Open Virtual Mobility

Output 07.A1.1: Quality Assurance Framework standards

-Final draft -

Outcome 07 Quality Assurance Framework	
Document submission and review information	
Declared due date of deliverable	31 August 2020
Reviewed due date of deliverable	31 August 2020
Actual submission date	First update September 2018 Second update December 2019 Third update August 2020
Organisation name of lead contractor	Beuth University of Applied Sciences Berlin
Revision	Final
Author and reviewer information	
Name of the author	Gemma Tur and Santos Urbina
Affiliation of the author	University of the Balearic Islands
Name of the reviewer	George Ubachs
Affiliation of the reviewer	EADTU

The creation of these resources has been (partially) funded by the ERASMUS+ grant program of the European Union under grant no. **2017-1-DE01-KA203-003494**. *Neither the European Commission nor the project's national funding agency DAAD are responsible for the content or liable for any losses or damage resulting of the use of these resources.*

Imprint

Imprint: This publication is O7 of the Open Virtual Mobility Erasmus+ strategic partnership founded by the European Commission 2017 - 2020 under **2017-1-DE01-KA203-003494,** URL: https://www.openvirtualmobility.eu/

This paper is the final document of milestone 07.A1.1 produced as part of Outcome 07 "Quality Assurance, Dissemination and Sustainability" whose aims is the design of the Quality Assurance Framework by means of a literature review for the theoretical background and a survey for external and internal reviewers to assess the whole QAF strategy.

PDF download

A full-text PDF of this report is available as a free download from:
https://www.openvirtualmobility.eu

Social media

Find us on Twitter: @openVM_erasmus
Give us your feedback on social media with the following hashtag: #openvirtualmobility

Suggested citation

Tur, G., Urbina, S. & Ubachs, G. (2019, December 10). *Open Virtual Mobility. Output 07.A1.1: Quality Assurance Framework. Final draft.* Retrieved from https://www.openvirtualmobility.eu

Corresponding author

Gemma Tur
gemma.tur@uib.es
University of the Balearic Islands
Calvari, 1, 07800 Ibiza
Balearic Islands, Spain

A. Executive summary

The first half of the document presents the theoretical background for the methodological strategy to carry out the design, implementation and assessment of all single elements in the project: the Learning Hub, MOOC, OER, Open Badges, e-assessment, directory skills and matching tool. It defines the main guidelines on which these elements have to be based and that answer to the context of online learning, Open Education and the European Higher Education. Also, the pedagogical underpinning of the OpenVM is argued. The second half of the document is about the strategy design and the self-regulated approach proposed as well as the assessment by a group of internal and external reviewers. In the final part of the document, we present Data collected with the online surveys along with some recommendations for the SRL design, and conclusions about the increasing quality of the MOOC.

B. What are the objectives covered in this paper?

The main objective of this first milestone in Output 7 of the OpenVM project is to design the strategy of the Quality Assurance Framework (QAF) and present the first steps of the strategy.

C. Who is this paper for?

This paper is for anyone involved in E+ projects, MOOCs and in general, online learning in HE institutions and open education. Quality Assurance (QA) might initially be understood as a competence of designers, leaders, policy makers or stakeholders the involvement of all participants at diverse quality levels, but the interrelation of all quality elements and the distributed leadership approach, makes it interesting to wider audiences as everyone can lead and follow different project dimensions. Therefore, this paper may be of interest to a wide variety of target agents:

- Higher Education Educators
- Primary, Secondary and Tertiary student teachers
- Higher Education Students (BA and MA)
- International Offices, Teacher training units/centres
- HE leaders
- Career Service Units
- Researchers and Research Units
- Internship providers
- Open Education Communities
- Policy makers
- e-learning designers
- and other practitioners involved in Open Education, online learning and HE.

D. What topics are addressed in this paper?

There are many topics addressed in this document related to the diverse fields about which the OpenVM is about:

- Quality and Quality Assurance Framework
- Quality Assurance in MOOCs
- Design Based Research
- MOOCs and Online learning in Higher Education
- Open Education
- Self-regulated learning

E. Contributors

Gemma Tur holds a PhD of Educational Technology from the University of the Balearic Islands (UIB), Spain. She works as a Lecturer in the Department of Applied Pedagogy and Educational Psychology of the UIB and collaborates in research in the Educational Technology Group of the same university (GITED- GTE). She is the coordinator of several programs in the Ibiza off-campus centre such as Early Childhood, Primary and Secondary Teacher Education courses and the Open Senior University. She has participated in many international conferences such as the PLE Conference, EDEN, EDUTEC, EDMEDIA and EDULEARN. Her research interests include eportfolios and Personal Learning Environments, social media for learning and reflexive aims, and in general, technology enhanced learning in Teacher Education.

Santos Urbina holds a PhD of Education Sciences from the University of the Balearic Islands (UIB), Spain. He works as a Professor in the Department of Applied Pedagogy and Educational Psychology of UIB and he is a member of Educational Technology Research Group of the same university. During the last 10 years he has been director of the Virtual Campus of the UIB. His preferred fields of research are focused on the design, production and use of didactic media, virtual campuses, technology-enhanced learning environments and the curricular integration of ICT.

George Ubachs is the Managing Director of EADTU, the European Association of Distance Teaching Universities. He is responsible for the development and support of the EADTU network, policies and execution of its goals in online, open and flexible higher education. He is the coordinator of international academic cooperation networks on networked curricula, virtual mobility, QA in online education and on business models for lifelong learning. George Ubachs is the coordinator of the E-xcellence movement on quality assurance in online, open and flexible education and leading the ICDE-UNESCO focal point for ????QA in online education in Europe. He further coordinates the EMPOWERing universities network of a 100 experts representing 12 specific fields of expertise related to online, open and flexible education. As coordinator of these two dedicated networks he works closely with the EUA, ENQA, ESU, ICDE and Unesco.

F. Acknowledgements

The strategy has been assessed by a group of internal and external reviewers, whose insights and help have been of immense importance in improving the strategy design. Special thanks to Ilona Buchem, whose contribution has been most helpful in the design of the whole quality strategy.

1. Aims and Scope

In this draft, the literature background regarding DBR and international QA frameworks on a wide range of themes is presented. Based on all these documents, a QA framework for the OpenVM project is presented. The whole QA strategy is assessed by internal and external experts and diverse moments of assessment have been carried out in order to improve each step until the final products and outcomes.

2. Background and rationale (State of the Art)

2.1 Introduction

The Quality Assurance Framework (QAF) is one of the fundamental aspects for the success of the Open Virtual Mobility. Quality is defined by Conole (2013, p.3) as 'the standard of something as measured against other things of a similar kind; the degree of excellence of something: quality of life'. Conole also takes from the UK Quality Assurance Agency the description of the QAF as 'the means through which an institution ensures and confirms that the conditions are in place for students to achieve the standards set by it or by another awarding body'.

2.2. Design Based Research

The OpenVM QAF is based on the Design Based Research (DBR) methodology, first described by Reeves (2006), who conceptualised it as a cyclic process for a didactic product creation (in its wider definition). The model is developed as a process of diverse stages, commonly known by the acronym ADDIE: Analysis, Design, Development, Implementation, Evaluation. A reduced version (McKenney & Visscher-Voerman, 2013) is collected by Mckenney & Reeves (2012), indicating that it is a synthesis of the existing approaches of design based research. The suggested scheme is the following:

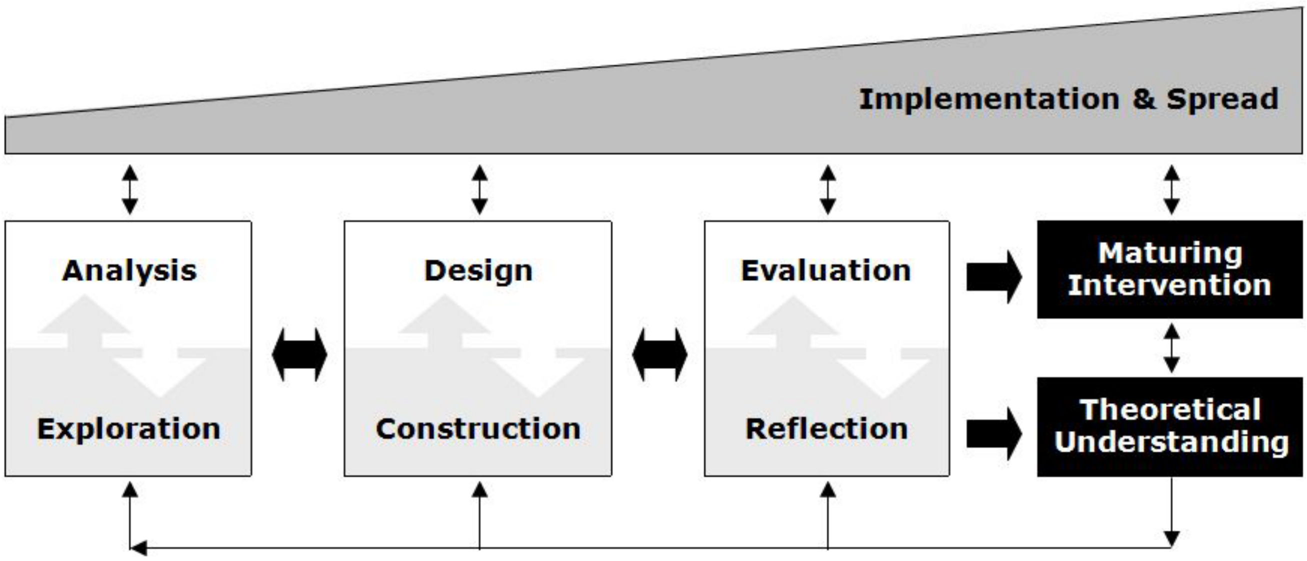

Figure 1: Generic model for design research in education (McKenney & Reeves, 2012)

Salinas (2012) remarks that the DBR model has had an important uptake in Technology Enhanced Learning research as it is aimed at creating knowledge on the design, implementation and evaluation of the educational experience. It aspires to explore problems in real contexts requiring a solution in a particular context (de Benito & Salinas, 2016). Moreover, the DBR model has been argued to be suitable for the study of innovation, for which the contrast with the theoretical background and action observation in successive iterations is the strategy for knowledge creation (Brown, 1992; de Benito & Salinas, 2016; Shavelson, Phillips, Towne & Feuer, 2003).

Following the Design Based Research model the development each Output in Open Virtual Mobility can be carried out in four stages, while at the same time answering to the need to explore the production of innovation and can guarantee the quality of the product (figure 2). In attachment 1 a draft of the table in greater detail of these phases for each Output is presented.

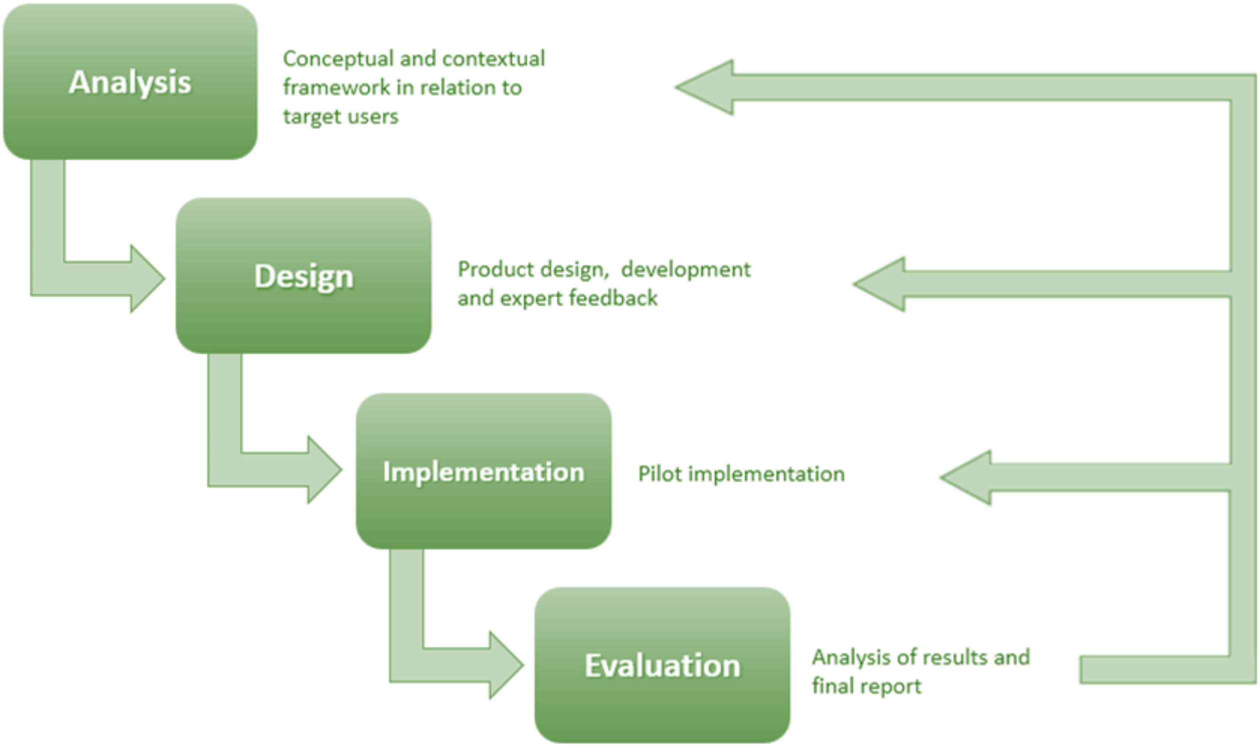

Figure 2. Design-Based Research for the Qualitative Assurance Framework in the OpenVM project

2.3. International frameworks for the OpenVM project

The QA for the OpenVM project included several international and specific frameworks (see figure 3) from which the various lines of work in the QA are developed, in particular the first: the ENQA recommendations for HE institutions (2009) and the updated version ESG (2015) by ENQA ESU, EUA and EURASHE, the Updating Quality Assessment for E-learning (2016), the OpenEdu Framework (2016), and the Virtual Mobility Matrix by EADTU (2018). Also the work by Jansen, Rosewell and Kear (2016) is considered in the quality assurance of the MOOC.

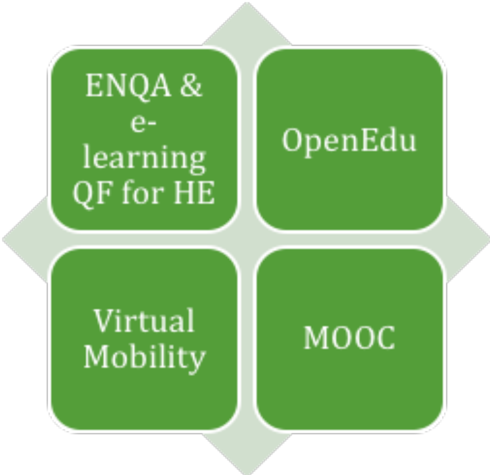

Figure 3. International frameworks for the OpenVM E+ project

Both the framework and the strategy assessment introduced in sections below were presented at the Edulearn Conference in Palma in July 2018 (Buchem, Tur & Urbina, 2018). Following ENQA and ESG recommendations for Higher Education institutions, the standards for internal and external QA have been observed, including some procedures and guidelines for each (ENQA, 2009, pp. 16-23; ESU, EUA, & EURASHE, 2015, pp. 11-20). Some standards are considered for the project as whole, while others are applied in particular to the context of the MOOC developed by the project.

