

# Open Virtual Mobility

## O4.A1.3 E-Assessment Concept

- Final draft -

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## Imprint

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## 1. Executive summary

This paper is a public document produced as part of Outcome O4-A1 “e-assessment concept” and in the Open Virtual Mobility Erasmus+ strategic partnership (2012-2020) and aims to define the concept of e-assessment as applied in the OpenVM project.

This publication summarises the first two milestones:

Milestone 1: O4-A1.1: e-assessment concept

Milestone 1: O4-A1.2 Comparative study of different E-Assessment forms

Evaluation activities can be of different types (formative, diagnostic, summative ...) and also take different forms (tests, online homework, self-evaluation by peers, evaluation based on evidence ...)

These activities must be defined in accordance with the needs and constraints of the project. The purpose of this document is to define what to evaluate, how to evaluate it and what tools to use.

### What are the objectives covered in this paper?

- Select the types of evaluation needed in the project
- Specify the tools to be used to do the e-assessments

### Who is this paper for?

- Mainly for the partnership of the project
- For educators who have to assess transversal competences

### What topics are addressed in this paper?

- e-assessment, virtual mobility, formative, summative, diagnostic assessments

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## 2. Aims and Scope

The openVM project aims at promoting Virtual Mobility (VM) in Higher Education (HE) through developing, assessing and recognizing the Virtual Mobility skills of educators and students.

This document aims at defining the e-assessment concept, to help the design of an e-assessment tool.

It will be used to assess the VM skills, as defined in output O1 of the project, and which will be implemented in the e-assessment tool in the learning hub, which is output O2. First, we list and define the different purposes of assessment and the different types of existing e-assessment. Based on the needs for the e-assessment tool, we then propose some kind of assessment in regard of the needs of the project.

## 3. Background and Rationale

Here we list and define the different approaches to assessment and also the different types of existing e-assessment methods.

There are a variety of purposes served by assessment in education and a range of terms used to describe these types of assessment.

### **Different pedagogical approaches:**

- Constructive alignment:

In a teaching, learning and evaluation situation, *constructive alignment* is an important concept developed by John Biggs (Biggs, n.d.; Biggs & Tang, 2011<sup>1</sup>), Constructive alignment is an outcomes-based approach to teaching in which the learning outcomes that students are intended to achieve are defined before teaching takes place. Teaching and assessment methods are then designed to best achieve those outcomes and to assess the standard at which they have been achieved.

Perspectives on learning:

Concerning the different perspectives on learning, their appropriate assessment and forms of feedback, see Figure 1 below:

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<sup>1</sup> [https://tru.ca/\\_shared/assets/herdsa33493.pdf](https://tru.ca/_shared/assets/herdsa33493.pdf)

Perspective on learning	Assumption	Assessment	Feedback
<b>Associative</b>	<b>Learning as acquiring competence</b> Learners acquire knowledge by building associations between different concepts. Learners gain skills by building progressively complex actions from component skills.	Concepts and competencies frequently assessed at micro level and in combination through macro-level tasks.	<ul style="list-style-type: none"> <li>Expert feedback focusing on weaknesses in skills and conceptual understanding</li> <li>Interactive environments for knowledge and skills acquisition</li> </ul>
<b>Constructivist</b>	<b>Learning as achieving understanding</b> Learners actively construct ideas by building and testing hypotheses.	Assessment by means of experimentation, discovery and inquiry-based tasks.	<ul style="list-style-type: none"> <li>Self-generated feedback arising from reflection and self-assessment</li> <li>Interactive discovery environments with opportunities for self-testing</li> </ul>
<b>Social constructivist</b>	<b>Learning as achieving understanding</b> Learners actively construct new ideas through collaborative activities and dialogue.	Collaborative and cooperative tasks involving shared expression of ideas. Participation by learners in the design of assessment tasks.	<ul style="list-style-type: none"> <li>Peer feedback arising from collaborative activities and dialogue</li> <li>Interactive environments that support sharing and peer feedback</li> </ul>
<b>Situative</b>	<b>Learning as social practice</b> Learners develop their identities through participation in specific communities of practice.	Holistic assessment in authentic or simulated professional contexts. Participation in social practices of inquiry and assessment.	<ul style="list-style-type: none"> <li>Socially produced feedback from multiple sources</li> <li>Feedback derived from authentic real-life tasks</li> <li>Interactive environments that simulate professional practice</li> </ul>

Figure 1: Perspectives on learning, approaches to assessment and feedback – from JISC, 2010, p. 1<sup>2</sup>

We do not present these as prescriptions because we do not yet know precisely the nature of learning activities, particularly in the MOOC, and how these skills will be acquired.

