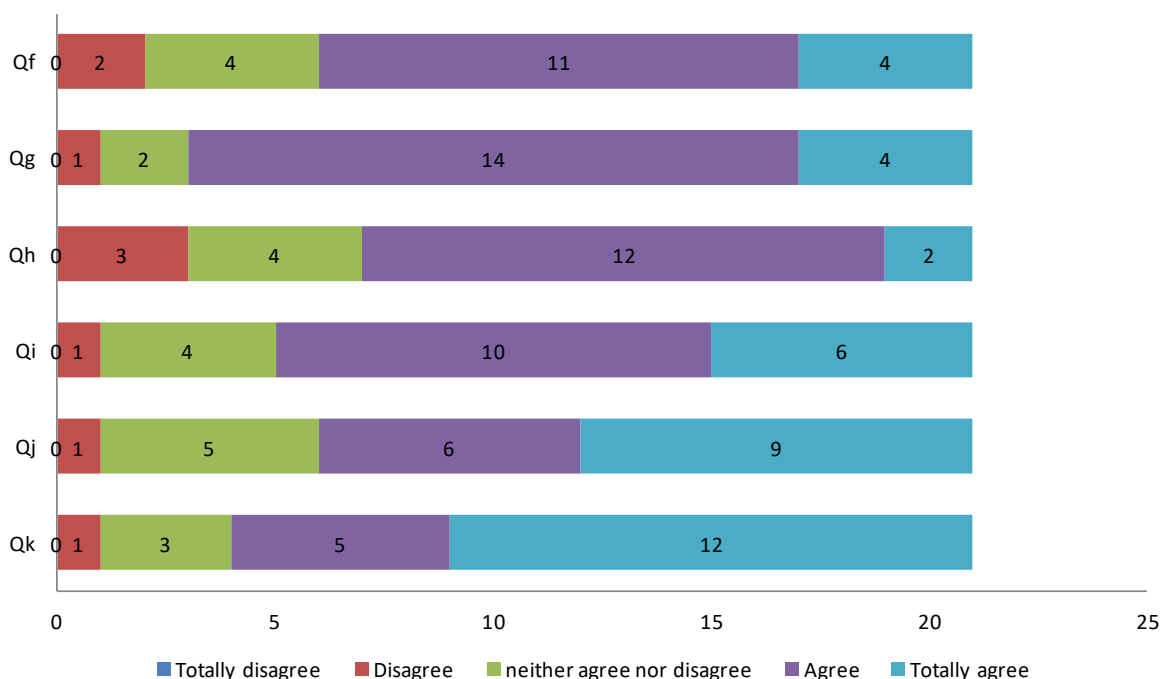
I felt good in this learning experience. I would like, in the future, to re-use this micro-MOOC to remove remaining doubts

Excellent platform.
Only one problem:
finding a topic

I propose to use the site to perform real tasks in the classroom, even by using mobile phones

Pilot-study 3: “Shedding light on the Light: a micro-MOOC on the vision mechanism”

The micro-MOOC “Realizziamo un paio di occhiali? Sì!” has been tested by a sample of 21 students (15 males, 6 females), 14-16 years old belonging to the second and third year of the Vocational Institute for Optician “E.Fermi-F. Eredia” – Catania. Firstly how the platform work was illustrated. Then the students explored the platform experiencing the ODL micro-MOOC with interest and enthusiasm.



• Figure 4- Pilot Study 3 students rating according to evaluation forms after implementation.

In general, the 21 students granted their experience with good scores. A high number of students has been satisfied by the ODL products. They agreed that they had very clear instructions by their teachers on what they were supposed to do (3.61). They also stated that the lessons were well organized. Finally, they granted with 4 the fact that they could generally work by themselves on this platform, that no special technology skills were needed and that they enjoyed this lesson. As shown in Figure 4, they granted with scores greater than 4.10 that they would like to have similar lessons in future and that they liked to use online (remote/virtual) laboratory in the science lessons. They also agreed that they were learning easily the new topic presented in this virtual environment (3.81). The weakest points were the problems experienced in using the ODL platform, because in the classroom during the experimental works they



were some technical problems in the internet connection. Moreover, some students requested further lessons to better understand how the platform works. For some students this experimentation was similar to a recovery course. Students continued their work at home on the platform: this improved their outcomes. This experimentation was very relevant for a girl, absent from school for two months for health reasons. She has been very thrilled to use this micro-MOOC.

Teachers

Last, after the end of the implementation the three teachers also completed the ODL questionnaire. This questionnaire was consisting of 11 questions and space for an open answer about thought the teacher may have had about the platform and it was distributed to the teachers in English as they all are fluent in English both orally and in writing.

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OPEN DISCOVERY
OF STEM LABORATORIES

Your School _____

Years of professional experience _____

Subject _____

Please rate from 1 to 5, where 1 is totally disagree, 2 is disagree, 3 is neither agree nor disagree, 4 is agree and 5 is totally agreed.