Standards and brief guidelines for internal QA:

- Policy for quality assurance. The project is committed to a culture of quality, with a public strategy in constant improvement.
- Design and approval of programme. The project has mechanisms to ensure that it is well designed so as to be able to meet overall aims.
- Student-centred learning, teaching and assessment. The MOOC will be designed to respect and attend student diversity and the need to promote flexible learning opportunities and autonomous learning. Criteria for assessment and the means of implementation will be made available in advance.
- Student admission, progression, recognition and certification. The MOOC program will be committed to following the admission and progression of students and specific efforts on Open Badges and Open Credentials will be made in order to recognise and certificate learning.
- Teaching staff. The project will involve teaching staff for the MOOC who are qualified and competent, whether because they are involved in design and pilot phases or because their recruitment will be based on their skills and previous experience.
- Learning resources and student support. The MOOC is based on OER, which must be available and adequate for students.
- Information management. Mechanisms and instruments will be developed to gather and explore relevant information and to follow students' achievement and satisfaction.
- Public information. Both the project and the MOOC will publish accurate and updated information about their work and program.

- On-going monitoring and periodic review programme. The DBR in which the project is rooted specifically helps to guarantee the permanent improvement of the program.
- Cyclical external quality assurance. External reviewers have been included in the whole QA framework as a whole.

Standards and guidelines for external QA, in particular applied in the context of the OpenVM MOOC:
- Consideration of internal quality assurance procedures. External QA will be able to rely on internal QA.
- Designing methodologies fit for purpose. The external QA processes will be carried out to guarantee fitness to their own aims: experts with appropriate skills, special training and including experts within the project, student participation and the usage of the review model including diverse steps from self-evaluation to the published report.
- Implementation processes. The project is committed to facilitating external QA by providing self-assessment, written material and consistent follow-up.
- Peer-review experts. Students will be included in the team for external QA.
- Criteria for outcomes. Criteria will be published and implemented rigorously.
- Reporting. There will be clear reports, including key findings, conclusions and recommendations.
- Complaints and appeals. The project will be designed so as to enable participants to raise issues of concern and dissatisfaction.

The QA for e-learning framework (Ubach & Konings, 2016) is also important for the OpenVM project since virtuality is at the core of the MOOC learning design. This framework supports the decision-making process in diverse areas: strategic policy, curriculum design, knowledge and skills, course design and delivery and, staff and student support.

As a strategic management decision, the OpenVM will have to consider the role of learning analytics to gather and assess data from Learning Hub, the MOOC and all single elements. As for the curriculum design, there are some relevant aspects to consider: flexibility, time and place to maximise flexibility, modularity, academic community development, transferable skills, and assessment procedures (both formative and summative). The course design will specifically include the educational methodology and the OER creation. The course delivery will consider the role of technology, the technical infrastructure and the specific relationship between the Learning Hub and the MOOC platforms. Support will be planned for staff and students regarding technology and educational aspects and also considering their different roles, and for example, also including the challenge of recognition for lecturers' career development.

The MOOC design is concerned about the familiar problem of the low completion rate, and so there are some quality criteria to specifically bear in mind. Based on Jansen, Rosewell and Kear (2016) these are the four areas in which the QA framework for the MOOC will be designed:
- Quality from the learners' point of view, which is about engaging a wide range of student rationale, backgrounds and abilities.

- Quality connected to the pedagogical framework of the MOOC. Some characteristics have been observed in this area concerning autonomy, diversity, openness and interactivity. In this regard, the learning design will be aimed at promoting SRL.
- Quality related to the input elements, regarding the instructional design, content and resources, technology and teachers.
- Quality based on outcome results, considering that low completion and certification are not necessarily due to poor quality and thus, more metrics and data are needed.

Furthermore, the area in which the project and the MOOC are developed, Open Virtual Mobility, leads us to the need to include the intrinsic characteristics of open education in the Quality Assurance Framework. For this aim, the OpenVM project has included the OpenEdu framework by the European Commission (Inamorato dos Santos, Punie & Castaño-Muñoz, 2016) in the Quality Assurance Framework so as to guarantee the quality assurance of single elements such as OER and the MOOC itself.

The OpenEdu Framework consists of ten dimensions, which describe "aspects or features of a situation" and "consist of different courses of action, focusing on a given area, which interact and together shape the practices of open education" (p. 24). There are two types: core and transversal dimensions. The former are the more common in open practices and answer the question of "what" when opening up educational implementations: access, content, pedagogy, recognition, collaboration and research. The latter answer to the "how" of opening up practices, and are in permanent interaction with all the rest: leadership, strategy, quality and technology.

The core dimensions can be briefly summarised as follows (pp.25-27):
- Access. The project understands opening access based on its three levels: access to programme, to courses and to educational content.
- Content. OER will be created with a great variety of formats, and will present a varying degree of granularity, from the single object for a piece of content to the full course (MOOC).
- Pedagogy. The learning design will explore a wide variety of practice with digital tools, making the rationale available both for the learning and assessment design. It will foster students' self-regulated learning (SRL) skills. The Learning Hub and all the elements will be assessed in terms of their learning design towards SRL.
- Recognition. The project is concerned with the recognition of credentials and a particular focus on credentialisation with Open Badges will be developed.
- Collaboration. Collaboration is at the heart of Virtual Mobility skills, so the MOOC is designed to promote collaboration among students, as well as teachers and other institutional leaders and stakeholders involved. Therefore, it will include activities to co-create and exchange OER and other open practices, foster the recognition of learning and promote intercultural values.
- Research. The research linked to the design, implementation and assessment of the MOOC and all single components is carried out under the same umbrella of openness, promoting collaboration among partners and generating data for further collaborative work.

The transversal dimensions are described in the following way (pp. 27- 29):

- Strategy. The strategy for the entire project is based on open practices, both for each individual element and the whole MOOC and for the related research design.
- Technology. Technological solutions answer to the challenge of open educational practices and their design is committed to the OpenEdu dimensions and the needs that derive from their interrelation.
- Quality. Quality refers to the convergence of five concepts as highlighted by the JRC IPTS report (2014) in relation to open education: efficacy (content fitness for purpose), impact (the effectiveness of an element), availability (ease-of-access and transparency), accuracy (no mistakes) and excellence (quality-potential).
- Leadership. The project is aimed at the promotion of Open Virtual Mobility across Higher Education institutions in Europe.

To sum up, the OpenVM quality assurance framework follows the following recommendations (pp. 30-31):

- A holistic strategy for opening up education
- Making the open strategy the main aim for the overall project strategy
- Promoting intra, inter and cross-border collaborations, as it is also the nature of virtual mobility
- Exploring new practices
- The constant revision of practices at all levels

The Virtual Mobility Matrix by EADTU (Ubachs & Hederikx, 2018) is the specific document on VM on which the QA for the OpenVM Eramus+ project is based. In this regard, the project and MOOC design are aimed at working on the skills needed when participating in an Open Virtual Mobility initiative, such as intercultural skills and international digital communicative abilities. Furthermore, the Learning Hub is created to supplement the lack of lists of available courses and programmes and other supports such as learning agreements.

Pedagogy is at the heart of the OpenVM since all the frameworks in which the OpenVM is rooted address diverse pedagogical elements as a central element from different approaches, such as learning design or the role of content, assessment and technology, among others. The following figure summarizes the pedagogical perspective from the diverse frameworks underpinning the OpenVM Learning Hub and all the elements: the student-centred design and the focus on public assessment regarding ENQUA, ESG and e-learning recommendations; the learning design for autonomous learning regarding the pedagogical lessons learnt from the MOOC approach; and the, need for a wide range of OER , the open characteristic for collaboration and the technological design under the open conditions.

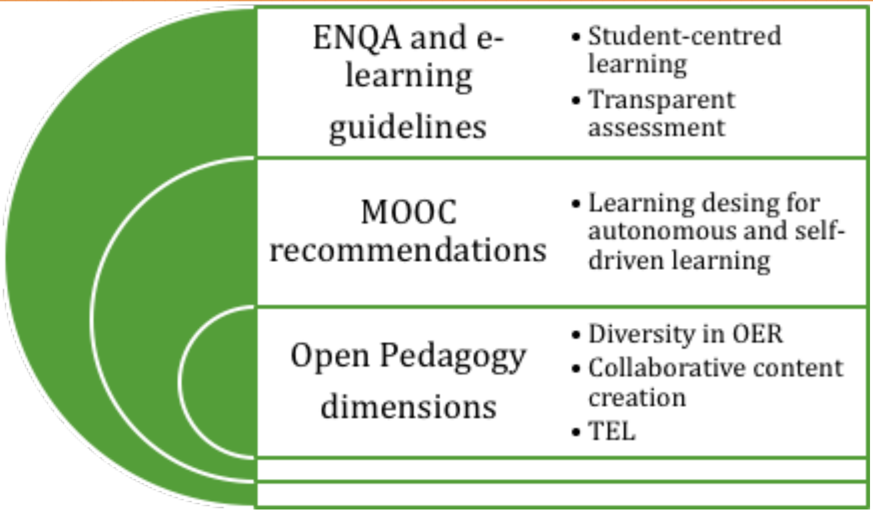

Figure 4. Pedagogical approaches from the diverse frameworks ot the OpenVM E+ project

2.4. The SRL approach

The quality of the pedagogical approach is based on addressing the learning design from the self-regulated learning framework, as argued in the conference paper presented at the Eden Research Workshop in October 2018 (Tur, Urbina, Firssova, Kamakshi & Buchem, in press). There are many models, but the one which has received most attention in Technology Enhanced Learning – see for example, the very well-known model by Dabbagh and Kitsantas (2012)- is the cycle by Zimmerman (2002). In this framework, self-regulated learning has three main phases, in which cognitive skills can be described in two main types for each:

- Forethought phase: task analysis and self- motivation cognitive skills, which are mainly about the preparation of learning.
- Performance phase: self-control and self-observation, which, in general, are about the monitoring of learning.
- Self-reflection phase: self-judgment and self-reaction, which are mainly about the self-assessment of learning.

The model is described as a cycle, which means that they are mainly consecutive - although some tasks can also be carried out in parallel - and that the last one can impact a new cycle. The following figure represents the cycle:

Figure 5. The self-regulated learning cycle by Zimmerman (2002)

Based on this cycle, the elements and strategies of the Learning Hub have been designed in order to answer to the needs of a SRL approach. The following figure presents the relationship between these components and the SRL phases from a theoretical perspective for the initial development of the products:

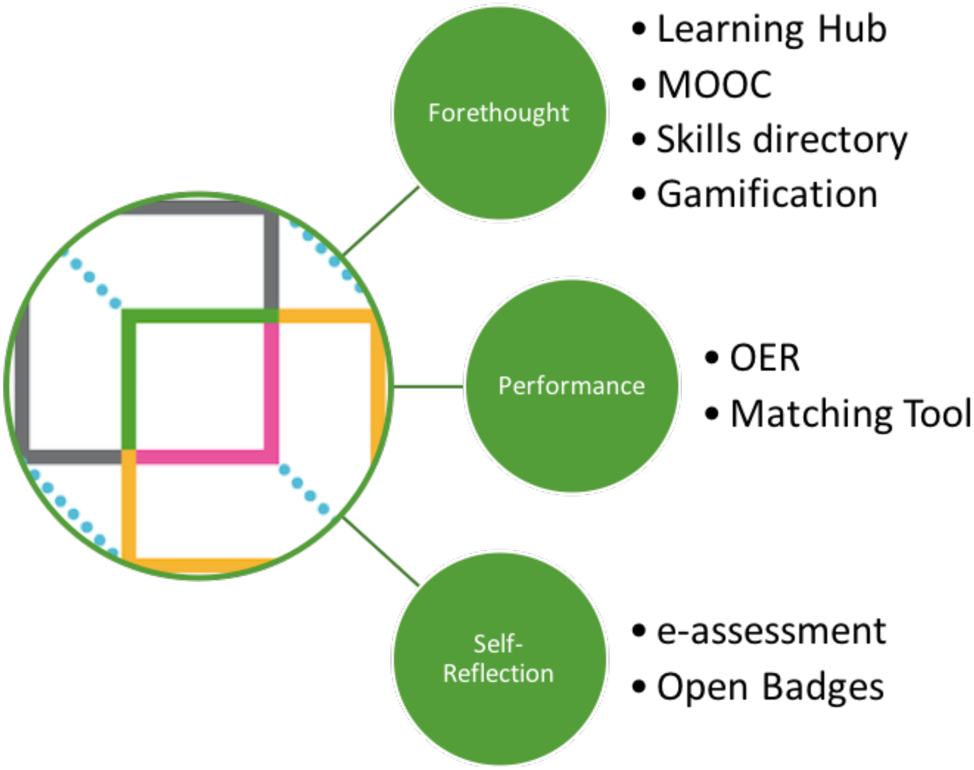

Figure 6. The self-regulated learning cycle applied to the OpenVM E+ project (first edition)

3. Methodology

3.1. Aims

The design of the QA framework in the OpenVM is divided into the following three overall aims:

(1) QA standards for the VM Learning Hub and its components (such as collaborative learning activities for OER co-design, algorithmic mechanism for group formation in the VM MOOC, e-assessment and recognition of VM skills with open credentials such as Open Badges and Blockcerts);

(2) The design of a quality assurance process for linking and integrating quality standards to all stages of development of intellectual outputs, e.g. by applying effective design and development methodology such as agile quality-driven development, peer-reviews of iterations and final outcomes as well as quality implementation process and corrective actions.

(3) QA instruments for quality assessment of teamwork (such as bi-monthly assessments) based on a set of qualitative and quantitative radiators (indicators) such as mood, agility, congruence and velocity.

At this current state of the development of the OpenVM project, the pedagogical learning design is also addressed.

