Open Virtual Mobility

O1 Framework and Guidelines:

O1-A1: Framework

MILESTONE 3: FINAL CONCEPTUAL FRAMEWORK

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This paper is a public document produced as the final outcome of **Output 1** of the Open Virtual Mobility project. It is the result of activities O1-A1.1 Literature Study; O1-A1.2 Compilation of the Conceptual Framework and O1-A1.3 Final Conceptual Framework (milestone 3).

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Executive summary

This paper is the **Final Conceptual Framework** (milestone 3) on OpenVM Framework.

What are the objectives of this paper?

This paper presents the final concept of the OpenVM learner competence framework, based on the conducted literature study, the Group Concept Mapping study of Open VM competences and the validation of the results through mapping on existing competence frameworks and a selection of VM cases.
The aim of this report is to:

A. Elaborate on the concept of Open Virtual Mobility in the context of topics of Virtual Mobility and Open Education.
B. Present the final concept of the OpenVM learner competence framework.
C. Present a contextualisation of this competence framework with respect to existing competence frameworks

Who is this paper for?

This paper addresses educators, students, international officers and higher education leaders as well as a wider academic audience interested in the value of Virtual Mobility for the development of learner skills and competences in context of international mobility in higher education in Europe and beyond. This paper also addresses the reviewers of the final report for the Open Virtual Mobility project assigned by the National Agency DAAD.

What topics are addressed in this paper?

This paper addresses the following three key topics related to the OpenVM Learner Competence Framework: (1) the background against the concept of OpenVM has emerged and is evolving; (2) Open VM Learner Competences, (3) a contextualisation of this competence framework with respect to existing competence frameworks.

Contributors

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1. Previous work

The main aim of Output 1 Activity 1 (O1-A1) was to gain more insight into the concepts of Virtual Mobility and Open Education, to understand the relationship between these concepts, to look at the opportunities that they offer teachers, students and other stakeholders and the needs they create, in order to build a Conceptual Framework on OpenVM.

The concept of the OpenVM Conceptual Framework was developed throughout the project lifetime following the workflow in O1-A1 (as described in the project application):

Milestone 1: O1-A1.1: Literature Study
O1-A2.1: Identification of experts for Expert Consultation
O1-A2.2: Data Collection
O1-A2.3: Roadmap Report on VM Skills
Milestone 2: O1-A1.2: A Compilation of the Conceptual Framework

The results from these milestones were published on the project website and all publications are available on the web page dedicated to Output 1 at:
https://www.openvirtualmobility.eu/topics/outputs/o1-framework-and-guidelines/

The previous publications are listed below. Please refer to the listed documents for further details related to the specific milestones and topics related to OpenVM Competence Framework:

Report on milestones 1 & 2 (O1-A1.1, O1-A1.2, O1-A2.1, O1-A2.2 November 2018/Quality Gate 2)
Firssova, O., & Rajagopal, K. (2018). OpenVM Competence Framework. Retrieved from https://www.openvirtualmobility.eu/wp-content/uploads/2019/09/openVM_O1_A1_FINALOct2018.pdf

Update on milestones 1 & 2 (O1-A1.2, O1-A2.2, O1-A2.3 October 2019, Quality Gate 3)
Firssova, O., Brouns, F., & Rajagopal, K. (2019). Group Concept Mapping study. Open Virtual Mobility Erasmus+ (2017-2020). Retrieved from https://www.openvirtualmobility.eu/wp-content/uploads/2019/09/openVM_O1_A2M2FinalSept2019.pdf

OpenVM Learner Competence Framework in the OpenVM Brochure:
OpenVM Learner Competence Framework was included in the OpenVM brochure:
https://www.openvirtualmobility.eu/wp-content/uploads/2020/04/OpenVM-Erasmus-brochure.pdf

Academic publications

Beside the above mentioned project reports and the brochure, the outcomes of O1-A1 were documented in the academic papers in journals and conference proceedings:

- Buchem, I., Konert, J., Carlino, Ch., Casanova, G., Rajagopal, K., Firssova, O. & Andone, D. (2018). Designing a Collaborative Learning Hub for Virtual Mobility Skills – Insights from the European Project Open Virtual Mobility. In: P. Zaphiris and A. Ioannou (Eds.). *Learning and Collaboration Technologies. Design, Development and Technological Innovation*. Springer International Publishing AG, Lecture Notes in Computer Science, vol. 10924, pp. 350-376. ISBN 978-3-319-91742-9, Retrieved from: https://link.springer.com/chapter/10.1007/978-3-319-91743-6_27
- Rajagopal, K., Firssova, O., Op de Beeck, I., Van der Stappen, E., Stoyanov, S., Henderikx, P., & Buchem, I. (2020). Learner skills in open virtual mobility. *Research in Learning Technology, 28*. Retrieved from: https://doi.org/10.25304/rlt.v28.2254

2. The concept of Open Virtual Mobility

In this section we present state-of-the-art on the topics of Virtual Mobility and Open Education based on the literature review conducted as O1-A1.1 in order to explore the concept of Open Virtual Mobility.
Virtual Mobility and Open Education are related but dissimilar concepts on the extension of regular Higher Education. In this section, we dive into what they are and how they relate to each other, the similarities and differences between these concepts. We discuss the phenomena of internationalisation, globalisation, digitalisation of education that drive these forms of education and the concept of OpenVM.

2.1. Virtual Mobility and Open Education as part of HEI landscape

The 21st century educational landscape has evolved towards new formats that overcome the rigid distinctions that used to dominate higher education (Wiley & Hilton III, 2009). Increasingly, educational institutions need to stand out in a global market of education, and fulfill the needs of a changing society and changing student expectations. Moreover, the boundaries of traditional higher education are fading, as in the digitalized 21st century further development of knowledge, skills and competences acquired within the initial higher education takes place in various constellations of social and professional communities and networks, workplace learning both on- and offline, locally and elsewhere, without borders, through commercial and open courses, offline and online open resources and practices. Higher education will inevitably undergo further changes integrating, "blending" online courses and quality resources produced elsewhere in their curricula. It is against this changing world in higher education that we situate the OpenVM project, which builds on the two concepts of Virtual Mobility and Open Education.

Internationalization has been a key theme for many decades in Higher Education. Multiple governmental schemes across the world have invested in creating offerings of high quality education, with collaborations across national borders (Varghese, 2018). One of the concepts related to implementing internationalization of higher educational curricula, particularly in the European Higher Education Area, is the concept of Virtual Mobility, defined as "*a set of ICT supported activities, organized at institutional level, that realize or facilitate international, collaborative experiences in a context of teaching and/or learning*" (Erasmus+ programme guide).

Virtual Mobility (VM) is a form of mobility between two (often European) higher education institutions, supported by a curricular, legal and institutional framework. Through VM, learners enrolled as students in one higher educational institute have the opportunity to follow a course at another higher educational institute in the online mode. As this is institutionally supported, VM

participants enjoy the formal advantages of studying at that other institute, such as instructional support and assessment of their performance in the course. Also, the gained credits for a successfully completed VM course are accepted by the students' home institutions and accredited as part of the curriculum. To support this form of student mobility, the student, thehome institution and the "virtually" visited institution make use of a Learning Agreement as an instrument, that stipulates the rights and duties of each party in the agreement (Ubachs & Henderikx, 2018).

In the last two decades, there has been an upsurge in open online learning developed and offered by a range of higher education institutes, including the world's most prestigious universities. Phenomena such as Massive Open Online Courses (MOOCS) and Open Educational Resources (OER) have significantly influenced the global educational scene (Jansen & Schuwer, 2015; Orr, Weller & Farrow, 2018). Higher education institutes invest in Open Education formats for diverse purposes, including the idealistic goals of reaching out to young people (e.g. in developing countries) who do not have traditional opportunities to participate in higher education, thus improving accessibility and lowering the barrier to high quality education for millions. They see the potential of open online education and OER for innovating higher education, developing and testing new designs and new educational formats. Furthermore, higher education institutes use Open Education to present and promote their curricular offering (Nascimbeni, e.a., 2018). Universities develop online courses and encourage students to follow them as part of their curricula or preparation to regular courses, consortia of universities, they develop and run Open Education together and facilitate exchanges within consortia (e.g. Virtual Exchange Alliance). Students use a plethora of educational resources with or without formal institutional approval. Opening up of formal education, the development of diverse "blends" between formal and open education is of particular importance from the lifelong learning perspective.