Circle your preference

- MicroMOOOS encourage and motivate students to learn.
1 2 3 4 5
- MicroMOOOS are interesting to students as they enrich and enhance lessons.
1 2 3 4 5
- MicroMOOOS develop students' and teachers' digital competences.
1 2 3 4 5
- MicroMOOOS help me to raise students' interest in subject learning.
1 2 3 4 5
- Remote and virtual laboratories are a perfect tool to improve subject visualization.
1 2 3 4 5
- MicroMOOOS encourage students to solve real life problems.
1 2 3 4 5
- Students like activities where they apply technologies, it makes lessons more attractive to them.
1 2 3 4 5
- MicroMOOOS make students think and act creatively.
1 2 3 4 5
- MicroMOOOS create modeling and simulations as learning methods.
1 2 3 4 5
- MicroMOOOS help to apply and experiment innovations, to satisfy learners interests and to meet new challenges.
1 2 3 4 5
- MicroMOOOS increase interest in subject learning even among those students who do not succeed in this subject well enough.
1 2 3 4 5

Figure 5 Teachers' Evaluation Form



According to their answers, in total the mean satisfaction grade provided by teachers was 4,75. Teachers highlighted that the use of micro-MOOCs enrich the lessons and raise students' interest in the subject, encouraging and motivating them to learn. They remark that activities where they apply technologies make lessons more attractive to the learners. Also, they agreed that micro-MOOCs helped them to apply and experiment innovations, to satisfy learners interests and to meet new challenges and that they increased students' interest in subject learning even among those students who do not succeed in this subject well enough, as it can be seen in Figure 6. The teachers concluded that ODL teaching/learning method is effective on promoting a deeper understanding of the concepts, developing practical (lab) and communication skills. They also stressed that students aged 13-15 need to be guided through the micro-MOOC experience, in particular during the use of virtual/remote labs (reasoned exploration).

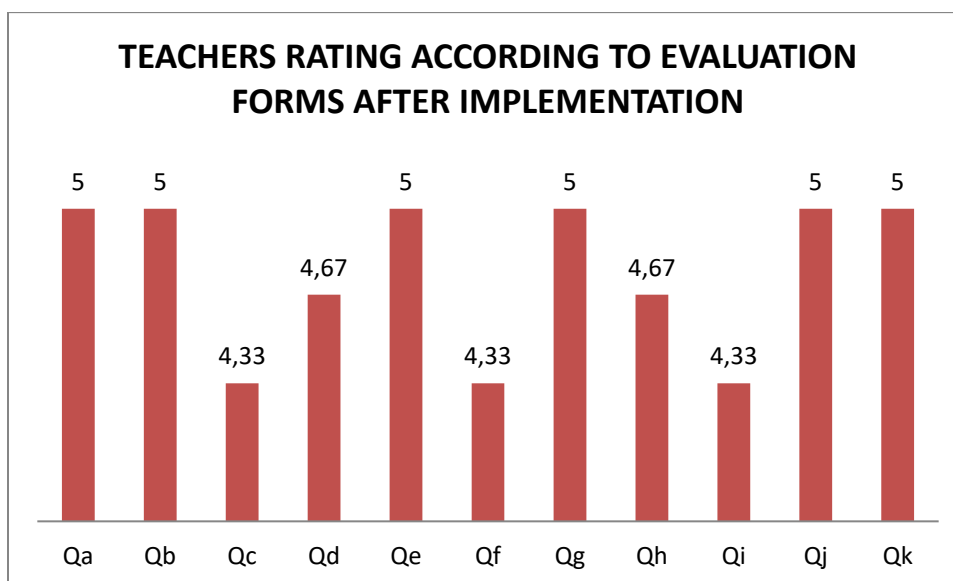


Figure 6 Teachers rating according to evaluation forms after implementation



Annex 6. ODL @ LieDM

1. MULTIPLIER EVENTS IN LITHUANIA

There were two ODL Multiplier Event organized in Lithuania.

- a. **On the 23th September, 2016 in Klaipėda, Lithuania.** The aim of the event was to introduce teacher the MOOC approach in the school environment and offer the developed mMOOC methodology. More than 30 teachers were introduced with MOOC approach in the school environment, basic structure of mMOOC and ODL MOOC platform. Teachers actively discussed on the mMOOC with STEM laboratories potential in the school sector and what functionality they need from the ODL MOOC platform.
- b. **On the 10th November, 2017 in Kaunas, Lithuania** during EDEN Open Classroom conference “Open Professional Collaboration for Open Classroom” in Lithuania. More than 30 teachers get familiar with the micro-MOOC scenarios, main features of the platform, methods how to incorporate micro-MOOC into curriculum and discussed other opportunities how technologies can enhance learning at school. ODL micro-MOOCs with STEM laboratories were presented as good examples and resources to use in the teaching practices. As there is a lack of Open Educational Resources in Lithuanian language, ODL products in national language were really appreciated by the teachers.
Teachers and legal representatives of the schools participated in the event. Some of the participated schools (Šiauliai Simono Daukanto Gymnazium, Prienai “Žiburio” Gymnasium and Visaginas Technology and Business VET Centre) were invited to work together with consortium members on an implementation micro-MOOC in their school curriculum.