### Types of assessment:

In the European project Tesla, a report (pp. 11-15)<sup>3</sup> sets out the background for assessment and e-assessment in higher and vocational education. Several types of assessment are described: summative assessment, formative assessment, diagnostic assessment, dynamic assessment, work-integrated assessment, synoptic assessment.

The most common types of assessment, and which are best suited to the needs of the project are: diagnostic, summative and formative assessments.

They correspond to the needs of the project:

- The summative evaluation in the delivery of badges.

<sup>2</sup>

<sup>3</sup> <https://tesla-project.eu/deliverable/deliberable-2>

- The formative evaluation in the evaluation of knowledge and skills acquired in the MOOC and through OER.
- The diagnostic assessment at the entrance of the hub for users in order to better understand the skills needed for virtual mobility and to evaluate themselves before embarking on a virtual mobility initiative

### **Assessment of skills:**

Among the different definitions of skills, the notion of tasks or activities is always associated.

The definition of skill used by ESCO<sup>4</sup> (European skills/competences, qualifications and occupations) applies the same definition of "skill" as the European Qualifications Framework (EQF)<sup>5</sup>. According to this, "skill means the ability to apply knowledge and use know-how to complete tasks and solve problems". They can be described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

Therefore, the assessment of VM competencies will include the interpretation of VM competencies in the tasks the student is able to perform, or to demonstrate that he or she has performed them, as well as the assessment of that ability.

### **Transversal skills:**

The majority of approaches concerning transversal competences are based on a framework of competences. For example, DIGCOMP, the European digital competence framework for citizens<sup>6</sup>.

The frameworks are generally organized with several areas (or dimensions) and sub-areas (or sub-dimensions).

In a first area (or dimension), the main components of competence are described, for example, in the framework of transferable skills of the University of Leicester<sup>7</sup> we can find at the first level: Interpersonal Skills, Exploration and Implementation Skills, Self-management Skills; in the soft skills framework of the eLene4work project<sup>8</sup>, we can find social, personal, methodological and digital soft skills.

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<sup>4</sup> <https://ec.europa.eu/esco/portal/escopedia/Skill>

<sup>5</sup> [European Qualifications Framework \(EQF\)](#)

<sup>6</sup> digital competence framework for citizens : <https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework>

<sup>7</sup> <https://www2.le.ac.uk/offices/careers-new/information-for-students/build-your-skills/skills>

<sup>8</sup> eLene4work project <http://elene4work.eu/>

Example: extract from DIGCOMP, the digital competence framework for citizens

Competence areas Dimension 1	Competence Dimension 2
2. Communication and collaboration	<p>2.1 Interacting through digital technologies To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.</p> <p>2.2 Sharing through digital technologies To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.</p> <p>2.3 Engaging in citizenship through digital technologies To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.</p> <p>2.4 Collaborating through digital technologies To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge.</p> <p>2.5 Netiquette To be aware of behavioural norms and know how while using digital technologies and interacting in digital environments To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.</p> <p>2.6 Managing digital identity To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services</p>

Table 1: extract from DIGCOMP digital competences framework



### Assessment of transversal skills:

To assess the transversal skills, there are usually several levels that are pre-defined.

For example, on the Europass website, there is a self-evaluation grid for digital competences<sup>9</sup> based on the DIGCOMP framework.

There are three existing levels: basic user, independent user and proficient user. For each competence of the framework, the associated tasks are defined for each level.

Extract from the self-evaluation grid

Competence	Basic user	Independent user	Proficient user
Communication	<p>I can communicate with others using mobile phone, Voice over IP (e.g. Skype) e-mail or chat – using basic features (e.g. voice messaging, SMS, send and receive e-mails, text exchange).</p> <p>I can share files and content using simple tools.</p> <p>I know I can use digital technologies to interact with services (as governments, banks, hospitals).</p> <p>I am aware of social networking sites and online collaboration tools. I am aware that when using</p>	<p>I can use advanced features of several communication tools (e.g. using Voice over IP and sharing files).</p> <p>I can use collaboration tools and contribute to e.g. shared documents/files someone else has created.</p> <p>I can use some features of online services (e.g. public services, e-banking, online shopping).</p> <p>I pass on or share knowledge with others online (e.g. through social networking tools or in online communities).</p> <p>I am aware of and use the rules of online</p>	<p>I actively use a wide range of communication tools (e-mail, chat, SMS, instant messaging, blogs, micro-blogs, social networks) for online communication.</p> <p>I can create and manage content with collaboration tools (e.g. electronic calendars, project management systems, online proofing, online spreadsheets).</p> <p>I actively participate in online spaces and use several online services (e.g. public services, e-banking, online shopping).</p>

