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1 Introduction

This report documents the work performed in task 4.3 “Develop a Joint Open Badge and formal local certifications” with the objective to establish an open badge certification process and related instrument during the training phases of the DigiFoF project. An Open Badge is an online certificate, that is issued for the participants of training courses and is presented as an image, that can be openly shared and used within any type of media, as a digital representation of a competence achievement. The training courses in DigiFoF will be certified using the open-badge approach, building on two levels, discussed below:

1. Certification of OMiLAB local trainers: the training courses (material, training plans, learning goals) for local nodes are established. Local entities are certified after successfully completing the training sessions. The target group for this certification are local trainers and laboratory staff following a train-the-trainer concept.

The certification process for the OMiLAB training has been established, further details on the process to setup the environment are provided in section 3.

2. Guidelines for local training courses and their certification: formal certification processes on individual level (applicable for each node) are discussed following the certification process discussed in detail, for localized badges. The localisation is on one hand relevant for specific content covered of local laboratories (for trainers and students) and reflect the certification requirements within HEIs. The modules defined for 1) are considered the foundation for any open badge certification on local level.

The certification process builds on the specification of learning goals for each training module identified. Six distinct training modules are established and used within the open-badge certification process constituting the OMiLAB Training Package. The modules are briefly introduced below and described in detail in section 2. The learning goals specify the competences for the badge to be issued.

The open badge certification process considers the modules defined above and certificates are issued on an individual level. The prerequisite for the issuance of a badge is the completing of the training modules defined, the issuing entity is OMILAB NPO for local trainers.

Individual certification by local OMiLABs follows the same structure and process:

- 1) *Training modules and training material*: the training module and relevant training material is developed, detailing the learning goals for each module.
- 2) *Local certification process - setup*: the certification process to register the badge follows the same steps as introduced in section 3. Specific issues related to national legislation and university policies are reflected per partner. The templates for training module development is established in section **Error! Reference source not found.**

- 3) Local certification process – usage: the process is used during the training courses at HEIs; participants are certified according to local regulations.

2 OMiLAB Training Modules

The OMiLAB Training consists of six modules that aim to provide local trainers with the knowledge to operate an OMiLAB and provide training sessions/courses to participants. Each module as listed below, is introduced using a common template for describing the steps and content used during the training session as a module factsheet (Table 1).

Table 1 Training Module Factsheet

<i>Name</i>	<i>Name of the trainer/expert, responsible for the session</i>
<i>Theme</i>	Theme to follow for the training module
<i>Situation</i>	Training situation (room, environment, space)
<i>Prerequisites</i>	Prerequisites for the participant and trainer
<i>Learning Goal</i>	Learning goals defined for the module
<i>Outcomes</i>	Objectives and goals, situation after the training module
<i>Duration</i>	Duration of the module

The structure of the OMiLAB Training is graphically shown in Figure 1.

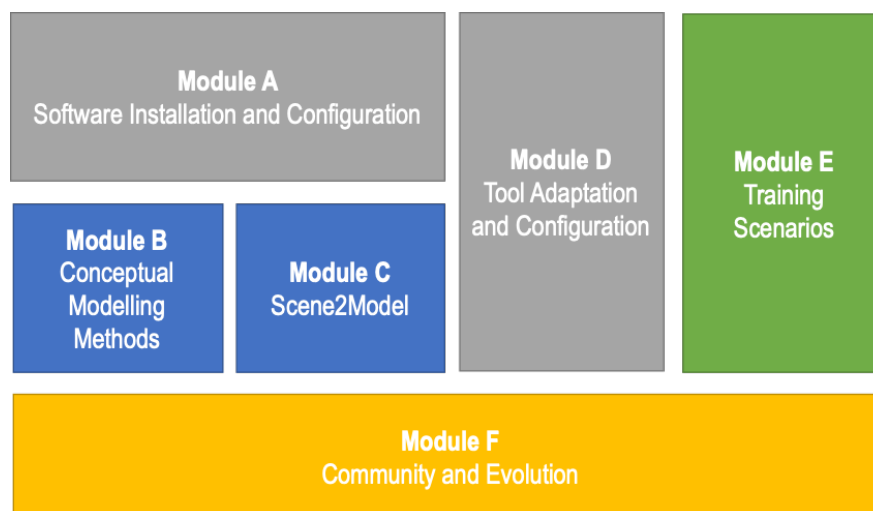


Figure 1: OMiLAB Training Modules

1. **Module A-Software Installation and Configuration:** covering aspects related to the installation of the software, its configuration and integration within a laboratory and individual experimentation setting.
2. **Module B-Conceptual Modelling Methods (Usage and Configuration):** covering the use and configuration of software tools on conceptual modelling level in the lab. This relates

to the creation, adaptation and configuration of models for the use within the lab. For demonstration purposes, the Bee-Up tool is used within this module.