2. LOCAL EVENTS IN LITHUANIA

There were four ODL local event organized in Lithuania.

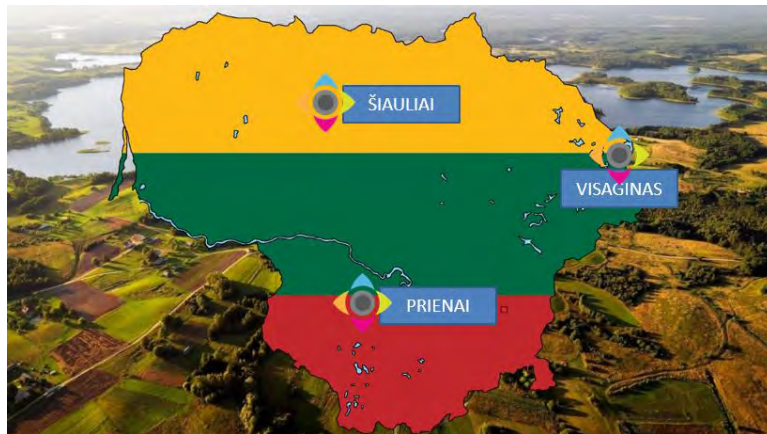
- a. **On the 7th November, 2016** LieDM association presented ODL project together with MOOC approach in the school environment to the teachers and future teachers at Vytautas Magnus University, Lithuania (15 participants).
- b. **On the 8th November, 2016** ODL project and the mMOOC with STEM laboratories approach in the school sector was presented during National Open Education week in Lithuania. The event is organized by Lithuanian Association of Distance and e-Learning (LieDM association) contributing to the initiative of European Commission on “Opening up education” (more than 15 participants).



- c. **On the 29th September, 2017** local event in Birštonas for school teachers in Lithuania (16 participants). Teachers were introduced how to implement mMOOCs in school curriculum.
- d. **On the 20th November, 2017** local event for teachers in Kaunas at Vytautas Magnus University (30 participants). Teachers were introduced how to implement mMOOCs in school curriculum.

3. IMPLEMENTATION AT SCHOOLS OF LITHUANIA

ODL mMOOC were implemented in three schools in Lithuania:



- a. **Šiauliai Simono Daukanto Gymnazium, Šiauliai, LITHUANIA, ODL mMOOC „Water Pollution“**
mMOOC „Water Pollution“ (subject: Biology, Teacher: Liuda Lileikienė, Learners age: 17-18 years) was implemented with 20 learners.
- b. **Prienai „Žiburio“ Gymnasium, Prienai, LITHUANIA, ODL mMOOC „Household chemicals“**
mMOOC „Household chemicals“ (subject: Chemistry, Learners age: 16-17 years) was implemented with 21 learners.
- c. **Visaginas Technology and Business VET Centre, ODL mMOOC „Cyclone and Anticyclone“**
mMOOC „Cyclone and Anticyclone“ (subject: Geography, Learners age: 16-18 years) was implemented with 20 learners.

Learners' feedback

After implementation of mMOOCs learners were asked to give feedback:

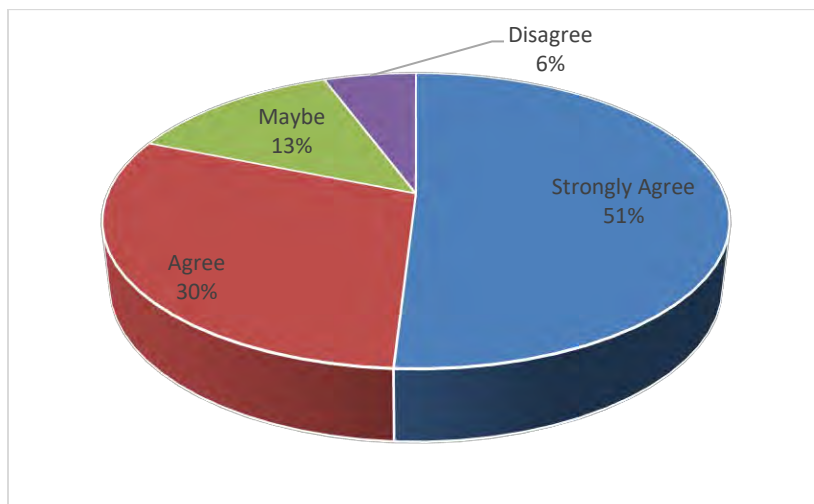


- a) by filling in the learners' feedback questionnaire (53 learners)
- b) by answering interview questions.