3.2. OpenVM QAF strategy

Based on the previous international frameworks, diverse tasks and instruments have been included in the QA for the OpenVM Erasmus+ project, which will be designed, implemented and assessed in an iterative cycle following the DBR model. The following table presents the three aims with their tasks and instrument planning:

AIMS	INSTRUMENTS
(1)	Design-Based Research cycle for the design of single elements in the Learning Hub (Smart Tools, E-Assessment, Open Credentials, OER and OpenVM MOOC): 1) Assessment by partner (internal). 2) After improvement, 2nd assessment by external experts. 3) And after improvement again, a 3rd assessment by pilot users 4) User-testing assessment 5) Learning analytics
(2)	Design-Based Research cycle for the construction of a peer-review process: 1) Assessment by partner (internal). 2) After improvement, 2nd assessment by external experts. 3) And after improvement again, a 3rd assessment by pilot users Design-Based Research cycle for the construction of the assessment of final outcomes, based on E+ assessment guidelines: 4) Assessment by partner (internal). 5) After improvement, 2nd assessment by external experts. 6) And after improvement again, a 3rd assessment by pilot users
(3)	Design-Based Research cycle for the construction of the survey: 1) Assessment by partner (internal). 2) After improvement, 2nd assessment by external experts. 3) And after improvement again, a 3rd assessment by pilot users

Table 1. Quality Assurance framework for the OpenVM project: aims and instruments planning

3.3 Instruments

The instrument for the QAF strategy
The instrument used by reviewers was an online version of the survey and is presented in the following tables (Table 2, 3 and 4):

(1) **QA standards for the VM Learning Hub and its components (such as collaborative learning activities for OER co-design, algorithmic mechanism for group formation in the VM MOOC, e-assessment and recognition of VM skills with open credentials such as Open Badges and Blockcerts);**			
A. Design-Based Research cycle for the design of single elements in the Learning Hub (Smart Tools, E-Assessment, Open Credentials, OER and OpenVM MOOC): design, prototype and cyclic editions after pilot implementation. Assessments will be based on OpenEdu Framework (2016) and the Updating Quality Assessment for E-learning (2016) for all these elements:			
Assessment by partner (internal).	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After improvement 2nd assessment by external experts.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
And after improvement again a 3rd assessment by users applying in the pilot.	Relevant	Appropriate	Feasible
	1 2 3 45	1 2 3 4 5	1 2 3 4 5
User-testing assessment	Relevant	Appropriate	Feasible

	1 2 3 45	1 2 3 4 5	1 2 3 4 5
Learning analytics	Relevant	Appropriate	Feasible
	1 2 3 45	1 2 3 4 5	1 2 3 4 5
(2) The design of quality assurance process for linking and integrating quality standards to all stages of development of intellectual outputs, e.g. by applying effective design and development methodology such as quality-driven agile development, peer-reviews of iterations and final outcomes as well as quality implementation process and corrective actions,			
A. Design-Based Research cycle for the construction of a peer-review process:			
Assessment by partner (internal).	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After improvement 2nd assessment by external experts.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
And after improvement again a 3rd assessment by users applying in the pilot.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
B. Design-Based Research cycle for the construction of the assessment of final outcomes, based on E+ assessment guidelines			

Assessment by partner (internal).	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After improvement 2nd assessment by external experts.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
And after improvement again a 3rd assessment by users applying in the pilot.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
(3) **QA instruments for quality assessment of teamwork (such as bi-monthly assessments) based on a set of qualitative and quantitative radiators (indicators) such as mood, agility, congruence and velocity.**			
A. Design-Based Research cycle for the construction of the survey:			
Assessment by partner (internal).	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
After improvement 2nd assessment by external experts.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

And after improvement again a 3rd assessment by users applying in the pilot.	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Table 2. Dimensions for each aim in the OpenVM QAF strategy.

Final open questions
General structure of the QA strategy

How do you rate the internal coherence of the different tasks and instruments planned in the QA strategy?	1 very incoherent 2 3 4 5 very coherent
Why?	

Table 3. Final open question on the general structure of the OpenVM QAF strategy

For each aim

Would you recommend any other task or instrument for each aim? Why?			
Could you assess your new task or instrument with the same criteria: Relevant, Appropriate and Feasible?			
Task or instrument …..	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Task or instrument…	Relevant	Appropriate	Feasible
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Table 4. Additional tasks or aims by reviewers.

The instrument for the SRL analysis
The inclusion of each element is justified from its potential for at least one main phase of the SRL cycle, as can be observed from previous sections. However, the analysis has been carried out considering all phases in order to have a wider perspective of the learning design for SRL.

The instrument was answered by seven internal partners of the OpenVM project. It included the eight elements or strategies of the project and the six sub-phases of the SRL cycle by Zimmerman (2002). The survey was built as a Likert scale and partners had to answer in terms of agreement, from total disagreement (1 point) to total agreement (5 points). The complete table is presented in attachment 3 and below there is an example from the first question regarding the Learning Hub.

		1	2	3	4	5
Learning Hub						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					

Table 5. Example of the instrument. First question regarding the Learning Hub.

4. Results

4.1. On the QAF strategy

To assess the QA framework designed for the OpenVM Erasmus+ project, an online survey is built and answered by a total of seven external and internal experts. Based on the guide by the European Commission (2018) and those by Escobar-Pérez and Cuervo-Martínez (2008), the validation of this instrument includes three general dimensions of items and criteria, grouping together different ideas or concepts of the same semantic network: relevance (its essential nature or importance), appropriateness (if it is a consubstantial part of the conceptual network); and, feasibility (its possibilities of implementation). So, the reviewers give their opinion on the extent to which the task or instrument is relevant, appropriate and feasible to fulfil the aim. The survey, which is presented as a likert-scale, includes 5 levels of agreement ranging from total disagreement (1) to total agreement, and some final open questions regarding the overall coherence of the strategy and the possible addition of any other task or instrument, for which they have to add their assessment in the three same dimensions.

Selected data from on online survey assessing fitness-for-purpose of the OpenVM QA framework is presented below. As an example of the general results, results from the first survey section in the three dimensions are presented in the following three figures (figures 7 to 9). It can be observed that reviewers answer with a general agreement about the first cycle of review by internal partners, the least agreement for the external partners' reviews and again a general agreement for the review by users.

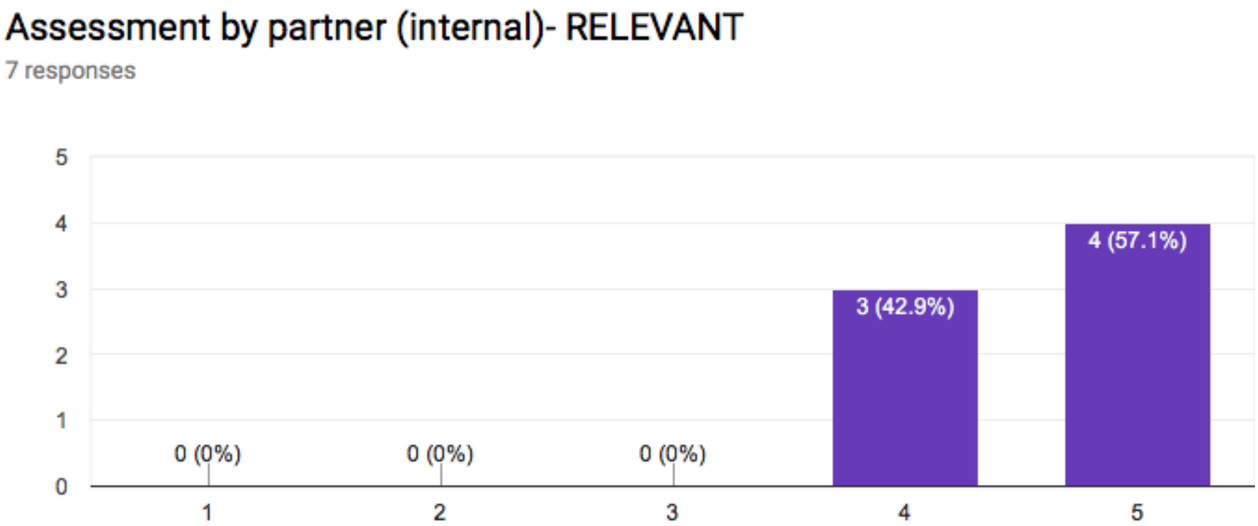

Figure 7. Section 1. Question 1. Dimension "relevant".

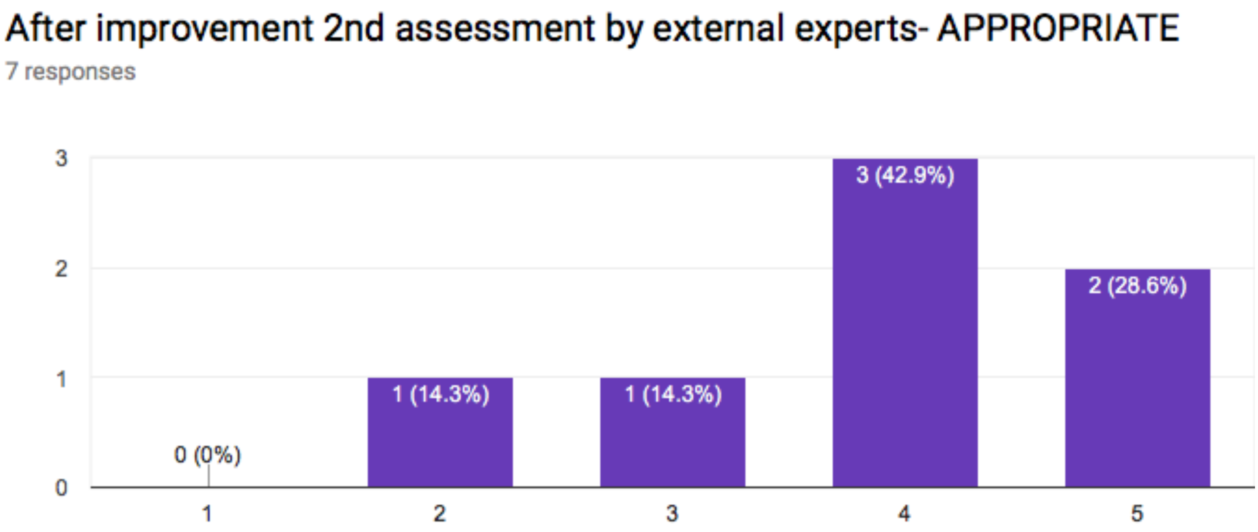

Figure 8. Section 1. Question 2. Dimension "Appropriate"

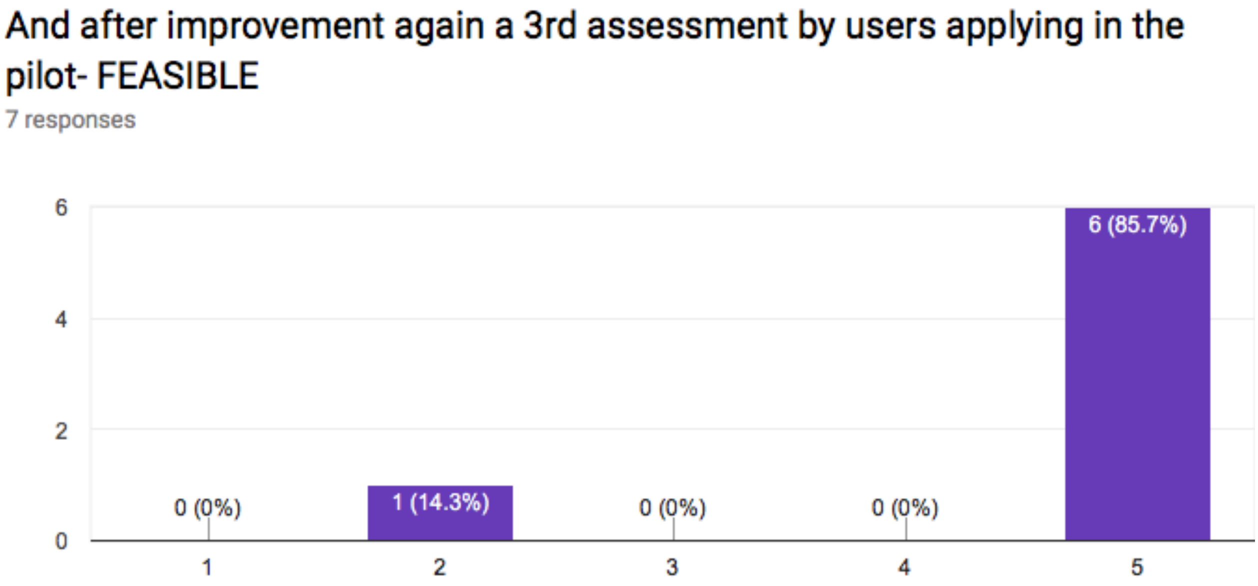

Figure 9. Section 1. Question 3. Dimension "Feasible".

4.2 On the SRL design

The SRL design is also put into practice by means of a Design Based Research approach, thus three moments of assessment are planned in order to design, develop and implement a high-quality product. The first quality assessment of the SRL takes place during the theoretical development, when the

MOOC is designed through the analysis of context, target audience and learning aims and outcomes, in September 2018. The second round of assessment takes places in May 2019, which is just after the first development of the product, before the pilot phase and along with the pre-pilot that was tried out with students in Beuth University during their spring teaching term.

4.2.1. First quality assessment of the SRL design

The results obtained as a first assessment of the overall learning design for SRL aims show some potentials and challenges that will need to be addressed in further stages of development. All elements have been assessed as advantageous for some phases of the SRL cycle to a certain extent, which in turn means that there are also some drawbacks in most of them. As an example of the unbalanced results, only a certain number of results are presented at this point in the project, and only one element per phase is shown (figures from 10 to 12). Figure 10 shows the results for the Learning Hub and it can be seen that it receives a high level of agreement for the task analysis phase, the self-reflection, self-observation and self-judgment. However, there are also some lower results for that of self-motivation and self-control. Figure 11 shows the results for the OER which are the most contradictory as it gets the best results for the task-analysis, and however, the worst for both the tasks in the performance phase (self-control and self-observation). The third figure (figure 12) on this research shows the agreement of internal reviewers on the value of Open Badges for the self-reflection phase, and it can be observed that there is a high level of agreement among them on the potential of Open Badges for diverse phases of the SRL cycle. However, it seems contradictory that the highest levels of agreements achieved are about the performance phase whereas in the self-reflection phase they are not as high.