Although there are many different implementations of Open Education, they share some underlying philosophies: (i) offer increased access to education to more students, (ii) offer students increased access to (quality) educational resources, or (iii) allow more students to achieve quality certified education (e.g., Bozkurt, Akgun-Ozlyck & Zawacki-Richter, 2017). A successful implementation of opening up access to more students has been the invention of Massive Open Online Courses (MOOCs), where quality content is made available by individual tutors (e.g., PLENK MOOC, Downes, 2010) or established institutions such as universities (Castano Munos, e.a., 2016). In MOOCs, in principle, every person in the world who has access to the Internet can enroll, follow and complete a course on their topic of interest. The underlying philosophy affords primary importance to the learner, who determines where and what to study, how much time and effort to invest and with what result (Henderikx, Kreijns, & Kalz, 2017).

2.2 Similarities and differences

Momentarily, Virtual Mobility as a form of cross-border online learning and Open Education, which is both online and borderless by default, notwithstanding their significant similarities, are two distinctly different strands, each with its own rich potential of contributing to the internationalization of higher education (Daniel, 2012; Ubachs & Henderikx, 2018). Both these phenomena also fulfill economic arguments for the individual student and the institution to have access to or offer more quality learning opportunities, enabling individuals and institutions to operate in a globalized world. However, the communities around the two phenomena are also relatively distinct from each other.

From a learner's perspective, virtual mobility and open education offer different opportunities for developing learner skills and competences. From an institutional perspective, both facilitate different teaching models, but also have particular facilitation needs. However, current literature does not give clarity in which learner skills and competences are acquired and built by these activities, nor what the prerequisite learner skills are for successfully completing these activities. Few studies look at virtual collaboration within an international context. Júnior et al. (2018) look at a categorization of the international collaborations based on minimal design features but do not consider learner skills or competencies. Van Gaalen (2009) describes the MINT tool used by Nuffic in the Netherlands for characterizing internationalization. Although this tool does consider learner competence development, it uses self-evaluation and benchmarking and does not prescribe what learner competences are relevant in the context of internationalization. Green (2012) presents a quality framework that can support curriculum design and evaluation for internationalization, but it does not integrate the broader competence development perspective.

The specific contexts of Open Education create manifold opportunities for learners to develop skills and competences, however these opportunities have not been investigated to the extent this theme deserves either. Studying what learners actually learn in Open Education is challenged by its very variability, from the personal perspective, to start with the drive to enroll and learn (Henderikx, Kreijns & Kalz, 2017) to the institutional perspective, the drive to develop and deliver education.

2.3 VM and OE as implementations of internationalisation in Europe

Virtual Mobility and Open Education can be seen as two phenomena implementing internationalization at higher education institutions within the European Higher Education Area.
The European strategy on Higher Education is captured in the concept of the European Higher Education Area (EHEA) and the Bologna Process (Bologna Declaration, 1999). Through the Bologna

process, 48 European and partner countries have committed themselves to gradually align their different political, cultural and academic traditions around key values, and "agree to and adopt reforms on higher education on the basis of common key values - such as freedom of expression, autonomy for institutions, independent student unions, academic freedom, free movement of students and staff." The main goal of these countries is to "increase staff and students' mobility and to facilitate employability" (EHEA, n.d.). This unique context has created a unique setting for various internationalization activities that increase engagement between EHEA partner countries. Examples are the alignment of degrees in the Bachelor/Master system, the creation of the Diploma Supplement Document, the Erasmus Student Mobility programme and the Marie Sklodowska-Curie staff exchanges and individual fellowships.

Internationalization has been a key theme in Higher Education for many centuries, from student mobility in the Middle Ages in Europe, to access to high-quality content from the most innovative American universities in the 21st century. What internationalization is, and how it can be implemented has been the topic of much discussion in academia (Knight, 2003; 2004). Knight (2003) offers the following working definition of internationalization: "*Internationalization at the national/sector/institutional levels is defined as the process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of post-secondary education. (Knight, 2003, p. 2)*".