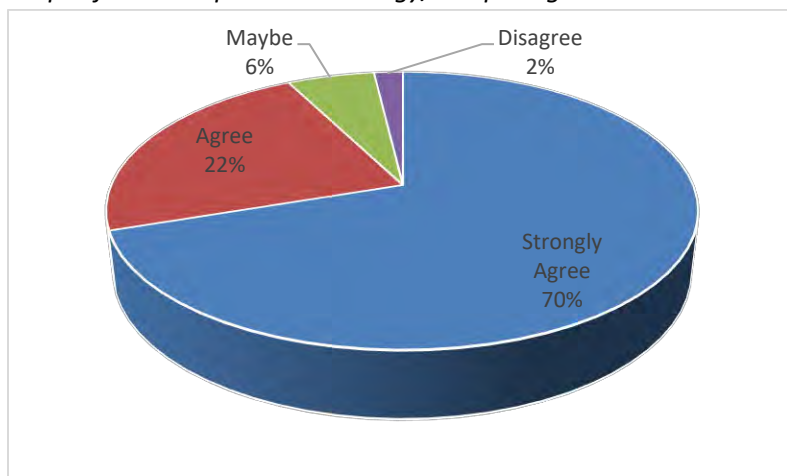
Larners' feedback about ODL platform

Most of the learners could generally work comfortably themselves in the ODL platform, it was easy for them to work with platform, no special technology/computing skills were needed and they were learning easily new topic in this virtual environment (see the results below).

I could generally work comfortably by myself in this platform

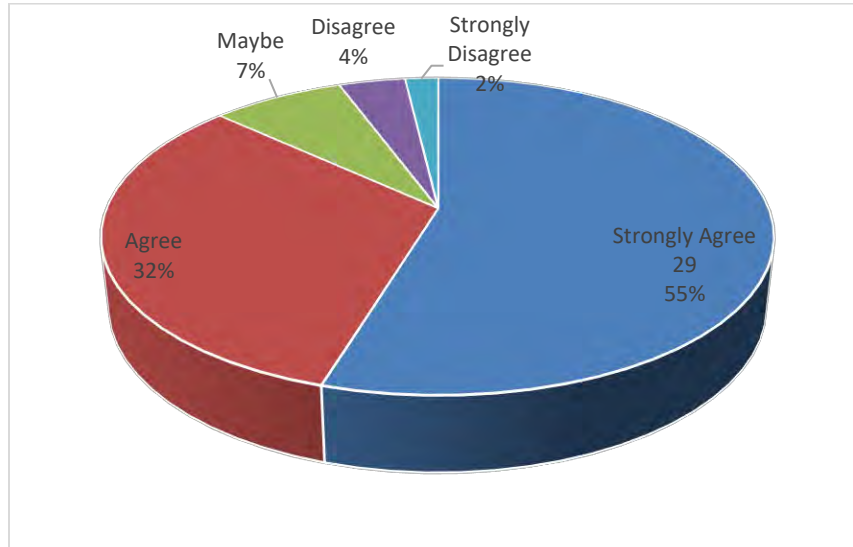


It was easy to work with platform: no special technology/computing skills are needed





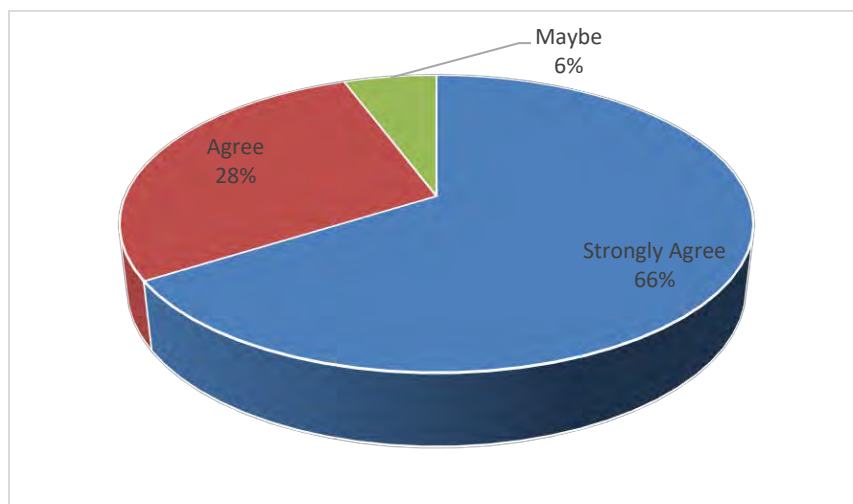
I was learning easily new topic in this virtual environment