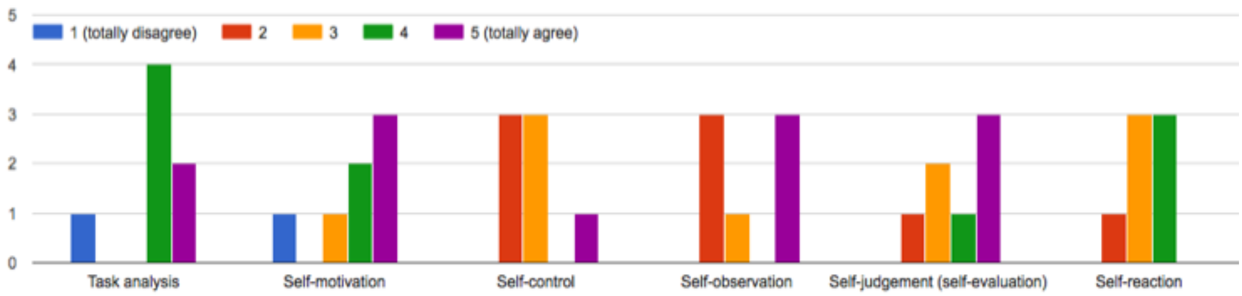

Figure 10. Agreement on the statement: "The OpenVM Learning Hub can help develop the following SRL skills …"

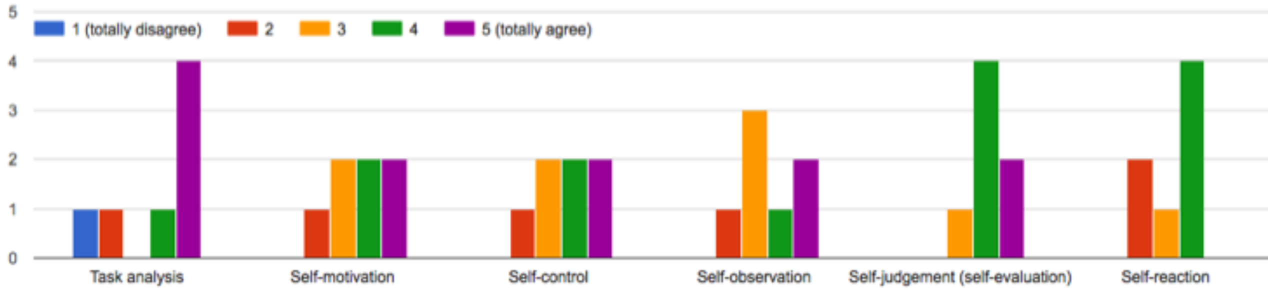

Figure 11. Agreement on the statement: “OER can help develop the following SRL skills …”

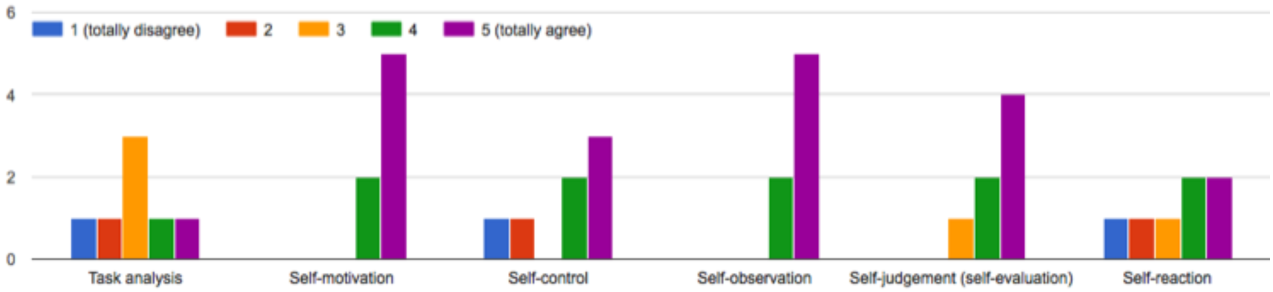

Figure 12. Agreement on the statement: “Open Badges can help develop the following SRL skills …”

4.2.2. Second quality assessment of the SRL design

Based on the development presented above, after the first design and implementation, an internal review was carried out and the results obtained allowed us to observe a potential for SRL in more elements and approaches than those initially planned. In the following table, we present and summarise the alignments that were observed:

SRL phases	OpenVM elements	SRL sub-phases	OpenVM elements	SRL sub-phases
Forethought	Learning Hub	Task analysis	OER	Task analysis
	MOOC	Task analysis	Gamification	Task-analysis
		Self-motivation		Self-motivation
	Skills directory	Task analysis	Open Badges	Self-motivation
Performance	OER	Self-control	Skills directory	Self-control
		Self-motivation		
	Gamification	Self-control	MOOC	Self-observation
		Self-observation		
	Matching tool	Self-control	e-Assessment	Self-control

				Self-observation
		Self-observation		
Self-reflection	e-Assessment	Self-judgement	Skills directory	Self-judgment
		Self-reaction		Self-reaction
	Open Badges	Self-judgement	Gamification	Self-judgment
		Self-reaction		Self-reaction
			MOOC	Self-judgment
				Self-reaction
			OER	Self-judgment
				Self-reaction

Table 6. First iteration. Results. Planned and unplanned alignments

METHODOLOGY

Following the OpenVM quality assurance approach based on the cyclic iterative process of improvement, a new internal review was carried out. From a descriptive approach, based on the collection of quantitative data through a survey, a new assessment of the alignment of SRL with the OpenVM elements was explored. The survey includes six of the eight elements that were theoretically explored in the first round. The last three elements are deleted from the new edition, as in the pilot designs both the matching tool and the skill directory have yet to be implemented and the gamification only partially developed. The survey was answered by seven reviewers again from the diverse partners participating in the project in May 2019.

RESULTS

The six sub-phases are suggested in relation to the Learning Hub, the MOOC, the OER, the Open Badges and the e-assessment (figures 13 to 17).

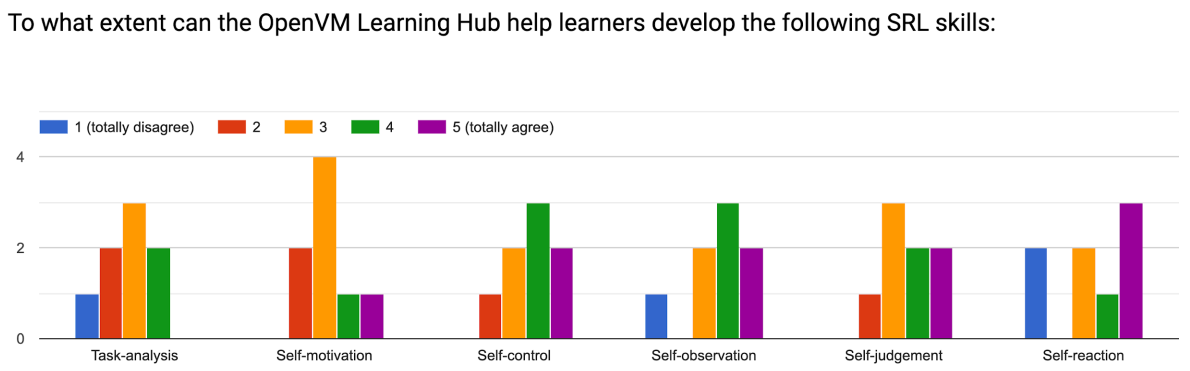

Figure 13. OpenVM Learning Hub and SRL skills

In terms of SRL, the Learning Hub seems to be more efficient for the performance (a total of 5 answers in agreement options) and self-reflection phases (a total of 4 reviewers in agreement options).

To what extent can OpenVM MOOCs help learners develop the following SRL skills:

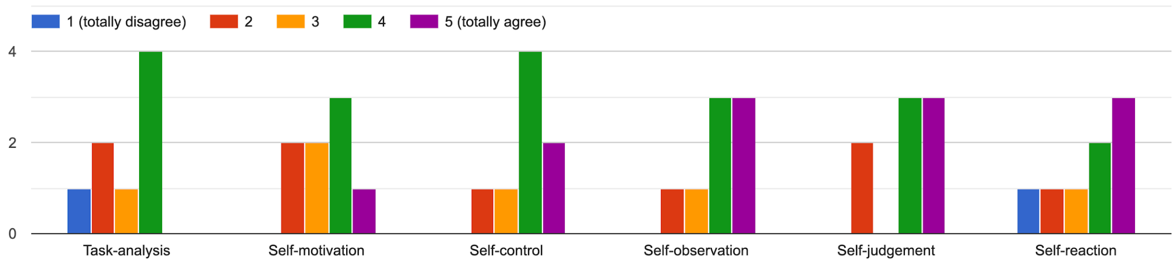

Figure 14. OpenVM MOOC and SRL skills

The MOOC design seems to be well aligned with most of the phases of the SRL. Thus, a total of 5 answers in agreement are given to the potential of the MOOC for task analysis, self-control, and self-reaction and, 6 answers for the self-observation and self-judgment.

To what extent can OpenVM OERs help learners develop the following SRL skills:

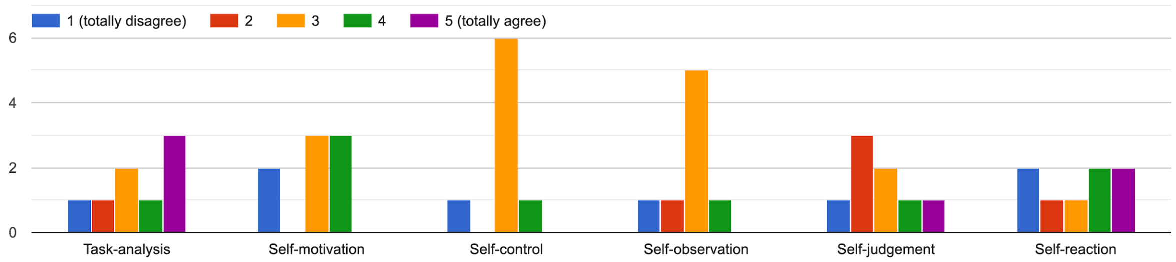

Figure 15. OpenVM OERs and SRL skills

The OER elements are those receiving the worst results with balance results between positive and negative options, and a quite relevant high number of answers in the neutral option (number 3). Only self- reaction and task-analysis processes obtain four answers in agreement.

To what extent can OpenVM Credentials help learners develop the following SRL skills:

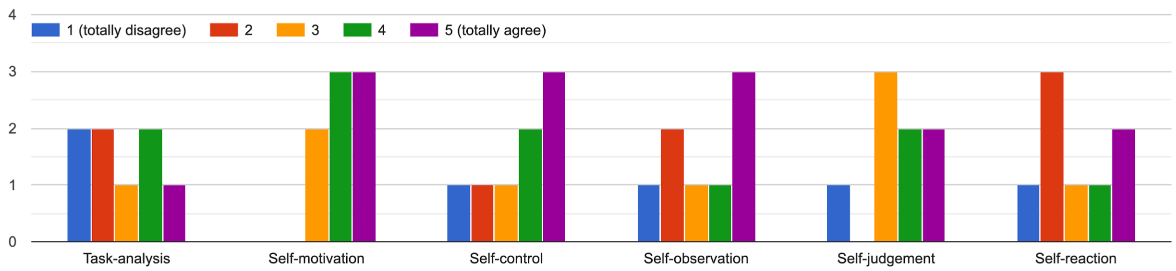

Figure 16. OpenVM Credentials and SRL skills

Open Badges seem to be validated with positive answers by internal reviewers in most phases. In general, most elements obtain a relevant numbers of answers in agreement: 5 for the self-motivation and self-control phases, 4 answers for the task-analysis and self-observation and 3 answers for the self-judgment and self-reaction phases. However, the self-reflection phase, which was theoretically assigned to this element, receives a lower number of answers in agreement than the other phases.

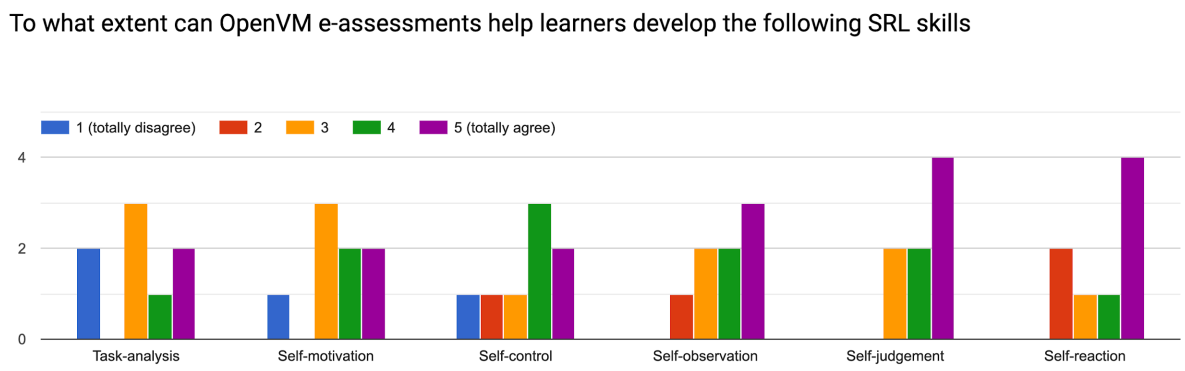

Figure 17. OpenVM e-assessment and SRL skills

The e-assessment is clearly validated in the phases for which it was initially designed. So, automated assessment receives 5 answers in agreement for the self-reaction phase. And it also achieves 4 answers in agreement for the self-judgment, self-control and self-observation phases. The alignment with these two last phases mentioned could mean that e-assessment also emerges as a learning strategy for the learning performance.

In the following tables, we present a Comparative of first and second survey by internal reviewers.

		First survey (n=7)		Second survey (n=7)	
		Disagreement	Agreement	Disagreement	Agreement
Learning Hub	Forethought: task analysis	1	6	3	2
	Forethought: self-motivation	1	5	5	2
	Performance: self-control	3	1	1	5
	Performance: self-observation	3	3	1	5
	Self-reflection: self-judgement	1	4	1	4
	Self-reflection: self-reaction	1	3	2	3

Table 7. Assessment of OpenVM elements by internal reviewers. Learning Hub

After the first design, development and piloting implementation, the Learning Hub emerges as a powerful resource for the meta-cognitive tasks of the performance phase. Also, it should be highlighted that for most reviewers the Hub could be useful for the reflective phase whereas the forethought phase is the least validated.

		First survey (n=7)		Second survey (n=7)	
		Disagreement	Agreement	Disagreement	Agreement
MOOC	Forethought: task analysis	0	6	3	3
	Forethought: self-motivation	0	5	2	3
	Performance: self-control	2	2	1	5
	Performance: self-observation	1	2	1	6
	Self-reflection: self-judgment	1	6	1	5
	Self-reflection: self-reaction	2	5	2	5

Table 8. Assessment of OpenVM elements by internal reviewers. MOOC

The MOOC design is validated for the performance stage with most reviewers answering in agreement after the first design. Likewise, it is also validated for the self-reflection stage whereas the development carried out seems not to validate the initial alignment with the forethought phase.

		First survey (n=7)		Second survey (n=7)	
		Disagreement	Agreement	Disagreement	Agreement
OER	Forethought: task analysis	2	5	1	4
	Forethought: self-motivation	1	4	1	2
	Performance: self-control	1	4	1	0
	Performance: self-observation	1	6	2	1
	Self-reflection: self-judgment	0	6	3	2
	Self-reflection: self-reaction	2	4	3	3

Table 9. Assessment of OpenVM elements by internal reviewers. OER

The OER elements are the ones which seem more challenging after the first pilot design, development and implementation. The way OER have been included in the MOOC design does not seem to be validated by internal reviewers in terms of SRL aims.

		First survey (n=7)		Second survey (n=7)	
		Disagreement	Agreement	Disagreement	Agreement
Open Badges	Forethought: task analysis	2	2	3	3
	Forethought: self-motivation	0	7	0	5
	Performance: self-control	2	5	1	5

	Performance: self-observation	0	7	1	4
	Self-reflection: self-judgment	0	6	1	3
	Self-reflection: self-reaction	2	4	3	3

Table 10. Assessment of OpenVM elements by internal reviewers. Open Badges

The results of the second survey show both challenges and potential for the usage of Open Badges for SRL aims in the OpenVM MOOC. First of all, it seems striking that the way in which the Open Badges have been included does not support the self-reflection phase for a large percentage of reviewers whereas, however, most of them do support the forethought phase in terms of self-motivation beliefs and the meta-cognitive tasks involved in both the sub-process of the performance stage.