3. **Module C-Scene2Model (Usage and Configuration):** covering the use and configuration of the Scene2Model tool for design thinking workshops. A specific focus is given to the design thinking method employed and tool support offered.
4. **Module D-Tool Adaptation and Configuration:** this module covers the meta-modelling aspects to develop own tools or adapt existing ones, using the ADOxx meta-modelling Platform (www.adoxx.org)
5. **Module E-Training Scenarios:** the example cases for experimentation are introduced from a trainer's perspective as an initial set of content to be used during local training sessions.
6. **Module F-Community and Evolution:** this module is established to introduce community building and evolution techniques for OMiLABs.

2.1 Module A-Software Installation and Configuration

Module A is a technical training module and covers the steps required to install the software included in an OMiLAB locally.

Table 2 Training Plan: Module A-Software Installation and Configuration

<i>Name</i>	<Name of Trainer>
<i>Theme</i>	Training room and software available (USB stick of download links) Participants have their own laptop/PC without the software installed Training room is equipped with OMiLAB hardware equipment
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Connectivity to OMiLAB is available - Trainer has the same settings and resources available as the students - Hands-on mode for installation
<i>Prerequisites</i>	<ul style="list-style-type: none"> - OMILAB Hardware is available - PCs/Notebooks are available for each participant
<i>Learning Goal</i>	<p>ADOxx Installation (Local, Standalone)</p> <ul style="list-style-type: none"> - Installation of ADOxx - Configuration hints: Operating systems and database configuration - Verification of installation - Discussion of lessons learned, configuration hints <p>Scene2Model (Local, Standalone)</p> <ul style="list-style-type: none"> - Installation of Scene2Model - Configuration hints: networking, local and remote server of Scene2Model - Verification of installation - Discussion of lessons learned, configuration hints <p>Bee-Up (Local, Standalone)</p> <ul style="list-style-type: none"> - Installation of Bee-Up - Configuration hints: IOT Adaptors - Verification of installation - Discussion of lessons learned, configuration hints <p>OLIVE Installation (Local, Standalone)</p> <ul style="list-style-type: none"> - Installation of OLIVE prerequisites - Installation of OLIVE - Configuration hints - Verification of installation - Discussion of lessons learned, configuration hints
<i>Outcomes</i>	All participants have the OMILAB tools installed and can use them for modelling or implementation. Support material in case of issues is discussed and introduced.
<i>Duration</i>	½ day

2.2 Module B-Conceptual Modelling Methods (Usage and Configuration)

The objective of module B is to introduce conceptual modelling and the value of models. As a practical case, the Bee-Up tool is used to create an own conceptual model, analyse and simulate it and connect it to the CPS devices within the OMILAB.

Table 3 Training Plan: Module B-Conceptual Modelling Methods (Usage and Configuration)

<i>Name</i>	<i><Name of Trainer></i>
<i>Theme</i>	Training room and software available on participant PCs (Bee-Up Installation completed) Training room is equipped with OMILAB hardware equipment
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Connectivity to OMILAB is available - Trainer has the same settings and resources available as the students - Hands-on mode for the demonstration: Guided Example
<i>Prerequisites</i>	<ul style="list-style-type: none"> - OMILAB Hardware is available - PCs/Notebooks are available for each participant - Module A is completed
<i>Learning Goal</i>	<ul style="list-style-type: none"> - Introduction to the conceptual modelling - Discussion on model value (why model, how to model) - Fundamental modelling methods, languages and notations - Focus: Flowcharts, BPMN, Petri Nets - Introduction to Bee-Up and the modelling interface - Create an own model with Bee-Up (guided) - Analyse and simulate the model in Bee-Up - Execute/run the conceptual model in OMILAB
<i>Outcomes</i>	All participants have modelled a conceptual model, run model-value functionality and interacted with the OMILAB environment through the modelling toolkit
<i>Duration</i>	½ day

2.3 Module C-Scene2Model (Usage and Configuration)

The objective of module C is to introduce design thinking and the usage of the Scene2Model tool.