<sup>9</sup> self-evaluation grid for digital competences <https://europass.cedefop.europa.eu/sites/default/files/dc-en.pdf>

	digital tools, certain communication rules apply (e.g. when commenting, sharing personal information)	communication ("netiquette")	I can use advanced features of communication tools (e.g. video conferencing, data sharing, application sharing).
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Table 2 : self-evaluation grid of Digicomp

In other self-assessment tools of transversal skills, we can also find predefined levels. For example, at the University of Exeter, there is a self-assessment audit for personal and key skills<sup>10</sup> with 4 levels:

- 1 Started but need more practice
- 2 Able to do this with some help
- 3 Competent without help
- 4 Competent and able to help others

In the digital competence framework for educators DIGCOMPEDU<sup>11</sup>, there are levels similar to those used for language skills.

A1	A2	B1	B2	C1	C2
Newcomer	Explorer	Integrator	Expert	Leader	Pioneer

Table 3 : Levels of DIGICOMPEDU

For all competencies of DIGCOMPEDU and for each of the 6 levels, the tasks that the user must perform to reach the level are described.

In other evaluation tools of transversal competences, the levels are based on different Likert scales.

<sup>10</sup> Self assessment audit on personal and key skills

[https://www.exeter.ac.uk/media/level1/academicserviceswebsite/studentandstaffdevelopment/documents/pdp/Personal\\_and\\_Key\\_Skills\\_Self\\_Assessment\\_Audit.pdf](https://www.exeter.ac.uk/media/level1/academicserviceswebsite/studentandstaffdevelopment/documents/pdp/Personal_and_Key_Skills_Self_Assessment_Audit.pdf)

<sup>11</sup> digital competence framework for educators DIGICOMPEDU <https://ec.europa.eu/jrc/en/publication/euro-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu>

The Ikanos project, led by the Basque Government in Spain, offers a grid-based diagnostic tool for assessing one's own digital competence based on the DIGCOMP framework. It uses Likert scales with values from 0 to 10 and also True/False answers.



Fig2 : self-diagnosis tool extract

In the eLene4work project, there is a self-evaluation tool for soft skills based on the eLene4work framework.

The self-evaluation tool<sup>12</sup> use Likert scales with 4 levels + a “Not Applicable” response:

1 = I strongly disagree; 2 = I somewhat disagree; 3 = I somewhat agree; 4 = I strongly agree

For each skill, there are sentences that describe the behaviour, the abilities, the actions, the tasks that the user must perform or have.

For example for the competence on communication:

“I communicate transparently, stating clearly what I want to express or I can change my viewpoint based on the valid opinion of others...”

The majority of assessments of transversal competences are based on questionnaires with Likert scales.

Extract from the e-assessment tool of eLene4work project

<sup>12</sup> Self-evaluation tool of eLene4work project <http://sa.elene4work.eu/selfassessment.php>

# eLene<sup>4</sup>WORK

SELF-ASSESSMENT TOOL

Assess your soft skills and digital soft skills to identify your strengths and areas for improvement

eLene4work website
Personal Journal
Orientation guide

Social
Personal
Methodological
Digital
Learning Agenda
Create PDF

### 1. Communication

Skill Rating Skill Importance

[Hide](#)

1 = I strongly disagree, 2 = I somewhat disagree, 3 = I somewhat agree, 4 = I strongly agree

RATING	N/A	STATEMENTS
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I communicate transparently, stating clearly, what I want to express.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I can change my viewpoint based on the valid opinion of others.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I tailor my message to suit the person(s) I am talking too.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I find it easy to listen to what other people have to say without interrupting.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		When someone is talking to me, I think about what I am going to say next to make sure I get my point across correctly.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		The visuals in my presentation match well with the information I am communicating.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		To prepare for my presentation, I think carefully about the message I want to send.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I use organizational patterns (specific introduction and conclusion, sequenced material within the body, and transitions), so that my communication is as clear as possible.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I pay attention to my non-verbal behaviour, like facial expressions and eye contact, to make sure I stay engaged with the audience.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I encourage my audience to ask questions at the end of the presentation.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		When talking to people, I pay attention to their body language.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		When I set up a meeting, I try to reduce the risk of conflicts.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I consider cultural barriers when planning my communications.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		Before I communicate, I think about what the person needs to know, and how best to convey it.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		When I write a memo, email, or other document, I give all of the background information and detail I can to make sure that my message is understood.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I use appropriate, relevant, and compelling content to illustrate a subject.
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="checkbox"/>		I use high quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing.