		First survey (n=7)		Second survey (n=7)	
		Disagreement	Agreement	Disagreement	Agreement
e-Assessment	Forethought: task analysis	1	3	2	2
	Forethought: self-motivation	1	5	1	3
	Performance: self-control	0	6	2	4
	Performance: self-observation	1	6	1	5
	Self-reflection: self-judgment	0	7	4	6
	Self-reflection: self-reaction	1	5	2	4

Table 11. Assessment of OpenVM elements by internal reviewers. e-Assessment

The e-assessment tasks that have been designed, developed and implemented in first MOOC pilots seem to have been validated in the second survey round for the self-judgment sub-phase of the self-reflection phase for which they were initially planned, whereas the self-reaction receives lower agreement than in the first round of assessment. Also, it can be highlighted that they seem to be useful in terms of self-control and self-observation meta-cognitive tasks (performance phase).

4.2.3 Improvement of the SRL design

After the surveys and the pre-pilot implementation, the following recommendations were given to RomaTre team as leaders of Ouput 6 and developers of the MOOC:

Aspect	Comment in relation to SRL MOOC design
Introducing surveys	- In general, I feel there are two ways of presenting the quizzes in each miniMOOC. In the SRL and Intercultural skills, the questions are added after each OER whereas in others, like in the collaborative one, the questions are all added in one quiz at the end of OER. Also, in other MOOCs, like in the Media and Digital one, little quizzes are listed under the list of OER. I presume that this would not

	represent a very big problem but maybe I think it would be better to have a consistent design, to help students recognise the content and the assessment more easily.
Introducing OER	I have seen there are different ways of introducing text-based OER. On some occasions, the webpage is linked externally, in others the text is just copied in the same site, and in others, the pdf is presented in a framework (or window). I feel these two last options are better than the first, as I think we had even commented in Heerlen that students reported it was confusing to go out from the pages of the miniMOOC. But, in the case of the text copied in the same site of the miniMOOC, I would suggest adding a different colour as a background so it can be differentiated easily, and it has a kind of similar design to the pdf in a framework in the same site.
Introducing visuals	In general, I think I would add some new prompts in terms of SRL based on visuals … In general, I think your visuals from your document, could be adapted (maybe more colourful) : https://www.openvirtualmobility.eu/wp-content/uploads/2018/12/O6-A2-Virtual-Mobility-MOOC.pdf Just as the Open Badge visual is added in the upper right corner of the page, to indicate for which level of the MOOC the task is aimed at, I would add below, a visual to show the task position in the miniMOOC itself. So I suppose it could be done easily in all miniMOOCs with a standard image… A diagram showing the path in the MOOC itself and highlighting exactly where the learner is at that moment could be helpful in terms of SRL strategies
Hints and prompts for time management	Also, to help students manage their time and plan their learning strategies, it could be very useful to add an initial diagram or information about the number of OER and if they are video or text -based. The cognitive strategies for audiovisuals or texts may not be the same and knowing if one has to listen or to read is helpful information in terms of SRL
Visuals as introductory elements	Visuals to highlight OER and quizzes and e-portfolio tasks. In general, I think we should highlight the presence of these elements by adding attractive icons Another option would be to add a visual for the quizzes with the number of questions for each… Also.. some visuals at the end of a each sub/mini MOOC.. something like.. What to do next? New paths for different interests or related levels...
Collaborative Learning MOOC	- In the Collaborative Learning MOOC, advanced level: a similar task with e-portfolio and peer assessment should be added, instead of the questionnaire that there is now. We could leave it as optional, but anyway, we should include the same final assessment as in the other subMOOCs.

Table 12. Recommendations for the improvement of the SRL design of MOOC

4.2.4 Third quality assessment of the SRL design

In this case, we focused on the MOOC design, and we asked for a final third internal assessment to partners who had participated during both the design and pilot implementation processes. In this case, we added two parts to the instrument: the same Likert scale elements ran for the pilot users, and a second part for a final meta assessment of the whole DBR process carried out (see attachment 2).

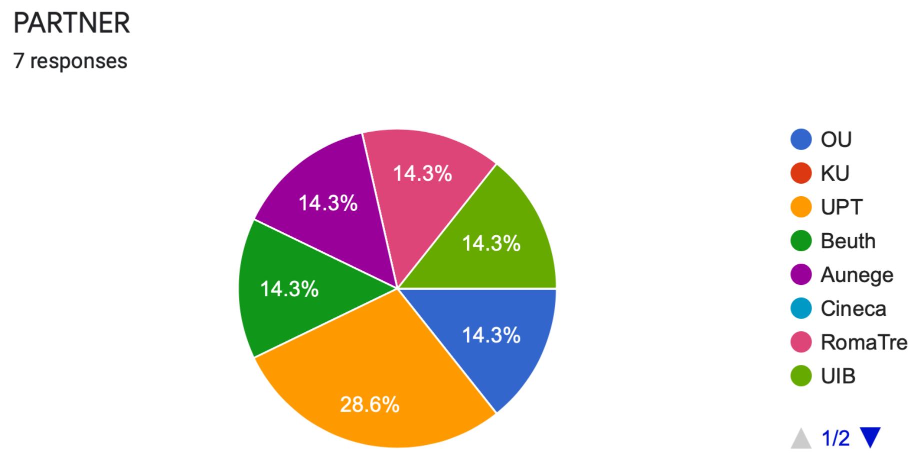

Figure 18. OpenVM partners who participated as internal reviewers for the third assessment

RESULTS
The six sub-phases are suggested in relation to the MOOC pathways and informative hints, the OER, the Open Badges and the e-assessment (figures 19 to x).

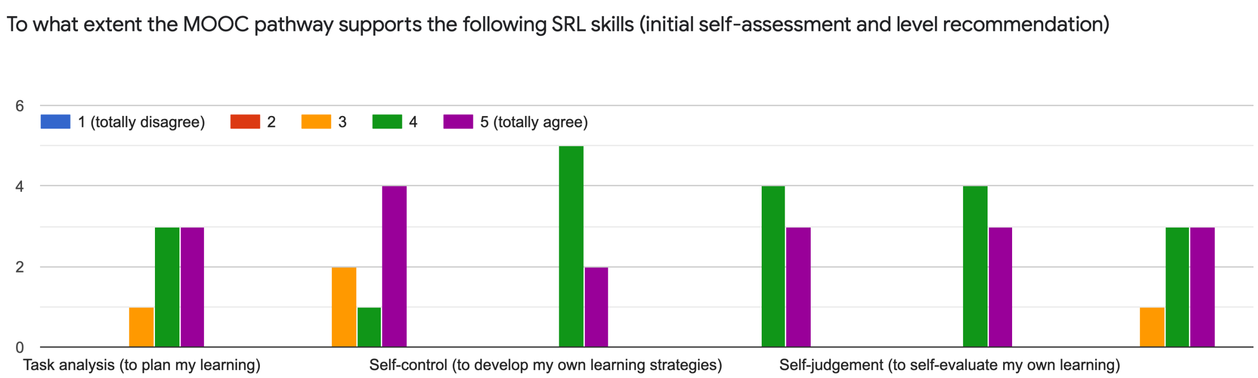

Figure 19. OpenVM MOOC pathways for SRL according to internal reviewers

Internal reviewers are satisfied with how the pathways (figure 19) support SRL, in particular for both subphases in learning performance and the self-judgment subphase.

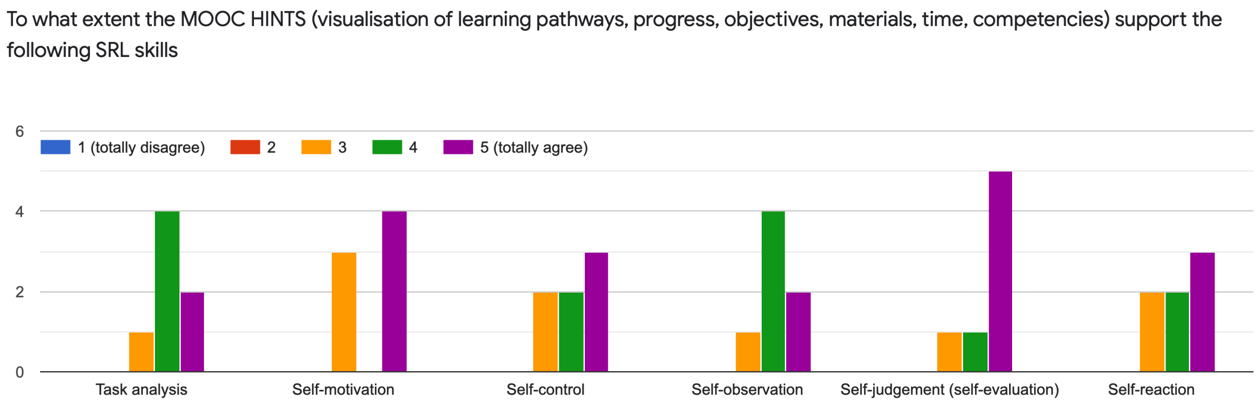

Figure 20. OpenVM MOOC hints for SRL according to internal reviewers

The informative hints (figure 20) in the MOOC can support self-regulated learning, according to the results obtained.

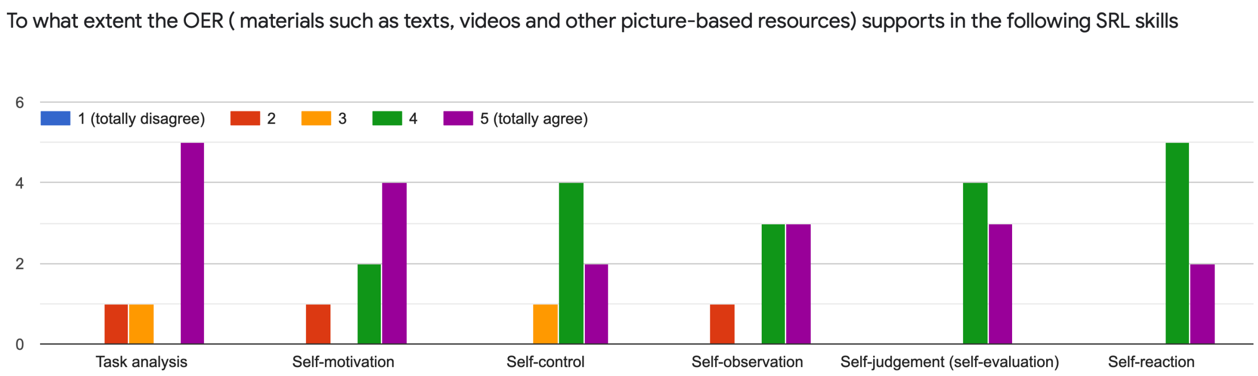

Figure 21. OpenVM OERs and SRL skills for SRL according to internal reviewers

The OER are the only elements that receive some negative answers from internal reviews (figure 21). The support of OER to SRL should also be explored in consideration to the alignment of self-assessment tools (figure 23) so, even though the OER might have some negative assessment for the forethought and performance phases, the exploration with the results along with automated tests allow us to suggest that both together do in fact support SRL.

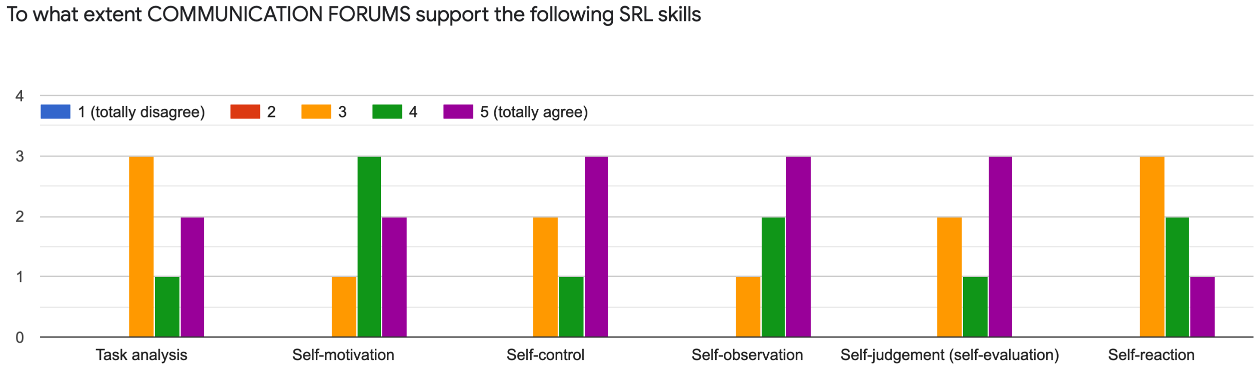

Figure 22. Open VM communication forums for SRL for SRL according to internal reviewers

The communication forums receive high levels of agreement of their support to SRL (figure 22) although there are a relevant number of neutral answers in all phases.

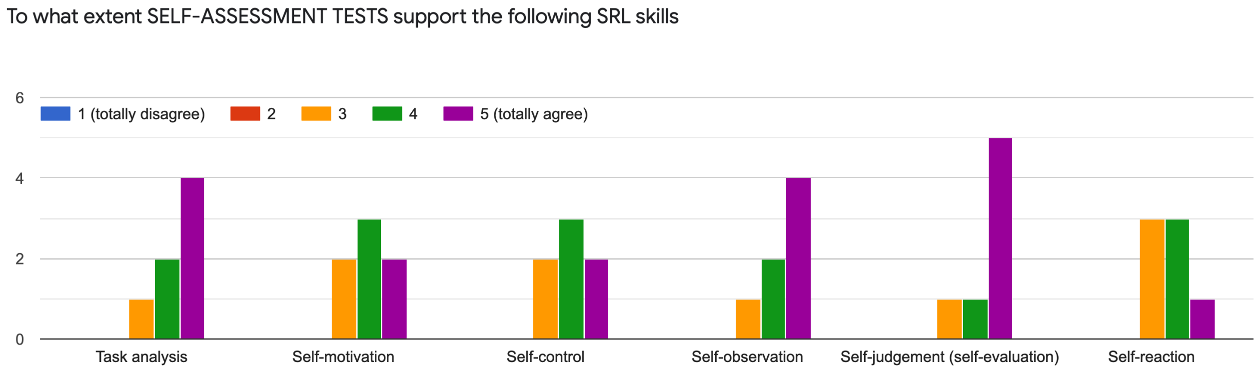

Figure 23. Open VM self-assessment tools

Self-assessment tools receive good results in all phases, but the highest levels correspond to task analysis and self-observation and for self-judgment (figure 23).