Learners' feedback about ODL mMOOCs

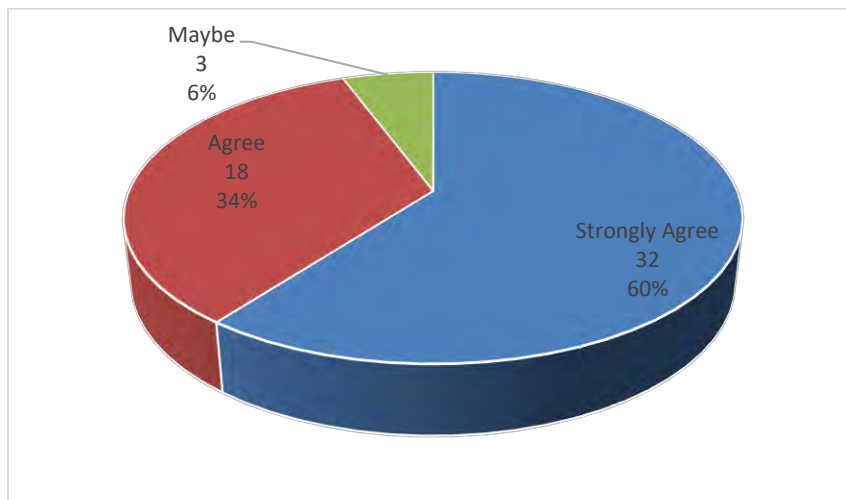
Most of the learners enjoyed the lessons where mMOOC were used, liked to use online (remote and virtual) laboratories in their science lessons and would like to have similar lessons in the future (see the results below).

I enjoyed this lesson

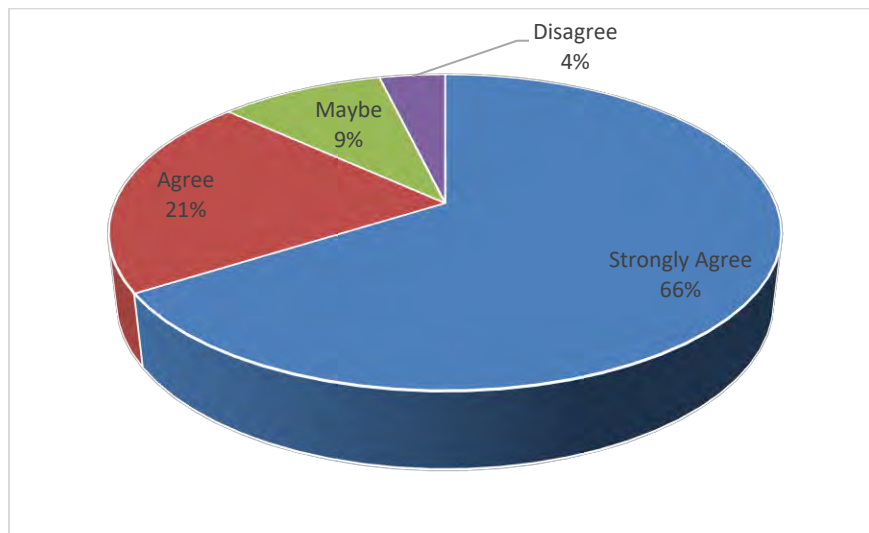




I would like to have similar lessons in future



I like to use online (remote and virtual) laboratory in my science lessons



Teachers' feedback

Teachers feedback was collected:

- a) by filling teachers' feedback questionnaire
- b) by interview

Open Discovery of STEM Laboratories [ODL]

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Teachers' feedback is positive and shows that mMOOCs encourage and motivate students to learn, enrich and enhance lessons, improves students' and teachers' digital competences. Learners like activities where they apply technologies, it makes lessons more attractive to them, mMOOC make learners think and act creatively, create modeling and simulations as learning methods and help to apply and experiment innovations, to satisfy learners interests and to meet new challenges (see the results below).

Please rate from 1 to 5, where 1 is totally disagree, 2 is disagree, 3 is neither agree nor disagree, 4 is agree and 5 is totally agreed.

Circle your preference

1. MicroMOOCs encourage and motivate students to learn.
1 2 3 4 **5**
2. MicroMOOCs are interesting to students as they enrich and enhance lessons.
1 2 3 4 **5**
3. MicroMOOCs develop students' and teachers' digital competences.
1 2 3 4 **5**
4. MicroMOOCs help me to raise students' interest in subject learning.
1 2 3 4 **5**
5. Remote and virtual laboratories are a perfect tool to improve subject visualization.
1 2 3 4 **5**
6. MicroMOOCs encourage students to solve real life problems.
1 2 3 **4** 5
7. Students like activities where they apply technologies, it makes lessons more attractive to them.
1 2 3 4 **5**
8. MicroMOOCs make students think and act creatively .
1 2 3 4 **5**
9. MicroMOOCs create modeling and simulations as learning methods.
1 2 3 4 **5**
10. MicroMOOCs help to apply and experiment innovations, to satisfy learners interests and to meet new challenges.
1 2 3 4 **5**
11. MicroMOOCs increase interest in subject learning even among those students who do not succeed in this subject well enough.
1 2 3 **4** 5

Please provide your additional thought about this platform

The platform is user-friendly. You can find lessons on a variety of topics from the world.

Please rate from 1 to 5, where 1 is totally disagree, 2 is disagree, 3 is neither agree nor disagree, 4 is agree and 5 is totally agreed.