Not Important  
  Not so Important  
  Important  
  Very Important

IMPORTANCE of Skill:

Fig 3: Self-evaluation tool of eLene4work project

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### e-assessment types:

In the “The Use of ICT for the Assessment of Key Competences report <sup>13</sup>(9)”, new generations (3 & 4) of assessment (embedded assessments) are presented, covering learning analytics, virtual worlds and intelligent tutors, but these are considered outside the scope of the project .

We will use the e-assessment types defined in the draft e-assessment concept 04.A1.1, but the list is not closed.

## 4. Methodology and results

The first phase is to define the objects of the evaluation by trying to answer the following questions:

- *What will be evaluated?*
- *Who will be evaluated?*
- Who (or what) will “perform” the evaluation?

In the second phase we will define the purpose of assessment:

- Formative?
- Summative?
- Diagnostic?
- Other?

In the third phase: we will define the tools most appropriate for each purpose of assessment

### First phase

The main objects to be evaluated in phase one are the VM skills. These skills are defined in the first part of the project as part of the conceptual framework though applying different research methods such as Group Concept Mapping used in Output O1. The framework also defines which VM skills are relevant for which target groups (students, educators).The main target is therefore the evaluation of VM skills of Students and educators.

### Second phase

According to the literature, there are mainly three different types of assessment, depending on the purpose: formative, summative and diagnostic [1].

Formative assessment is used to provide feedback during the learning process. Summative assessment provides a quantitative grade and is often conducted at the end of a unit or lesson to determine that the learning objectives have been met. Diagnostic assessment is a form of pre-assessment that allows a teacher to determine students' individual strengths, weaknesses, knowledge, and skills prior to instruction. It is primarily used to diagnose student difficulties and to

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<sup>13</sup> The Use of ICT for the Assessment of Key Competences <http://ftp.jrc.es/EURdoc>

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guide lesson and curriculum planning. It can also be used after teaching is completed, to evaluate the efficiency of learning.

We will use the three purposes of assessment:

Diagnostic assessment at the entry in the hub, will be done with a self-assessment tool to determine the level of skills already acquired, and to have an idea of the lack of certain skills necessary for virtual mobility.

Formative assessment within the MOOC, to self-evaluate the acquisition of knowledge and skills acquired in the MOOC.

Summative assessment, to earn badges in Output 5 of the project.

### **Third phase**

In the third phase, the tools to be put in place to best respond to the forms of evaluation required for the project will be studied.

First, for the diagnostic evaluation, the design of the self-assessment tool will be described, then a comparative study of the main e-assessment tools will be carried out with a definition of the criteria important for the project. Those criteria have been established on the basis of meetings and discussions with the project partners.

#### **Diagnostic assessment: The self-assessment tool**

According to different tools used to assess transversal skills and also to the table 4 Types of e-assessment /criteria, the best tool to evaluate VM skills is a self-evaluation tool which is integrated into the VM Learning Hub. A similar tool is already used in another project (self-assessment tool in eLene4work). The tool consists of a survey with a Likert scale, which allows users to self-evaluate their soft skills by answering a set of statements (or items), which are defined from the competency framework developed in the project. Statements define activities, tasks or behaviours related to the competency that the student is supposed to do or is able to do. They allow the student to define their level of acquisition of VM skills.

Used at the entrance to the Hub, it allows learners to become aware of the different skills to be implemented in a virtual mobility initiative but also to know their strengths and weaknesses in this field. It can also be used at the end of the learning process to measure the progress achieved.

To improve the reliability of the self-assessment tool and in particular the writing of statements, several methods and principles are applied. Whenever possible, use publications defining the skills used in the tool, as, for example, for open-mindedness (Multicultural Personality Questionnaire: Development of a Short Form or Measuring Open-mindedness) or learner control and appropriation (Learner control in a personal learning environment: a cross-Cultural study)

A structured and in-depth peer review has been set up in the project partnership to validate the statements used in the tool by a group of VM competence experts. It will thus be possible to validate

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not only the adequacy between VM skills and the statements of the test, but also the quality of the language.

In order to ensure that the tool is valid for users, in particular, the understanding of the statements by the target users also needs to be validated. Each partner will thus conduct a field test with a selected group of learners. For each field test, the partner will provide a summary of the student feedback on both form and content. The results of the peer review and the field test will be collected, analysed and used to produce the final version of the tool.

### **Formative and summative assessment: choice of e-assessment tools**

In order to choose the tools best suited to the forms of evaluation selected, we first define a set of criteria important to the project and then a list of the most commonly used evaluation tools. These tools will be categorised according to the criteria in order to choose those most appropriate to the project.