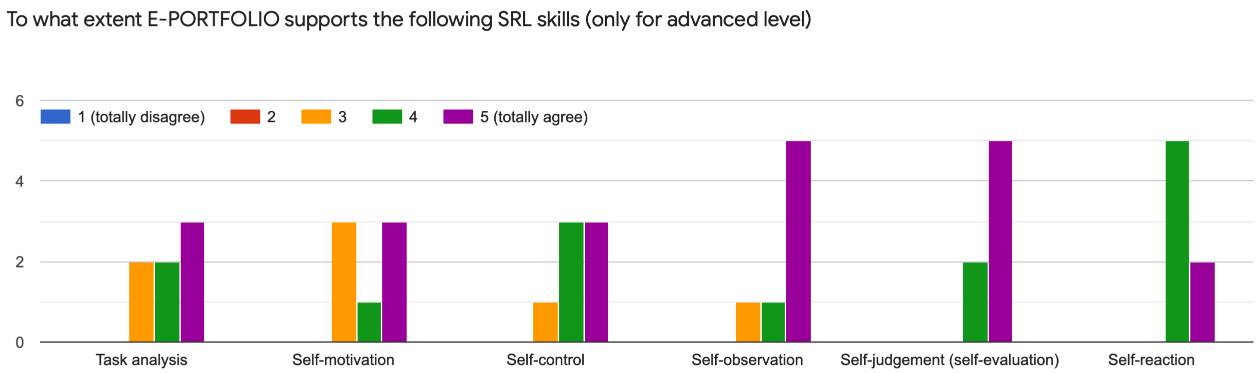

Figure 24. OpenVM e-portfolio for SRL according to internal reviewers

Again, all answers are in positive terms, but eporfolios for self-assessment achieve the best results in terms of SRL enhancement (figure 24).

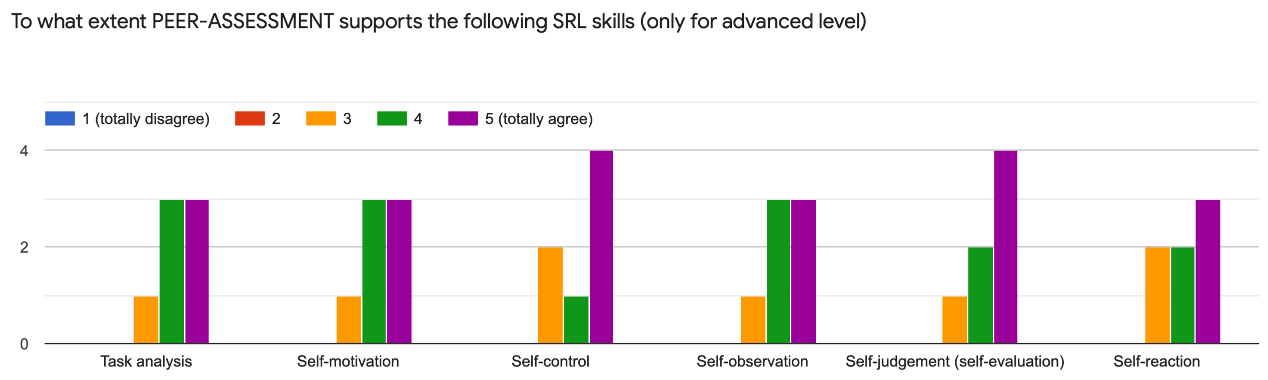

Figure 25. Open VM peer-assessment for SRL according to internal reviewers

Peer assessment seems to be supportive for SRL although for all phases there are reviewers with neutral opinions (figure 25).

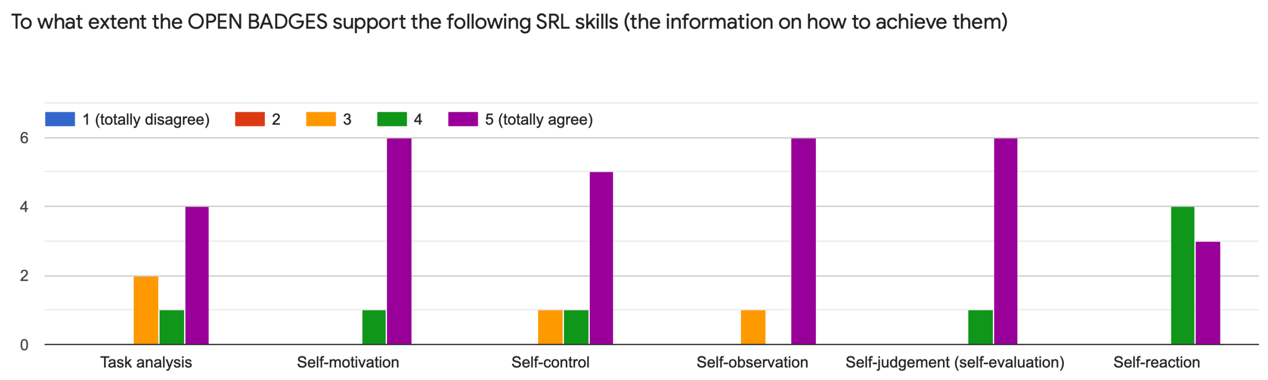

Figure 26. OpenVM Credentials and SRL skills

Open Badges seem to be validated with positive answers by internal reviewers in most phases, and it is remarkable that these are the elements with the best results in terms of support for SRL (figure 26).

4.2.5 Assessment by the MOOC participants

We asked about the SRL design only to participants who had attended the Autonomous Driven Learning and Active Self-Regulated Learning miniMOOC, since we understood they could have more expertise to answer a survey which involved some relevant previous knowledge in the field. The whole instrument can be observed in the documentation of the MOOC assessment by Output 6.

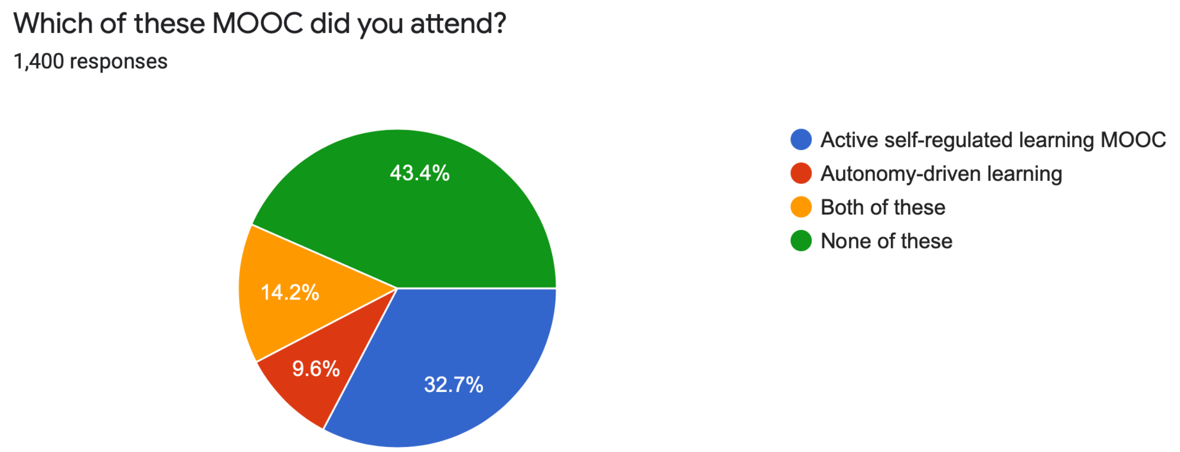

Figure 27. Participants in the OpenVM MOOC

More than half of the participants took the courses on SRL and autonomous skills.

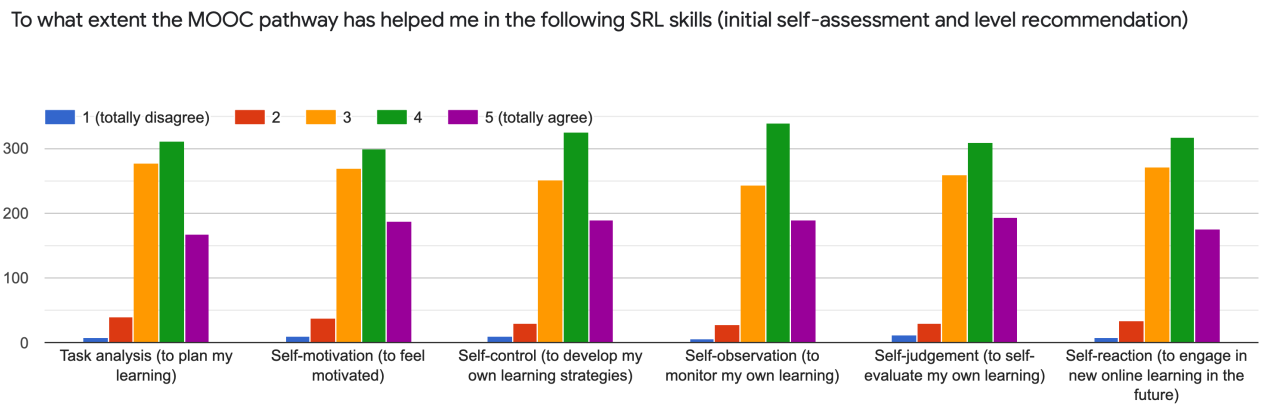

Figure 28. Participants' perceptions on the possibilities of the MOOC pathways to support SRL skills

The MOOC pathways obtain relevant positive answers by participants (figure 28) in all SRL phases.

To what extent the MOOC HINTS (visualisation of learning pathways, progress, objectives, materials, time, competencies) have helped me in the following SRL skills

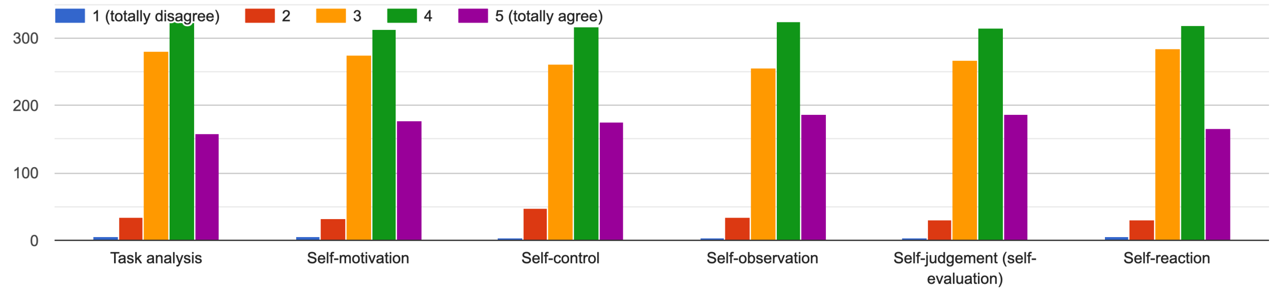

Figure 29. Participants’ perceptions on the possibilities of the MOOC hints to support SRL skills

The MOOC informative hints seem to receive positive assessments by participants (figure 29).

To what extent the OER (materials such as texts, videos and other picture-based resources) has helped me in the following SRL skills

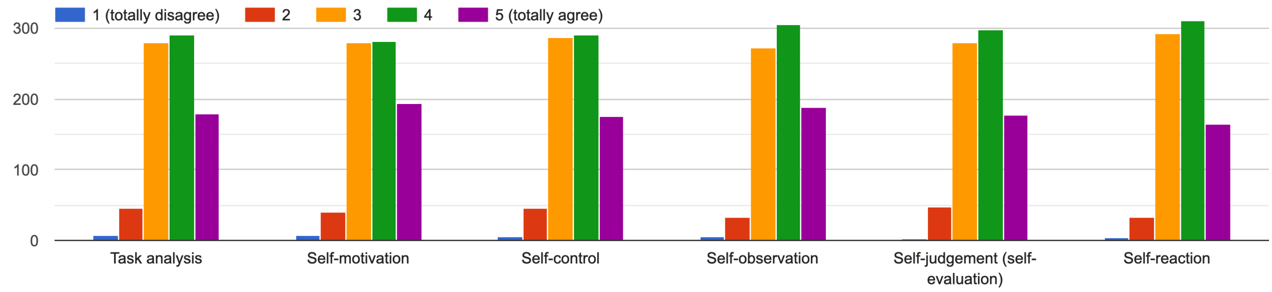

Figure 30. Participants’ perceptions on the possibilities of the OER to support SRL skills

OER seem to receive positive answers in all phases (figure 30). The slightly higher positive answers for the self-assessment phases may suggest that they could work well together with other tasks like the self-assessment tests.

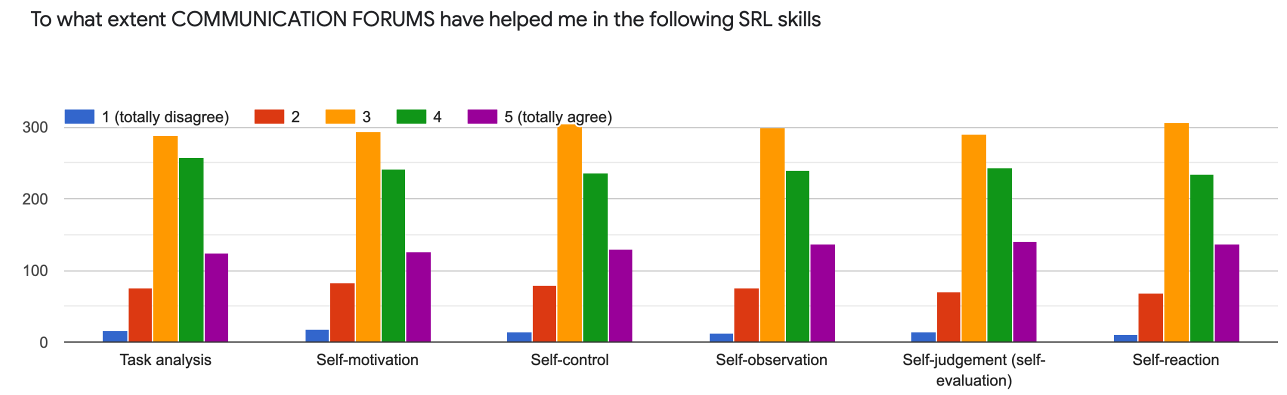

Figure 31. Participants' perceptions on the possibilities of the forums to support SRL skills

In all phases, communication forums obtain higher positive answers than negative. However, there is a relevant presence of neutral answers, which may suggest challenges for the supporting role of SRL for peer communication.