Circle your preference

1. MicroMOOCs encourage and motivate students to learn.
1 2 3 **4** 5
2. MicroMOOCs are interesting to students as they enrich and enhance lessons.
1 2 3 **4** 5
3. MicroMOOCs develop students' and teachers' digital competences.
1 2 3 4 **5**
4. MicroMOOCs help me to raise students' interest in subject learning.
1 2 **3** 4 5
5. Remote and virtual laboratories are a perfect tool to improve subject visualization.
1 2 **3** 4 5
6. MicroMOOCs encourage students to solve real life problems.
1 2 3 **4** 5
7. Students like activities where they apply technologies, it makes lessons more attractive to them.
1 2 3 **4** 5
8. MicroMOOCs make students think and act creatively .
1 2 3 **4** 5
9. MicroMOOCs create modeling and simulations as learning methods.
1 2 3 **4** 5
10. MicroMOOCs help to apply and experiment innovations, to satisfy learners interests and to meet new challenges.
1 2 3 **4** 5
11. MicroMOOCs increase interest in subject learning even among those students who do not succeed in this subject well enough.
1 2 **3** 4 5

Please provide your additional thought about this platform

MicroMOOCs are interesting to students who can self-study



Annex 7. ODL @ HITSA

During the ODL project in Estonia, a number of events have taken place and they have been divided into three different categories: a) multiplier event, b) local events with teachers and c) school implementations.

1. ODL Multiplier Events

In Estonia there has been one big multiplier event. It took place in the framework of bigger networking and learning conference (it is called „Võrgustik võrgutab“ in Estonian) and overall topic of the day was „Change in the approach to learning“. This conference was free for all teachers, head teachers, educational technologists and school principals – the registrations were gathered through HITSA’s official registration system.

In this event there were presentations about change in the approach to learning, a modern school, e-learning and MOOCs. In the last part of the event, the authors of the best e-courses of the year were awarded.

During the event we shared ODL flyers to the participants and later we shared with them the presentations.

2. ODL Local Events

The first ODL local event was held in October 2017 in Tallinn Secondary School of Science. We specially introduced and advertised this event in newspaper a month before.

This event was more like a workshop and it was held in the same day together with other workshops for teachers and educational technologists. Workshop lasted 1,5 hours and each participant got ODL flyer and a special worksheet that helped to design a concept for a new micro-MOOC. Participants registered to the workshop before it was held and later we shared with them the presentations.

The second ODL local event was held in March 2018 in Tallinn. We invited the same participants who already knew about the ODL project, but also we invited new participants through our network. We had a webinar about new web platforms for teachers, where we also introduced ODL project and invited to participate. Participants registered to the workshop before it was held - the registrations were gathered through HITSA’s official registration system.

This was a very practical workshop which lasted the whole day (8 academic hours). There was introduction and then we investigated together some micro-MOOCs and then each participant started own micro-MOOC and we worked together in the ODL edX platform, trying to experiment and test different solutions and put together our new micro-MOOCs. All teachers who participated were familiar with the e-learning and MOOCs before and they were interested to develop their own micro-MOOC. After the workshop the presentation and some instructional materials and worksheets (some translated into estonian and some in english) were shared with the participants. Also, the evaluation form was distributed and each participant got certificate of attendance.



3. School Implementation

For the school implementation we cooperated with teachers who were already familiar with the ODL project. Two piloting events have taken place and in total 49 students and 2 teachers participated. Students and teachers have completed online evaluation questionnaires after piloting events (via Google forms).

Learners' feedback

Students' questionnaires were in Estonian and they consisted of 11 questions covering all the ODL aspects and space for an open answer about comments the students may have had. There was a scale of 1 to 5 with one representing what they agreed with the least and 5 what they agreed with the most.

ODL mikro-MOOCi
tagasisideküsimustik õpilastele

Vastamine võtab aega 5-7 minutit. Küsimustik on anonüümne ja vastuseid kasutatakse vaid üldistatud kujul. Sinu vastused aitavad kaasa õppeplatvormi paremaks ja kasutajasõbralikumaks muutmisele.

*Required

Kooli nimi, kus Sa õpid: *

Your answer

Tunni või kursuse nimi, mille Sa läbisid moocSPACE keskkonnas: *

Your answer

Sinu vanus: *

Your answer

Selgitus:

Palun vali hinnang ühest viieni, kus 1 = ei nõustu üldse ning 5 = nõustun täielikult.

Figure1. Students evaluation form (screenshot)

In total, 49 students aged 14-15 years old participated in piloting and all filled the evaluation form after the lesson. As it can be seen in the table below (Figure 2), students graded their experience with ODL micro-MOOC and edX platform quite well. The average rating is above 4. Most well rated was the question about how the lesson was organized – it got almost 4,8 average rating. Also students rated highly the question about similar lessons in future – rating about 4,75 shows that mostly students would like to have similar lessons in future. By contrast, the question



“I could myself work in the lesson covered today” got the lowest average score from students, which was about 4,17. It shows, that students were not all very confident about working alone with this platform, but it is understandable because they saw and experienced it the first time.