Different criteria for the choice of tool:

#### **Automated:**

This criterion means that the evaluation is automatic without the intervention of a teacher; this concerns both the scoring and the feedback.

#### **Evidence-based:**

Assessment based on the provision of evidence.

#### **Feasibility:**

This is a criterion to evaluate whether the e-evaluation is feasible or not within the framework of the project, both at the level of the tools to be implemented and also in terms of implementation time.

#### **Compatible with summative assessment:**

Allows a mark or grade to be given to the student at the end of the learning.

#### **Adapted to assessing skills:**

Assessment strategies have to be developed that go beyond testing factual knowledge. These strategies must include the skills and attitudes dimension of VM skills. Some e-assessment types are more or less adapted to evaluating knowledge rather than skills.



Choice of the most appropriate e-assessment tools:

To facilitate the choice of e-assessment tools according to the criteria we have chosen, we have created a table, which is not in its final version and could evolve during the life of the project.

Types of e-assessment /criteria	Automated	Evidence-based	Compatible with summative assessment	Feasible	Adapted to assessing skills
Multiple choice questions (with feedback or not)	++	--	++	++	+
True or False questions	++	--	++	++	+
Single choice questions (with feedback or not)	++	--	++	++	+
Matching tests	++	--	++	++	+
Survey with Likert scale	++	+	++	++	++
Simple games	++	-	++*		++
Assignment	--	+	++	++	++
Peer assessment	-	++	++	++	++
Cases studies	--	++	+	--	++
Games	++	+	++	--	++
e-assessments type(H5P)	++	+	-- *	++	+
e-portfolios	--*	++	+	+	++

Table 4 : Types of e-assessment /criteria



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It is possible to add rows for other forms of e-evaluation and to add columns for other criteria.

**legend:**

++ highly compatible and -- not at all compatible with the criterion

\* To verify that the marks can be sent to the platform system and also set up to be used only once.

**Summative assessment will be used in the Open Credentials of Output 5.**

The evaluation will focus on the activities that the student will have to perform in the MOOC and the evidence that he/she will be able to provide to attest to the competence.

According to the table above, the most appropriate tools to assess evidence and compatible with summative assessment is a peer-assessment tool. It can be associated with an e portfolio, e-portfolio can be used to upload evidence. Include evidence in an e-portfolio can be one of the activities of the MOOC or as a duty included in the Peer-assessment tasks.

Nevertheless, a peer-assessment tool has some constraints:

The first constraint is a time constraint because the operation of the tool is based on successive phases. Furthermore, the allocation of badges cannot be done at any time.

The first phase is the submission of evidence: each student must submit the files used as evidence or links to evidence already submitted in the e-portfolio. The second phase is the peer review of evidence, which implies that the first phase is completed and therefore the submission of evidence is no longer possible. The last phase is the assignment of marks and therefore badges.

The second constraint is that since the evaluation is done by peers, the instructions (which evidence to provide), the scale and the evaluation grid or rubric must be very precise in order to make the evaluation as clear and objective as possible for a student.

The third constraint is that the evaluation cannot be completely automated and requires minimal intervention by a teacher: choice of dates of phases, distribution of peer evaluations to be carried out.

This issue has to be discussed with Output 6 (MOOC ) leaders.

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### **Formative assessment will be used in the MOOC (Output 6)**

During the MOOC, formative assessment according to constructive alignment will be closely developed in line with the learning objectives of the MOOC.

Formative evaluations are part of the learning activity and improve learning if they are accompanied by feedback. This feedbacks can be related to a specific part of the content and/or specific hints.

Some tools, especially automated tools and tools with feedback, can be used in formative evaluation, for example multiple choice questions with feedback and with hints, Matching tests, H5P- type e-assessments.

## 5. Conclusion

The study of the evaluation needs of the OpenVM project made it possible to define the concept of a self-assessment tool for VM competencies through the definition of VM competencies in output O1 and also through research carried out with respect to online competency assessment tools and in particular those tools dealing with transversal competencies. The methodology used to validate the tool with peer review by experts and field tests with students will make the tool more reliable and ergonomic.

For other needs, in particular with output O5 (open credentials) and the OpenVM MOOC developed in O6, appropriate e-evaluation tools are recommended as a result of this study. However it still remains a challenge to implement them in the Hub, and a cross-partnership collaboration with key members of O1, O4, O5 and O6 is necessary in order to align the choice of assessment methods and tools with the overall aims, while addressing the questions of feasibility, scope and sustainability.