Table 4 Training Plan: Module C-Scene2Model (Usage and Configuration)

<i>Name</i>	<Name of Trainer>
<i>Theme</i>	Training room and software available on participant PCs (Scene2Model Installation completed) Training room is equipped with OMILAB hardware equipment.
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Connectivity to OMILAB is available - Trainer has the same settings and resources available as the students - Hands-on mode for the demonstration: Guided Example for demonstration
<i>Prerequisites</i>	<ul style="list-style-type: none"> - OMILAB Hardware is available - PCs/Notebooks are available for each participant - Module A is completed
<i>Learning Goal</i>	<ul style="list-style-type: none"> - Introduction to Design Thinking - Introduction to SAP Scenes - Introduction to Scene2Model: Conceptual and Technical Architecture - Guided example: from Scene to Model
<i>Outcomes</i>	All participants have jointly created a scene, digitized the scene on their PCs/notebooks.
<i>Duration</i>	½ day

2.4 Module D-Tool Adaptation and Configuration

The objective of module D is to introduce adaptation possibilities for the tools introduced in module B and C. The metamodeling approach is discussed and capabilities to create and adapt metamodels using the ADOxx platform.

Table 5 Training Plan: Module D-Tool Adaptation and Configuration

<i>Name</i>	<Name of Trainer>
<i>Theme</i>	Training room and software available on participant PCs (Scene2Model Installation completed) Training room is equipped with OMiLAB hardware equipment.
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Connectivity to OMiLAB is available - Trainer has the same settings and resources available as the students - Hands-on mode for the demonstration: from Hello World to Implementation
<i>Prerequisites</i>	<ul style="list-style-type: none"> - OMILAB Hardware is available - PCs/Notebooks are available for each participant - Module A is completed
<i>Learning Goal</i>	<ul style="list-style-type: none"> - Introduction to Metamodelling - Introduction to ADOxx - Conceptual and Technical Architecture of the platform: metamodel, model processing and extension capabilities - Guided example: Hello World - Introduction to OLIVE: interaction environment and micro-service development space
<i>Outcomes</i>	All participants created a minimal metamodel based on the training examples and cases. The implementation process is understood.
<i>Duration</i>	1 day

2.5 Module E-Training Scenarios

The objective of module E is to introduce the training scenarios and provide guidance for their presentation. The module is structured as a workshop with interactive elements and space for exploration.

Table 6 Training Plan: Module E-Training Scenarios

<i>Name</i>	<Name of Trainer>
<i>Theme</i>	Training room and software available on participant PCs (Scene2Model Installation completed) Training room is equipped with OMiLAB hardware equipment.
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Connectivity to OMiLAB is available - Trainer has the same settings and resources available as the students - Scenarios are installed on participant PCs
<i>Prerequisites</i>	<ul style="list-style-type: none"> - OMILAB Hardware is available - PCs/Notebooks are available for each participant - Module A, B, C are completed
<i>Learning Goal</i>	<ul style="list-style-type: none"> - Design to Concept Workshop: how design thinking results impact the conceptual layer? - Concept to Physical Workshop: Interaction between models and IOT adaptors - Concept to Concept Workshop: Differences between conceptual modelling languages, model transformation
<i>Outcomes</i>	The participants get an intuition about the three layers (Design, Concept, and Physical) and the relation and collaboration between them.
<i>Duration</i>	½ day

2.6 Module F-Community and Evolution

The objective of module F is on the community processes and how interaction between the community can be reached. The communities relevant for the laboratory are introduced.

Table 7 Training Plan: Module F-Community and Evolution

<i>Name</i>	<Name of Trainer>
<i>Theme</i>	Training room and software available on participant PCs (Scene2Model Installation completed) Training room is equipped with OMiLAB hardware equipment.
<i>Situation</i>	<ul style="list-style-type: none"> - All participants have arrived - Trainer has the window of the communities open so the participants can navigate there easily
<i>Prerequisites</i>	PCs/Notebooks are available for each participant
<i>Learning Goal</i>	<ul style="list-style-type: none"> - Tutorial on OMiLAB Community - Participation in OMiLAB Physical Lab - Participation in ADOxx/OLIVE Community
<i>Outcomes</i>	Training on working with communities and becoming a valuable member
<i>Duration</i>	½ day

3 Open Badge Certification: OMILAB Training

Within this chapter, the open badge certification process is discussed for the OMILAB training. Background information is provided to clarify the options assessed and steps performed in the context of the DigiFoF project. The initialization process is discussed to showcase the applicability of Open Badge certification of formal local certification.