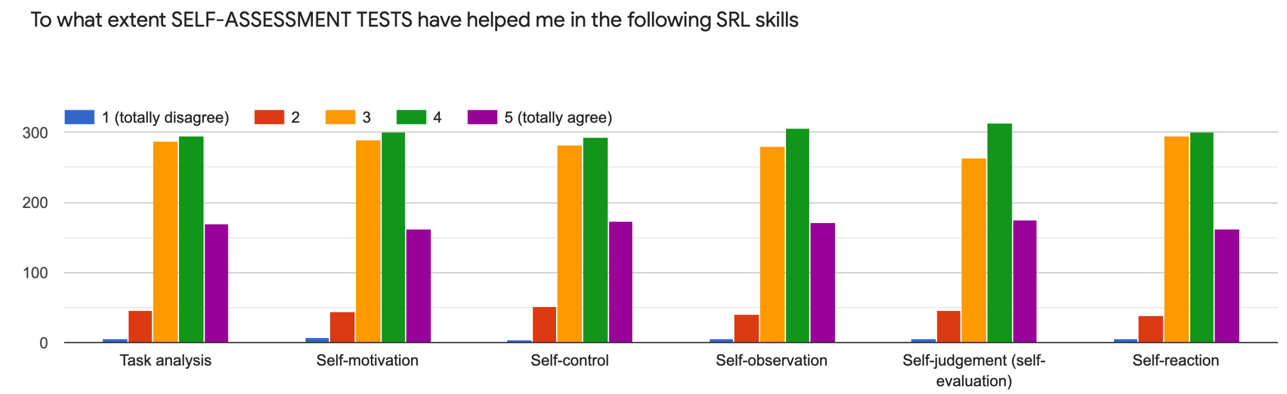

Figure 32. Participants' perceptions on the possibilities of the self-assessment tool to support SRL skills

Self-assessment tools seem to obtain balanced positive answers in all phases (figure 32). However, this is rather contradictory as it could have been expected that automated tests would have been perceived as more supporting for self-reflection than for other phases and skills.

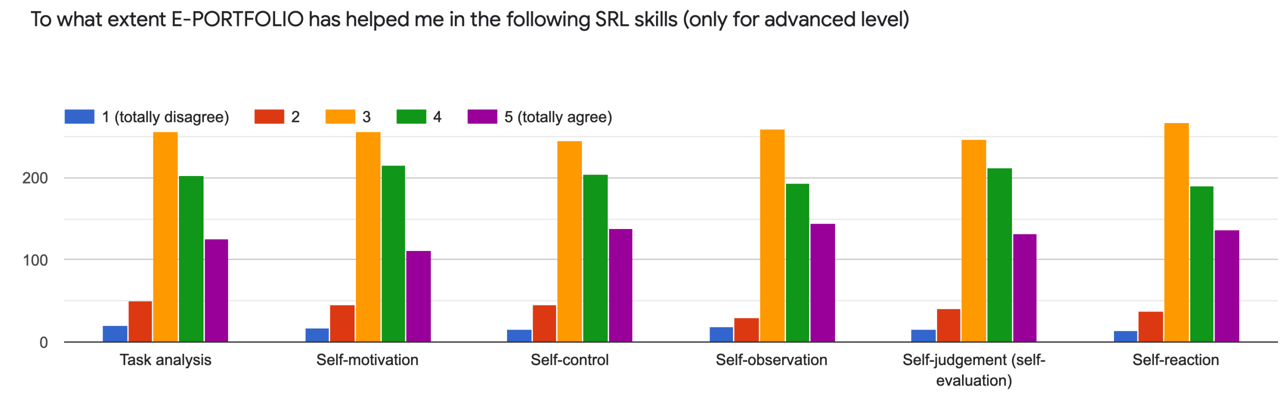

Figure 33. Participants' perceptions on the possibilities of the eportfolios to support SRL skills

Participants' are divided between those feeling neutral and those who are quite positive about it in all SRL phases (figure 33).

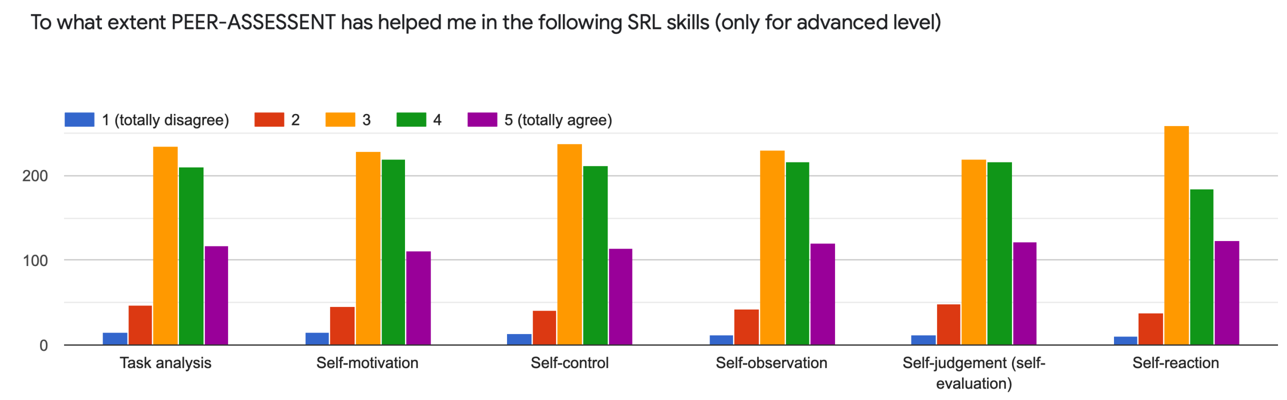

Figure 34. Participants' perceptions on the possibilities of the peer-assessment tools to support SRL skills

Although there is an important part of students answering with the neutral option, there seem to be a slightly higher number of students positive about the peer-support for SRL (figure 34).

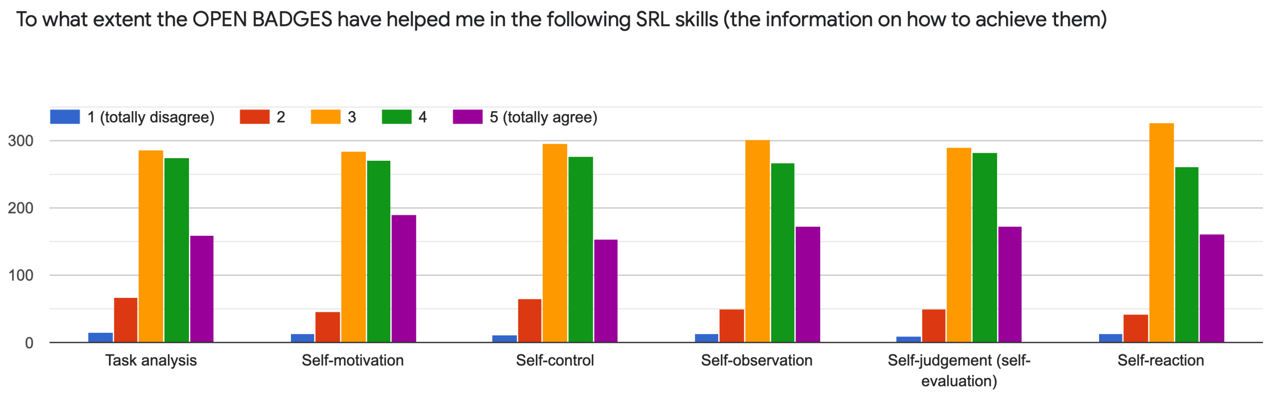

Figure 35. Participants' perceptions on the possibilities of the Open Badges to support SRL skills

Participants show more positive perceptions on the possibilities of Open Badges for SRL in all phases, with slightly lower results for the self-reaction subphase (figure 35).

4.3. Final overview to the Design-Based Research process

The following figure summarizes all the tasks carried out under the research framework in which the Learning Hub, MOOC and all elements have been created:

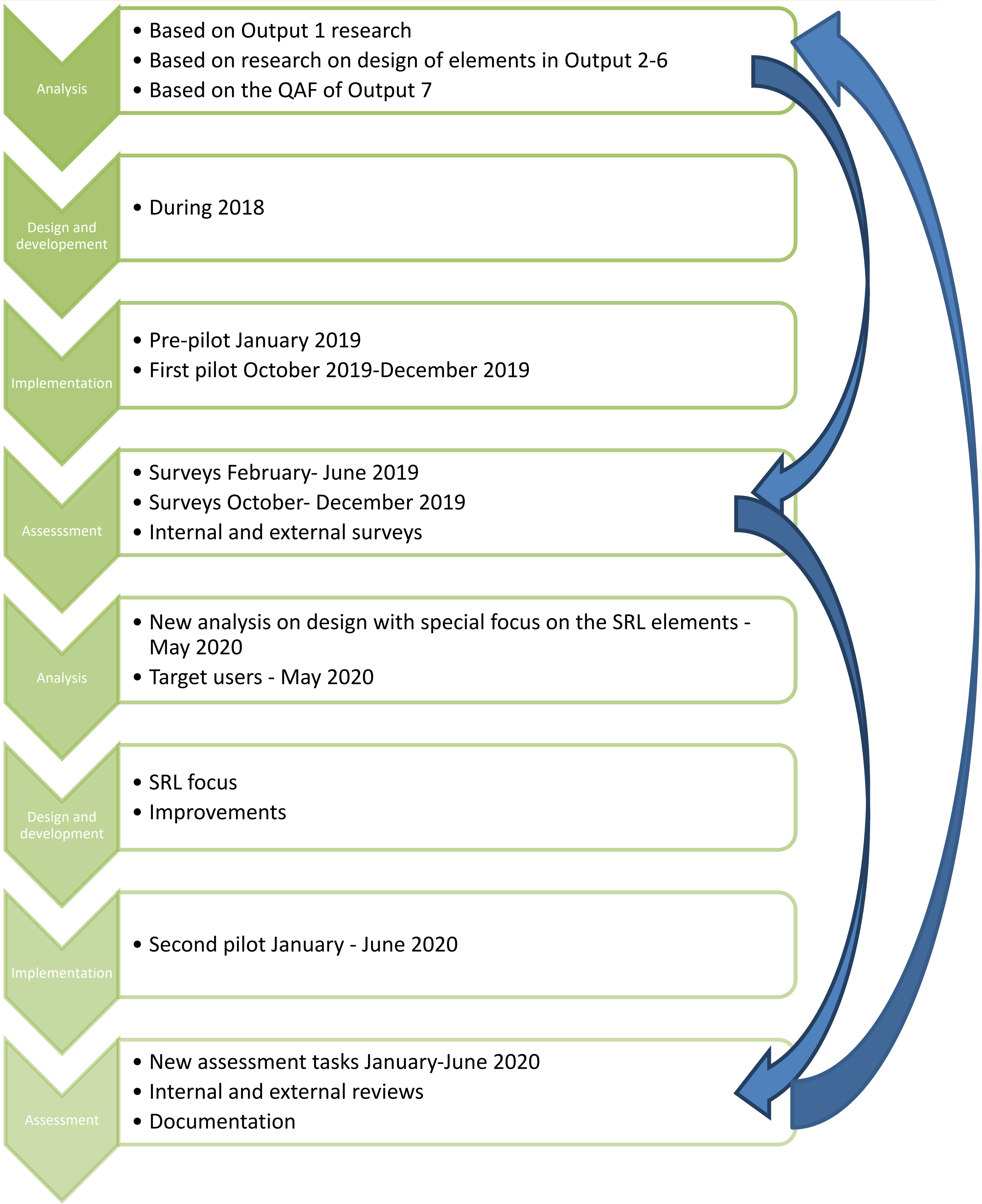

Figure 36. DBR carried out in the OpenVM partnership

As the final metanalysis of the work developed in the partnership, we ask our internal reviews to assess all the stages of the Design Based Research that we have carried out through the survey presented in Attachment 2. The following figures (figures 37 to 40) show that partners think the process has been carried out following all stages and steps successfully. The only answers in a negative sense are two questions for the analysis stage. Thus, during the five-year period after the lifetime of the project it is necessary to review the need for some more material to be produced in order to include, if necessary, the unsolved conceptual basic concepts or include target users who might have been underrepresented during pilot implementations.