Internationalization needs to be distinguished from globalization (Varghese, 2018). The globalization of Higher Education views Higher Educational Institutions (HEIs) as an important group of organizations in the current global educational market. From this perspective, HEIs are key suppliers of high-quality human resources to a globalized knowledge economic market. As such, globalization emphasizes the economic role and commercial function of HEIs, whereas internationalization looks at the socio-cultural aspects of education.

Internationalization has taken many forms in implementation, from student exchanges, student and teacher mobility, to cross-border collaborative projects (Varghese, 2008; Varghese, 2018). However, these activities also emerge as an implementation of HEIs taking up their supplier role in the globalized educational market. Often, offering these activities and courses to learners strengthens HEIs' reputation as high-quality human resource and knowledge developing institutions. Internationalization has been developing on the back of three disruptive drivers currently running through the global educational landscape: increased possibilities through digitalization (Flavin & Quintero, 2018), increased interest in global collaboration on individual and institutional level (Blight, Davis & Olsen, 1999; Ryan et al., 2017; van Tryon, McDonald & Hirumi, 2018) and the drive to openness to widen access to Higher Education (Wiley & Hilton III, 2009; Wiley, 2010). Each of these drivers creates new opportunities for learners, requiring the development of new learner skills and competences and at the same time stimulating it.

Within the EHEA, the first phenomenon related to implementing internationalization of higher educational curricula of interest here is Virtual Mobility (VM). This concept has been promoted with dedicated policies and funding. VM is a form of mobility between two or more (often European) higher education institutions, supported by a curricular, legal and institutional framework. Through VM, learners enrolled as students in one higher educational institute have the opportunity to follow a course at another higher educational institute in the online mode. As this is institutionally supported, VM participants enjoy the formal advantages of studying at that other institute, such as instructional support and assessment of their performance in the course. Also, the gained credits for a successfully completed VM course are accepted by the students' home institutions and accredited as part of the curriculum. To support this form of student mobility, the student, the home institution and the "virtually" visited institution can make use of a Learning Agreement as an instrument that stipulates the rights and duties of each party in the mobility (Ubachs & Henderikx, 2018). Virtual Mobility therefore integrates the concepts of institutional collaboration and cooperation through digitalization. It presumes some form of mutual value recognition between the institutions of each other's educational and/or research offering. The overriding goal is to widen access to more students to engage in mobility activities, with all the benefits associated with those activities.

Open Education is the second phenomenon supporting internationalization in the EHEA. This upsurge of Open Education can clearly be seen as a consequence of the globalized educational market (Varghese, 2018). Universities invest in online and blended learning in Open Education formats for diverse purposes, improving accessibility to high quality education. They see the potential of open online education and OER in innovating higher education, developing and testing new designs and new educational formats. Furthermore, universities use open online courses to present and promote their curricular offering (Castano Munos, e.a., 2016; Hollands, & Tirthali, 2014; Kiers, 2016) and enrich or extend curricula or create an additional offering for graduates (Pickering & Swinnerton, 2017). Collaboration between OE providers can be organized on an individual level, e.g. in the form of reuse of Open Educational Resources and Practices, and on an institutional level, e.g., through recognition of selected MOOCs offered by other institutions (Cronin, 2017, Hew & Cheung, 2014, Loeckx, 2016). Thus, OER and MOOCs have offered HEIs the means for establishing themselves as global organizations in a global educational market (Varghese, 2018).

Table 1 shows an overview of both concepts with respect to the three drivers.

Table 1. Virtual Mobility and Open Education against three disruptive drivers in Higher Education

	Virtual Mobility	Open Education
Digitalisation	++ ICT enabled	++ ICT enabled
[Institutional] Collaboration	++ formalized cross-border collaboration between HE institutions	+ primarily individual activities; sometimes networked collaboration between learners; collaboration between providers through European networks
Openness	- widening access to mobility	++ goal to widening access to (quality) higher education

2.4 Issue of OpenVM as a concept

Although Virtual Mobility and Open Education work towards similar goals (internationalisation of Higher Education and widening access), there are few instances where both concepts can be combined. In the OpenVM project, we have specifically looked at situations where mobility between higher education institutions is encouraged as well as Openness as a philosophy is supported.
In conformity with the learner-driven philosophy of Open Education, the focus is put on the learner: on the prerequisites that should be in place for the learner to benefit from OpenVM and on the learner skills and competences that OpenVM should support.