3.1 Background

An Open Badge is an online certificate, which is represented by an image that is determined by the issuer and contains information like a description and the award criteria as well as some details about the issuer. The Open Badge aims to function as a web-sharable digital representation of the achievements, skills and knowledge of the Badge owner. Therefore, an Open Badge gives the possibility to share this information, among others, on social media, résumés, blogs as well as online portfolios or websites. In that way it has a supportive function for educational and employment purposes as well as for lifelong learning.

In order to issue Open Badges, there are basically two possibilities:

- a) The certification entity can decide to issue your own badges by writing the code by individually. Details on how this can be accomplished are available in (Mozilla, 2019)
- b) An Open Badge platform can be used for certification. For this option, many platforms exist, which provide the necessary support to issue an Open Badge. A list with a selection of such platforms, which meet the IMS Global Learning Consortium standards, can be found at (IMS Global, 2019).

For the OMILAB training, an open platform has been selected as such the platform provides the functionalities beyond the scope of OMILAB and the project and allows to be integrated in existing solutions. The Badgr platform has been selected due to its distribution and use on a global level. Alternative platforms can be used. The steps performed to setup the certification environment are introduced in the following section. These steps are considered a guideline for local certification steps that local HEIs can repeat to establish their own open badge environment. The steps include:

- 1) Creation of an administrative account: required for managing the issuance process, responsibilities of issuer and profiles/badges
- 2) Setup of an issuer profile: needed as the certification body for the open badge.
- 3) Creation of an open badge including criteria relevant for awarding the badge: the badge is defined based on the learning goals of the above training modules. Completion of the training modules triggers the issuance and specifies (for the awardee) in detail the criteria for receiving the badge.

- 4) Awarding badges to training participants: as the continuous step of awarding badges to training participants, including the management of issued awards.

3.2 OMILAB Open Badge @ Badgr

For the creation of the OMILAB Open Badge, the server within the EU has been selected at Badgr. As a prerequisite an administration account is required. After opening the Badgr starting page the first step is to create an account. Figure 2 shows a screenshot of the Badgr starting page with the filled-out form as an example.

Step 1: Administrative Account (Preparatory)

Create a Badgr Europe Account

Already have an account? [Sign in](#).

SIGN UP WITH

facebook	Google
Microsoft	LinkedIn
Twitter	kony

OR

Email
info@omilab.org

First Name
OMILAB

Last Name
Vienna

Password (Must be at least 8 characters)
.....

Confirm Password
.....

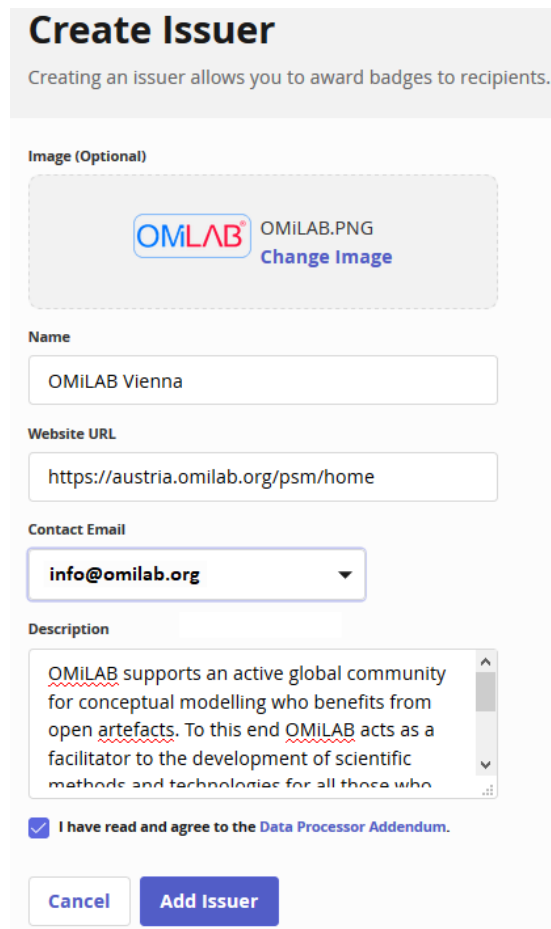
I have read and agree to the [Terms of Service](#).