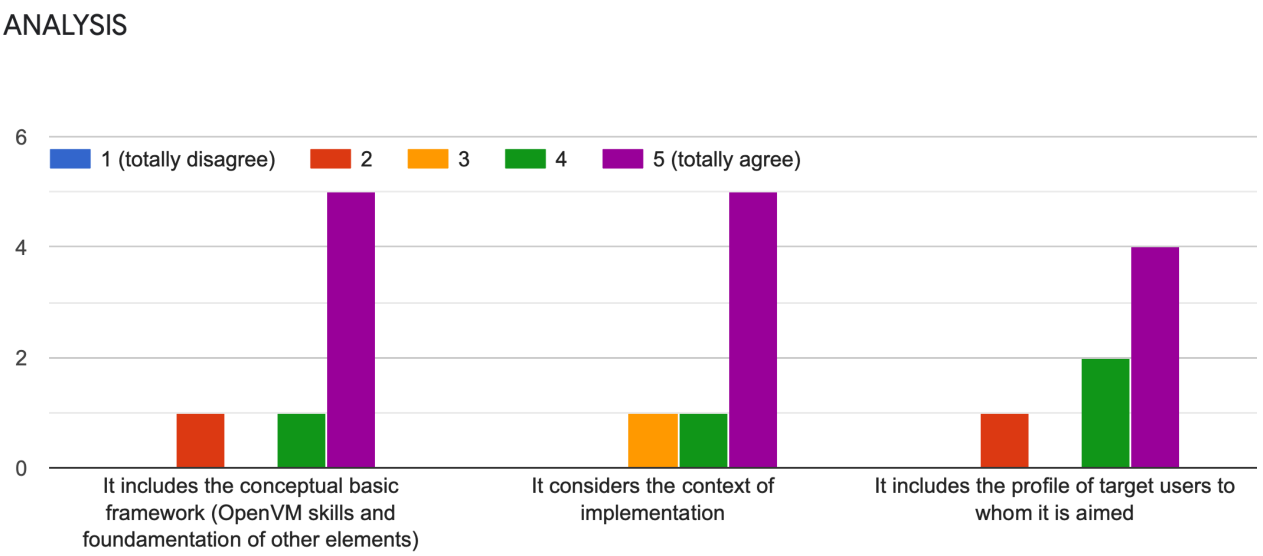

Figure 37. Analysis stage of the DBR for the OpenVM

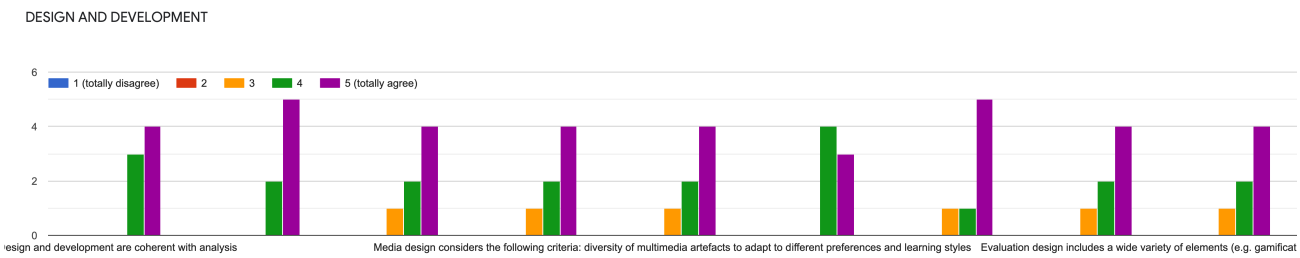

Figure 38. Design and development stage of the DBR for the OpenVM

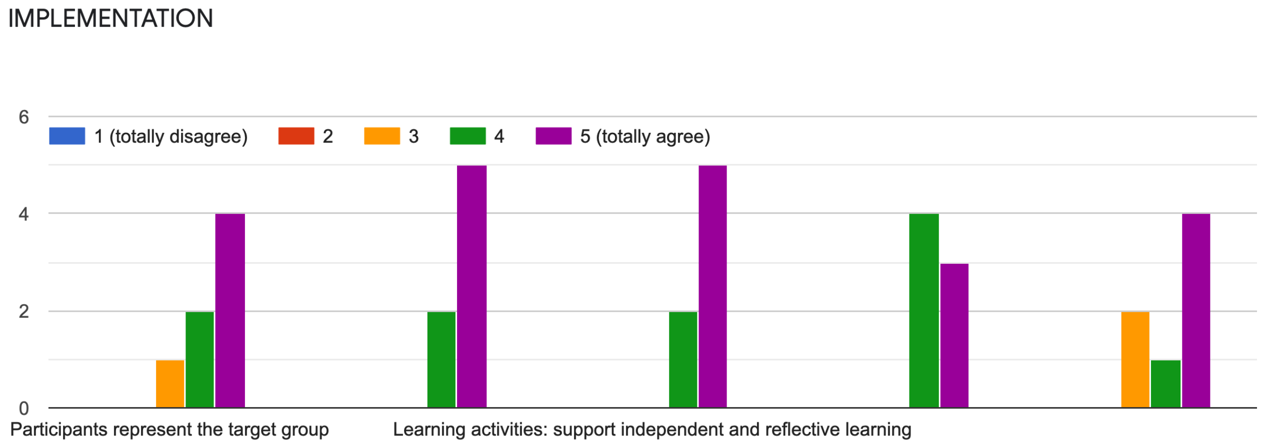

Figure 39. Implementation of the DBR for the OpenVM

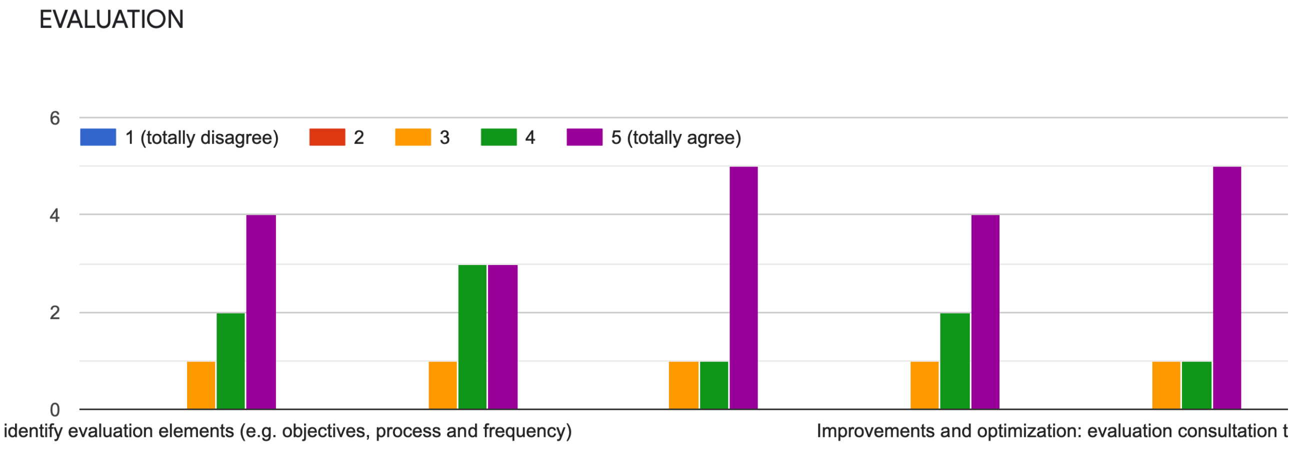

Figure 40. Evaluation of the DBR for the OpenVM

The qualitative comments that were expressed support the coherence of the resources developed, in particular in the analysis stage, as can be seen in the following lines:

- I think we have worked hard, designed and implemented in diverse cycles and the result is quite a good product that is aware of all the underpinning elements we have been discussing in depth. All the teams have been very worried about being coherent with the rest of the work being done and the results shows that the diverse elements are aligned in diverse aspects (Reviewer 7)
- Main design was taking into consideration the learners' types and needs, to support the acquirement of the knowledge and understanding of virtual mobility principles and tools. (Reviewer 1).

5. Conclusions

The Quality Assessment Framework was conceived under the methodological approach of Design-Based Research. First, we worked on the analysis of the relevant framework for virtual courses in the context of European Higher Education under the framework of Open Education. Based on the first steps, along with the topic of virtual mobility, we suggested an iterative process of design, implementation and consecutive improvement of the product creation. The collaborative work among partners during the lifetime of the project, and following an iterative cycle, has driven us in an authentic process of co-creation and co-design, which is a very interesting and innovative/original??? approach for Erasmus partnerships.

As for the SRL design of the MOOC, special attention was given to the development of first pilot courses, and some limitations and drawbacks were analyzed along with other partners. The second iteration and development of the MOOC design radically increased quality by the inclusion of elements aimed at improving students' autonomous and self-regulated learning abilities. In further work during the five coming years of sustainability plan, it would be interesting to keep exploring the affordances and limitations of the design in order to suggest recommendations for educational usage and further research.

6. References

ENQUA, ESU, EUA, & EURASHE (2015). *Standards and Guidelines for Quality Assurance in the European Higher Education Area, 2015.* Belgium: EURASHE. Retrieved from http://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf

Brown, A. L. (1992). Design experiments: theoretical and methodological challenges in creating complex interventions in classroom settings. *Journal of the Learning Sciences, 2*(2), 141–178.

Buchem, I., Tur, G. & Urbina, S. (2018). Quality assurance for attainment, assessment and recognition of virtual mobility skills in context of open education. QA Framework in the Open Virtual Mobility project. Edulearn Conference 2-4 July 2018. Retrieved from https://iated.org/concrete3/view_abstract.php?paper_id=65036

Camilleri, A. F., Ehlers, U. D., & Pawlowski, J. (2014). State of the Art Review of Quality Issues related to Open Educational Resources (OER). Luxembourg: Publications Office of the European Union 2014, 52 S. - (JRC Scientific and Policy Reports) - URN: urn:nbn:de:0111-opus-91019. Retrieved from https://www.pedocs.de/volltexte/2014/9101/pdf/European_Commission_2014_OER.pdf

Conole, G. (2013). MOOCs as disruptive technologies: strategies for enhancing the learner experience and quality of MOOCs. *RED, Revista de Educación a Distancia, 39*. Retrieved from http://www.um.es/ead/red/39/

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education, 15*(1), 3–8. doi: 10.1016/j.iheduc.2011.06.002

de Benito Crosetti, B., & Salinas, J. M. (2016). La investigación basada en diseño en Tecnología Educativa. *Revista Interuniversitaria de Investigación en Tecnología Educativa, 0*. Retrieved from http://revistas.um.es/riite/article/view/260631

ENQA (2009). *Standards and Guidelines for Quality Assurance in the European Higher Education Area, 2009*. Retrieved from http://www.enqa.eu/wp-content/uploads/2013/06/ESG_3edition-2.pdf

Escobar-Pérez, J. & Cuervo-Martínez, A. (2008). Validez de contenido y juicio de expertos: una aproximación a su utilización. *Avances en medición, 6*(1), pp. 27-36. Retrieved from http://www.humanas.unal.edu.co/psicometria/files/7113/8574/5708/Articulo3_Juicio_de_expertos_27-36.pdf

European Commission, Erasmus + (2018). *Guide for Experts on Quality Assessment. Actions managed by national agencies, 2018*. Retrieved from http://ec.europa.eu/programmes/erasmus-plus/sites/erasmusplus2/files/iii.01_esc-eguide_for_experts_on_quality_assessment_2018.pdf

Jansen, D., Rosewell, J., & Kear, K. (2017) Quality Frameworks for MOOCs. In: Jemni M., Kinshuk, Khribi M. (eds) Open Education: from OERs to MOOCs. Lecture Notes in Educational Technology. Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-662-52925-6_14

Inamorato dos Santos, A., Punie, Y., & Castaño-Muñoz, J. (2016) *Opening up Education: A Support Framework for Higher Education Institutions.* JRC Science for Policy Report, EUR 27938 EN; doi:10.2791/293408

Reeves, T. (2006). Design research from a technology perspective. In J. V. D. Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational design research* (pp. 52–66). New York: Routledge.

McKenney, S. & Reeves, T. (2012). *Conducting educational design research*. London: Routledge.

McKenney, S., Visscher-Voerman, I. (2013) Formal education of curriculum and instructional designers. *Educational Designer, 2*(6). Retrieved from http://www.educationaldesigner.org/ed/volume2/issue6/article20/

Salinas, J. (2012). La investigación ante los desafíos de los escenarios de aprendizaje futuros. *RED, Revista de Educación a Distancia, 32*. Retrieved from http://www.um.es/ead/red/32

Shavelson, R. J., Phillips, D. C., Towne, L., & Feuer,M. J. (2003). On the science of education design studies. *Educational Researcher, 32*(1), 25–28. DOI: https://doi.org/10.3102/0013189X032001025

Tur, G., Urbina, S., Firssova, O., Rajagopal, K. & Buchem, I. (in press). Open Virtual Mobility: a learning design 4 SRL. EDEN Research Workshop Barcelona 25-26 October 2018.

Tur, G., Buchem, I. & Urbina, S. (2019). The self-regulated learning quality assurance approach to designing MOOCs. Insights from in the Open Virtual Mobility project. *Edulearn Conference 2019 Palma July 2019.* doi: 10.21125/edulearn.2019.1403

Ubachs, G. & Konings, Lizzie (coor.) (2016). Updating Quality Assessment for E-learning a Benchmarking Approach (third edition). European Association of Distance Teaching Universities (EADTU). Retrieved from http://e-xcellencelabel.eadtu.eu/images/E-xcellence_manual_2016_third_edition.pdf

Ubachs, G. & Hederikx, P. (2018). EADTU Mobility Matrix, (pp. 26). Maastricht, NL: EADTU. Retrieved from https://tinyurl.com/EADTU-mobility-matrix

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64-70. doi: 10.1207/s15430421tip4102_2

Appendix

Add any further documents, information etc. as attachments (which may be links to other documents).

Attachment 1

The following table summarises the tasks and activities of each stage of the DBR model for each Output.

	DBR model	Description of tasks and activities of the Output
Output 1	Analysis	Literature review
	Design	Expert consultation (Group Concept Mapping)
	Implementation	OpenVM skills framework for the Learning Hub/MOOC/etc
	Evaluation	Internal reviewer, user experience analysis
Output 2	Analysis	PLE based, Open Source software, Open Education alignment, user needs analysis and goal definition based on the analysis of O3-O4-O5-O6
	Design	Standardised development
	Implementation	Assessment, of social software, semantic and adaptable software, VM Learning Hub Mobile Application code development and first prototype test
	Evaluation	User experience analysis, learning analytics, validation and analysis, end-user experience monitoring, interactive support, periodical monitoring
Output 3 (competency directory)	Analysis	Definite set of VM definition skills, cross-referencing VM skills in graph, guidelines and best practices
	Design	Competency directory requirements, functional prototype
	Implementation	Guidelines and editor functionality
	Evaluation	Final prototype and report

Output 3 (Matching tool)	Analysis	Collection of relevant factors for VM learning, requirement analysis for technical connection
	Design	Fit-for-purpose
	Implementation	Functional prototype
	Evaluation	Final prototype and report
Output 4	Analysis	Description aimed at three target groups, organisation, students and educator; grounded on O1-A1 and O1.A2.; based on self-assessment, evidence-based and peer-assessment, comparative study of existing e-assessment tools, redefinition for the VM Learning Hub alignment, guidelines for implementation in diverse settings
	Design	User centred design, textual and visual content for the tool,
	Implementation	Technical development, implementation and internal
	Evaluation	Internal peer-review testing, final adaptation and validation
Output 5 (Open credentials)	Analysis	Based on open standards, and in relation the OpenVM skills of O1
	Design	Design Thinking process for the badge design canvas, visual design templates, design aligned with e-assessment, user experience design
	Implementation	Workshops with VM experts, implementation and user-testing
	Evaluation	Final concept and report
Output 5 (Gamification for learning)	Analysis	Definition of the design process and tools, meaningful elements
	Design	Design of elements
	Implementation	Implementation and user-testing
	Evaluation	Final concept and report
Output 6	Analysis	Guidelines for OER design, crowd creation concept,

(OER)	Design	Based on Quality criteria
	Implementation	In the Learning Hub and MOOc
	Evaluation	Target audience, internatl review
Output 6 (MOOC)	Analysis	MOOC for OpenVM promotion and SRL skills
	Design	Design with design canvas, learning by design, inclusion of O3, O4 and O5, includes descriptions, introduction, references, explanation
	Implementation	250-300 teachers for pilot implementation, partnership participation,
	Evaluation	Quality assurance in line with O7 and peer review, dissemination of results
Output 7 (QAF)	Analysis	Design of quality assurance standards, for all the process and single components
	Design	Design of evaluation instruments
	Implementation	Pilot implementation
	Evaluation	Final revision and draft
Output 7 (Sustainability)	Analysis	Business model
	Design	Sustainability strategy
	Implementation	Strategy development
	Evaluation	Internal review

Attachment 2

The instrument to assess the quality of every single Output is presented in the following table. The criteria are divided into the four stages of the Design-Based Research model, and each one has to be assessed from 1 to 5 points, as well as some comments have to be provided.

	ASSESSMENT (max 5 points)	DESCRIPTION
ANALYSIS		
It includes the conceptual basic framework		
It considers previous work		
It considers the context of implementation		
It includes the profile of target users to whom it is aimed		
DESIGN AND DEVELOPMENT		
It considers the analysis stage		
Objectives are defined in relation to context and target users		
It is aimed at defined objectives		
Design and development are coherent with analysis		
It is friendly and usable		
IMPLEMENTATION		
The product implemented covers functionalities identified by analysis and provides reasons or plans for those not covered yet		
The sample represents the target group		
The instrument for data collection is suitable		
EVALUATION		
It takes into account all data collected		
It relates all data from different sources of information		
It promotes decision making		

Assessment grid

Excellent (EXC)- 5	Outstanding performance
Very good (VG)- 4	Above average performance
Good (G)- 3	Satisfactory
Sufficient (SUFF)- 2	Performance meet the minimum criteria
Insufficient- 1 (INSUFF)	Weak: further work is required

Attachment 3

		1	2	3	4	5
Learning Hub						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
MOOC						

Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
OER						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-	SELF-JUDGMENT					

REFLECTION PHASE	SELF-REACTION					
Open Badges						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
e-Assessment						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					

	SELF-OBSERVATION					
SELF- REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
Gamification						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF- REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
Skills directory						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					

PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					
Matching tool						
Forethought	TASK ANALYSIS					
	SELF-MOTIVATION					
PERFORMANCE PHASE	SELF CONTROL					
	SELF-OBSERVATION					
SELF-REFLECTION PHASE	SELF-JUDGMENT					
	SELF-REACTION					