In a superficial perspective, this relationship may seem irreconcilable: Open Education promotes the initiative of the learner in curating her education across formal and informal spheres, whereas Virtual Mobility is situated within the confines of institutional formal education.

However, further consideration of openness allows us to look at the interfaces between the two concepts:

(i) Learner self-direction and learner control are often encouraged within Virtual Mobility within certain well-defined boundaries. In Open Education as a form of informal learning, learner self-direction is the starting point of learning (Dabbagh & Kitsantas, 2012).
(ii) Virtual Mobility as well as Open Education are dependent on the use of ICT, to support interaction and collaboration, as well as to support sharing of and creation of new materials.
(iii) Both Virtual Mobility and Open Education promote the social aspects of learning and, in particular, socially-constructed knowledge creation (Seely Brown & Adler, 2008)
(iv) Teachers in Virtual Mobility can benefit from Open Educational Resources as teaching resources and as student-created materials.

It is in this scope that Open Virtual Mobility is situated, namely as a phenomenon that builds on learner and teacher initiative to promote learning through interaction and collaboration across educational institutions in an international and intercultural setting.

2.5 Conclusions

In this section, we have explored how the concepts of Virtual Mobility and Open Education relate to each other and to societal drivers in the internationalisation of education. We have also looked at the interface between the two, to understand the scope of OpenVM.

3. OpenVM Competence Framework

In this section, we present the final OpenVM Competence framework as an output of the OpenVM project, also looking at its relation with other existing learner competence frameworks. The conducted study that lay the basis of the Framework is described in detail in O1-A2 (see Firssova, Rajagopal & Brouns, 2019). Here we limit the presentation to a summary of the method and the findings and elaborate on the resulting framework and its components.

3.1 Group Concept Mapping Study for Framework development

To establish the conceptual framework on Open Virtual Mobility learner skills and competences a study was conducted involving experts on both Virtual Mobility and Open Education. This study was aimed at answering two questions:

- Which skills and competences do learners acquire and build when participating in Open Virtual Mobility Activities?
- Which contextual factors determine Open Virtual Mobility Activities?

3.1.1 A brief overview of the method

To answer the research questions standpoints of experts on Virtual Mobility and Open Education were sought. Knowledge and expertise on these phenomena is diffuse and scattered among individuals and institutions, university international offices, European networks and research centers in different countries. Therefore a methodological approach was sought that supports not only online data collection but also joint knowledge construction and addresses validity checks to ensure the quality of outcomes.

The applied methodology, the Group Concept Mapping (GCM, Kane & Trochim, 2007) supports knowledge construction through collecting and organizing ideas of individuals so that a collective visual geography of a concept can be created to be further analyzed, interpreted and used to feed understanding, design and /or decision or policy making. It is a mixed-methods approach in which advanced statistical analyses are applied to qualitative data.

Data generation and analysis in GCM is a structured multi-step approach in which (1) the target group is determined and participants are selected and invited, (2) participants generate ideas on the topic of the study supported by a prompt; (3) collected ideas are screened and cleaned up so that the resulting set contained unique unequivocal statements. (4) Thereafter, participants group and rate the collected unique ideas on the relevant dimensions (i.e., importance and feasibility) and (5) the resulting data is analyzed with multidimensional scaling (MDS) and hierarchical cluster analysis

(HCA) to identify patterns in the data. The output of this analysis are maps representing individual standpoints on an issue in relation to each other and taken together, a collective standpoint of all participants. (6) Such maps are then used to validate the shared understanding with study participants and (7) in order to formulate further actions or strategies (Kane & Trochim, 2007).