Yes, I would like to receive email updates about products & services, upcoming webinars, news and events from Badgr Europe.

Create Account

Figure 2: Create Account on Badgr


After creating the account, you should receive a confirmation email. Confirm the account and you can sign in to Badgr then. In order to be able to create Open Badges on Badgr, you need to add at least one issuer. To accomplish that step select the “Issuers” menu item in the Badgr main menu and click on “Create an Issuer”. In the next step provide the necessary information of your Organization together with an image for your badge. Figure 3 depicts an example of the fill-out form for the issuer creation.

Step 2: Setup of an Issuer Profile (Preparatory)

Create Issuer

Creating an issuer allows you to award badges to recipients.

Image (Optional)

 OMiLAB.PNG
[Change Image](#)

Name

OMiLAB Vienna

Website URL

<https://austria.omilab.org/psm/home>

Contact Email

info@omilab.org

Description

OMiLAB supports an active global community for conceptual modelling who benefits from open artefacts. To this end OMiLAB acts as a facilitator to the development of scientific methods and technologies for all those who

I have read and agree to the [Data Processor Addendum](#).

[Cancel](#) [Add Issuer](#)

Figure 3: Form to create an issuer on Badgr

As issuer you are now able to issue and award your own Open Badges. In addition, if you want to allow other persons even outside your organisation to award your badges you need to add those persons to your staff on the Badgr platform. In order to do this, you need to click on the issuer profile name in the “Issuers” menu first. After that a new page will be opened where you need to select the option “Manage Staff”. There you can add staff by providing the role and the email address. Figure 4 summarizes those steps figuratively.

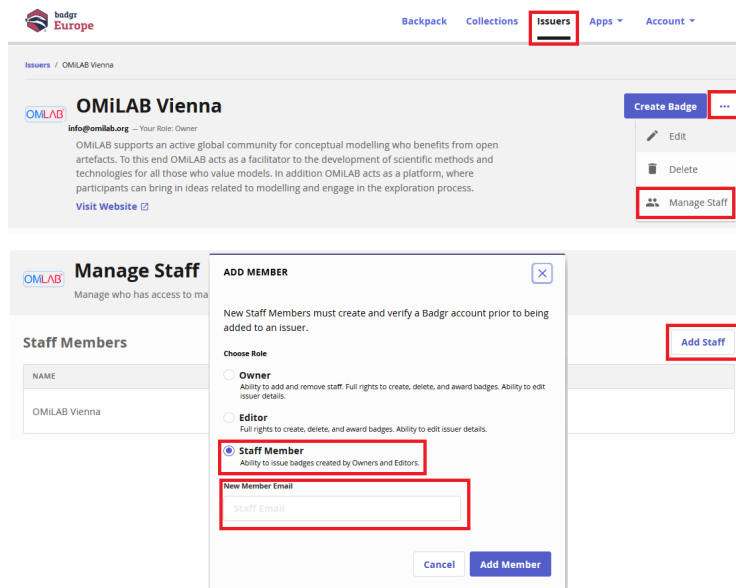


Figure 4: Steps to manage issuer staff on Badgr

After creating your issuer profile, you can now create your own Open Badges. As before, in the first step you need to click on your issuer profile name in the “Issuers” main menu.

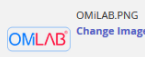
Step 3: Creation of the OMILAB open badge (Preparatory)

You should see a button “Create Badge”. By clicking on the button, you will be forwarded to a new page for creating an Open Badge. On this page you need to provide some details regarding your Badge into a form. Figure 5 depicts an example of the fill-out form for the badge creation.

Create Badge

You can award a badge to multiple recipients over time.

Image Generate Random



OMiLAB.PNG [Change Image](#)

Name

Short Description

Badge Basics

Badge images can be either PNGs or SVGs. All fields are required.

[Learn About Open Badges](#)

CRITERIA (At least one field is required.)

How does the recipient earn this badge?

[Write](#) [Preview](#) Markdown Supported

URL

What are Criteria?