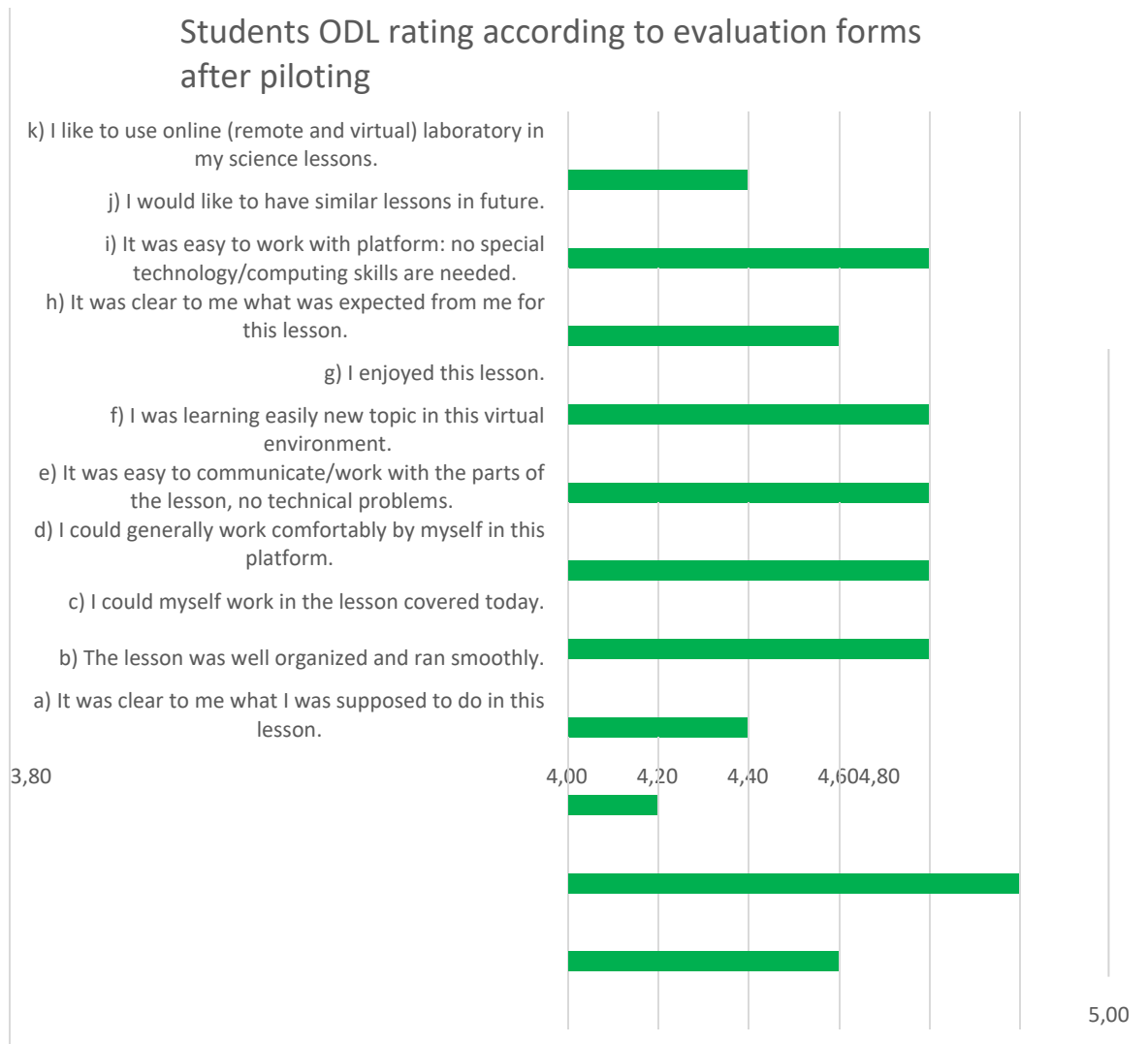


Figure 2: Students ODL rating according to evaluation forms after piloting

There were also an open answer from one student: „I liked this lesson, because it was a different and interesting one.”



Teachers' feedback

After the completion of the piloting, the two teachers also completed a questionnaire. The questionnaire was in Estonian and there were 11 questions and space for an open answer about thoughts the teacher may have had about the platform. There was also a scale of 1 to 5 with one representing what they agreed with the least and 5 what they agreed with the most.

ODL mikro-MOOCi
tagasisideküsimustik õpetajale

Vastamine võtab aega 5-7 minutit. Küsimustik on anonüümne ja vastuseid kasutatakse vaid üldistatud kujul. Sinu vastused aitavad kaasa õppeplatvormi paremaks ja kasutajasõbralikumaks muutmisele.

*Required

Kooli nimi, kus Sa töötad: *

Your answer

Tööstaaž õpetajana (täisaastates): *

Your answer

Tunni või kursuse nimi, mille Su õpilased läbisid moocSPACE keskkonnas: *

Your answer

Selgitus:

Palun vali hinnang ühest viienä, kus 1 = ei nõustu üldse; 2 = pigem ei nõustu; 3 = nii ja naa; 4 = pigem nõustun; ning 5 = nõustun täielikult.