A total of 49 stakeholders took part in the activities described above including validation of initial findings at an international conference (OE Global 2018) and in an expert session. Participants were invited via the networks of all project members and included representatives of the research community, educators, internationalization officers at Higher Education Institutions, HE boards representatives and policy makers. Participants generated statements with a focus prompts on competences Open Virtual Mobility activities entailed and the grouped and evaluated these statements. Based on the multidimensional scaling analysis and cluster analysis an initial overview of the competences involved was created. After the two validation activities a conceptual framework of the Open VM competences was constructed to include seven competence areas and three areas that represent conditions and prerequisites of the development of OpenVM competences.

3.1.2 Main outcome: Framing Open VM competences

These results of the GCM study allowed us to answer the two research questions posed above in a reasonably straightforward way. Open Virtual Mobility activities encourage the development of generic skills and competences, such as intercultural skills (1), networked learning (2), active self-regulated learning (3), media and digital literacy (4), autonomy-driven learning (5), interactive and collaborative learning in an authentic international environment (6) and open mindedness (7). These skills form a plausible point of departure in building a conceptual framework of Open Virtual Mobility.

The GCM study also pointed to three separate clusters that represent conditions and prerequisites for development of Open VM, namely: the added value of Open VM; the way the study and learning process is organized in Open VM and Open VM design characteristics. Figure 1 is a graphical representation of the resulting concept map of the Open VM.

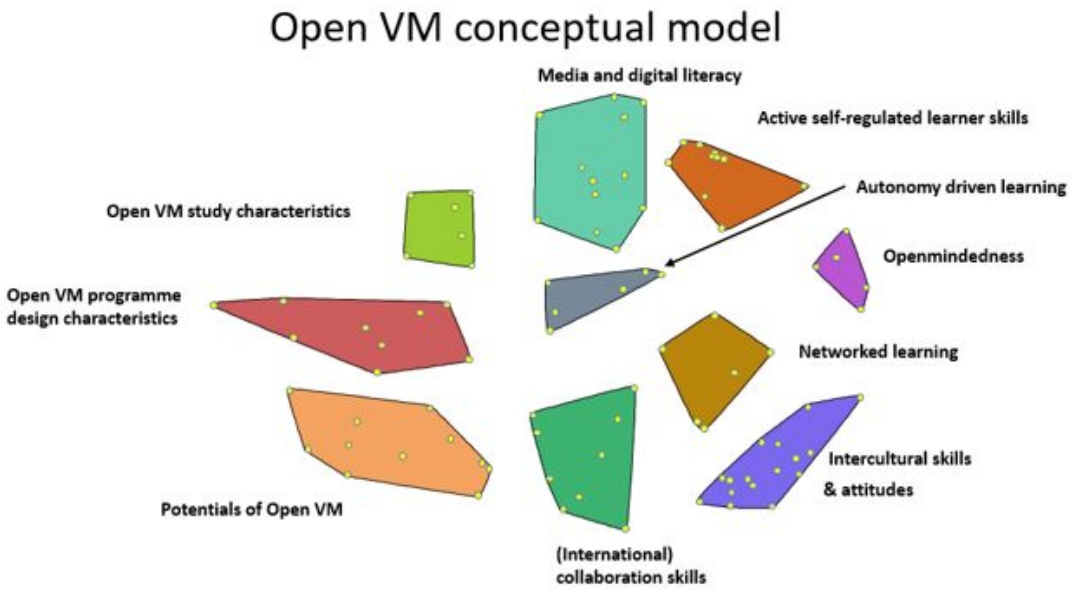

Figure 1. Resulting map of the Open Virtual Mobility concept

3.2 Final version of the OpenVM Framework

The Framework, a detailed account of the methodology applied and study results as well as OpenVM competence descriptions as handouts, with translated versions in NL, FR, DE, RO, IT, ES, is available at https://www.openvirtualmobility.eu/topics/outputs/o1-framework-and-guidelines. An overview is presented in table 2.

Table 2 OpenVM Competence Areas

Competence Area	Definition
Intercultural skills and attitude	Developing intercultural skills and attitude implies that the student acquires cultural knowledge and a better understanding of cultural perspectives, including understanding of the own cultural identity, that the student enhances and demonstrates cultural understanding and can apply intercultural awareness in culturally challenging circumstances.