The criteria field describes exactly what must be done to earn this badge. Some issuers choose a URL on their website as a promotional page that explains this badge opportunity and how to earn it.

Figure 5: Form to create an Open Badge on Badgr

Step 4: Award Open Badge to Participants

If you have completed the steps above, you are now able to award your own Open Badges. This can be done by selecting the Badge within the “Issuers” main menu. By clicking on the “Award Badge” button in the next step you will be directed to a new page. On that page you can specify the name and the email address of the person you want to award an Open Badge to. After awarding the Badge the recipient will be notified about the award through the provided email address. The look of the notification message in this case is shown in Figure 6. In case you award a lot of Badges the Badgr platform allows you to have an overview of all recipients by providing a list with all recipients including the date the Badge was awarded.

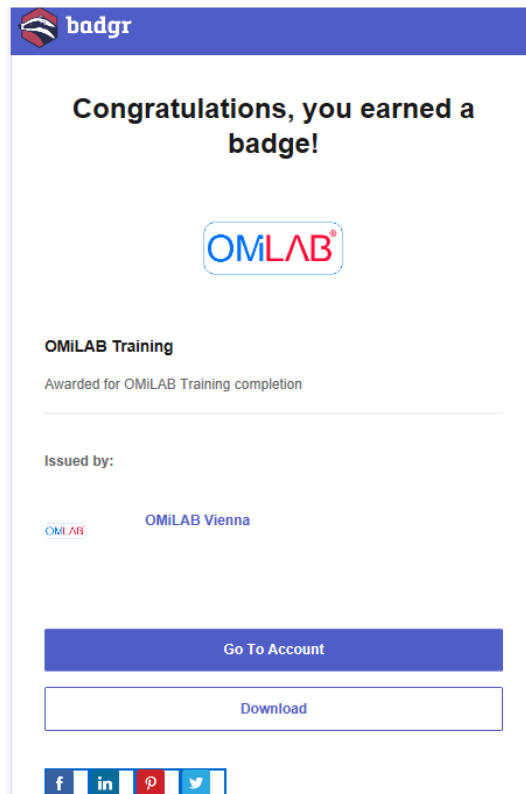


Figure 6: Badge award notification message example using Badgr

4 Local Certification Procedure

Any organisation can issue formal certificates to certify the participation or completion of vocational trainings without further technical requirements. However, in order to be allowed to issue nationally recognised certificates, accreditation by a state authority is required. The formal requirements for obtaining a state accreditation in a certain subject area can vary from country to country and therefore are not listed here for every participating country. This is subject to university policy, member-state regulation and individual agreements at HEIs. The approach followed in DigiFoF for local certification follows the process defined for the OMILAB training:

- 1) Identification of learning goals using the fact-sheet approach: this is required for any locally organized training course in the context of the project.
- 2) Certification of local trainers using the Open Badge Environment introduced in the previous chapter. The project team is well-aware that this certification is not nationally recognized, but following this approach, the foundational elements for an OMILAB with respect to training are defined.
- 3) Local certification process: this process is triggered by the responsible partners in the consortium that seek national recognized accreditation beyond university level course evaluation. An obtained accreditation authorises the organisations to award nationally recognised certificates that officially confirm that a person has acquired certain ability in a certain subject area and can also use or pass on this knowledge.
- 4) Issuance of badges according to local regulations.

5 Summary

This deliverable reports on the steps performed to establish an open badge certification for the OMILAB training as input for local, formal certification procedure.

The training material for OMILAB has been organized in 6 modules. For each module learning goals and corresponding learning material is prepared during the course of the project, building on introductory samples provided.

As a realization environment the Badgr platform has been selected and the training modules are configured for open badge certification. Participants of OMILAB trainings are awarded with the badge upon successfully participating in the training course.

References

- IMS Global. (2019). Open Badge Certifications. Retrieved December 16, 2019, from [https://site.imsglobal.org/certifications?refinementList%5Bstandards_lvlx%5D%5B0%5D=Open Badges](https://site.imsglobal.org/certifications?refinementList%5Bstandards_lvlx%5D%5B0%5D=Open+Badges)
- Mozilla. (2019). Open Badge. Retrieved December 16, 2019, from <https://github.com/mozilla/openbadges-backpack/wiki/New-Issuers:-Give-Yourself-a-Badge>