Figure 3: Teachers evaluation form (screenshot)

Teachers answers about micro-MOOCs were also positive, average rating was 4,5. There were four statements which got maximum points from teachers – teachers totally agree that micro-MOOCs encourage and motivate students to learn; students like activities where they apply technologies, it makes lessons more attractive to them; micro-MOOCs create modeling and simulations as learning methods and micro-MOOCs help to apply and experiment innovations, to satisfy learners interests and to meet new challenges. One statement got lower points



from teachers – they do not entirely believe that micro-MOOCs make students think and act creatively, as it can be seen in Figure 4.

One teacher pointed out in the open answer that in the platform there should be an opportunity for teacher to easily make own copy from each micro-MOOC one could like, because that would be easier and more fast way to adjust and/or improve it and start using it with students.

Other teacher also wrote a small comment into the open answer: „It seems to be a very good platform, but requires a lot of work from teacher before he/she can start using it with students.“

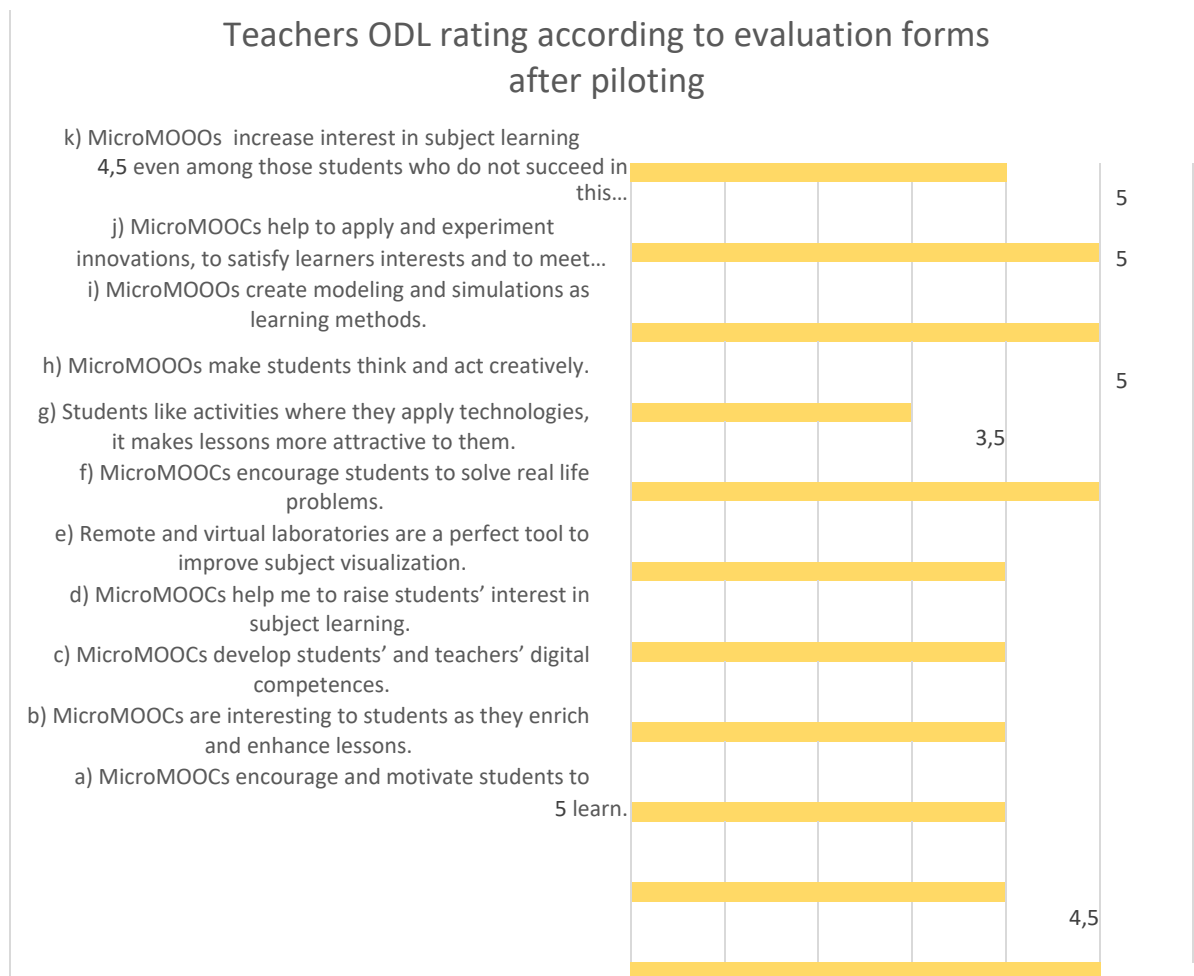


Figure 4: Teachers ODL rating according to evaluation forms after piloting