Interactive and collaborative learning in an authentic international environment	Interactive and collaborative learning in an authentic international environment implies that the student develops teamwork skills, collaborates with peers across disciplines and contexts, acquiring new international learning experiences and interacting with authentic international tools, systems and resources in a foreign language
Autonomy-driven learning	Being able to learn in an autonomy-driven way implies that the student self directs, and regulates one's own learning process, independently chooses in what mode or context to study, what tools to (learn to) use and how to organize the learning process.
Networked learning	Being able to learn in networked way (= engage in networked learning) implies that the student is able to use digital networks in/for learning and communication in international contexts or environments and is able to tackle complex, ambiguous and ill-defined issues and situations in (emerging or existing) social networks.
Media and Digital Literacy	Media and Digital Literacy implies that the student is able to use resources effectively to learn, can assess the quality of resources and demonstrates "learner control".
Active self-regulated learner skills	Being an active self-regulated learner implies that the student is able to self-regulate one's own learning process,can reflect on learning experience and one's own progress and can demonstrate that he/she has the agency of one's own learning.
Open-mindedness	Open-mindedness implies that the student is tolerant to others, has an open attitude towards others, demonstrates willingness to improve knowledge (of foreign languages) and demonstrates self-confidence in interaction with peers and teachers
Gaining Knowledge [1] of Virtual Mobility and Open Education	Gaining Knowledge of Virtual Mobility and Open Education implies that the student displays a higher level of understanding of the work forms, contexts and collaboration modes that the student engages with during a Virtual Mobility activity, an Open Education activity or an OpenVM activity.

3.3 Discussion

Based on the outcomes of the GCM study and validation with experts, competence areas could be defined and described in sufficient to detail to make it possible to apply the outcomes in educational activities (MOOC design and development, O6), design and development of OpenVM Assessment framework (O3) and develop Open Credentials (O5).

[1] This competence area was added by the project team of OpenVM project in addition to competence areas resulting form the study

As the visualization in Figure 2 demonstrates, the generic learner competences occupy the central position forming the core of the Open VM framework in the most direct sense of the word. Open-mindedness, however, seems geographically a borderline area. Semantically, though, a connection to OE is meaningful.

Furthermore, Open-mindedness as a competence area occupies the furthest position from the areas representing contextual and institutional determinants (conditions, prerequisites and study characteristics) of Open VM. The framework points to a gradual trend from institution-related to individual (X-axis). The trend from institution to individual in Figure 2 also suggests a trend from design-related to emerging (learner behavior / learner attitudes). The areas that represent contextual and institutional determinants indicate how an ideal context supportive of Open Virtual Mobility could be designed. The core competence areas situated towards the left depend on instructional design of the VM activities to support them. areas situated to the right, however, deal much more with the development of individual learner attitudes and related behavior and skills that are developed through both learning and life experiences.

Looking at the generic learner competences, we see an upward trend (Y-axis) moving from skills related to collaboration and social competences at the bottom to skills related to individual learner competences at the top.

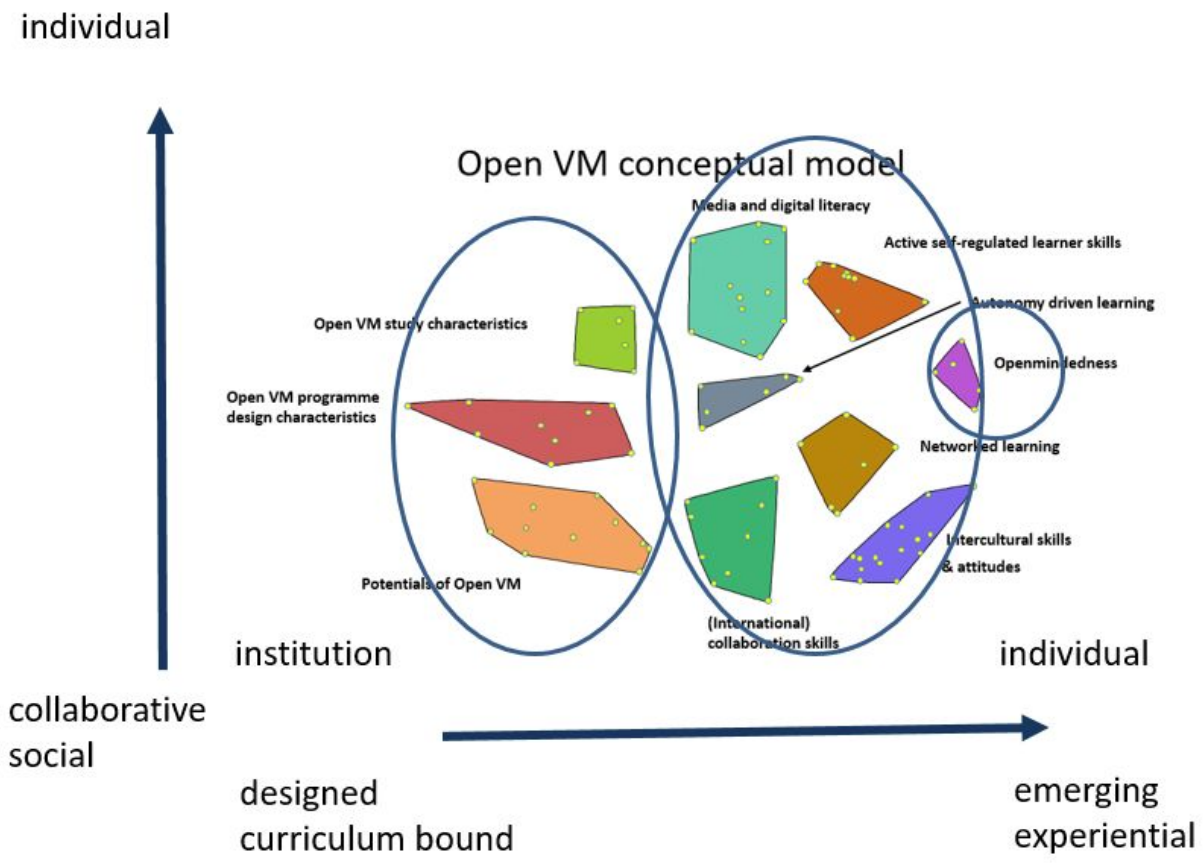

Figure 2. Analysis of the Open VM conceptual framework: visible trends

4. Exploration of relationships with other competence frameworks

The OpenVM Competence Framework touches upon learner competence areas and topics that are also discussed in other Competence Frameworks, including Competence Frameworks and Policy Recommendations from the European Commission. For this purpose, we undertook two analyses, mapping the Open VM competence framework into (a) five frameworks developed by European institutions to support policy making on national and institutional level and (b) into a comprehensive framework ESCO which builds upon other frameworks, yet aims at representing a broad spectre of occupations and professions. Mapping into five frameworks selected on the basis of their relevance, scope and/or scientific value can be seen as provisional. Mapping into ESCO was undertaken with an idea of also elaborating on the method of such method. Therefore, the approach to mapping into ESCO is presented in more detail.

4.1. Open VM Competence Framework Compared to other Competence Frameworks

Four selected Competence Frameworks are aimed at individuals. One is aimed at organisations. In table 3 we list the competence frameworks and their primary focus. We then discuss the overlap between the OpenVM Competence Framework and the five selected frameworks.

Table 3. An overview of consulted Competence Frameworks

Competence Framework	Competence areas
DigComp 2.1. Competence Framework	The DigComp 2.1 Competence Framework has been developed on the basis of the Digital Competence Framework for Citizens (Carretero, Vuorikari & Punie, 2017). The framework has 8 proficiency levels for 5 competence areas: • information and data literacy • communication and collaboration • digital content creation • safety • problem solving The 8 proficiency levels run from Foundation (2 levels), over Intermediate (2 levels) and Advanced (2 levels), to Highly Specialized (2 levels)

European Framework for the Digital Competence of Educators (DigCompEdu)	The European Framework for the Digital Competence of Educators (DigCompEdu) forcusses on professional, pedagogic and learners' competences of educators and describes what it means for educators to be digitally competent (Redecker, 2017) .
European Reference Framework on Key Competences for Lifelong Learning	This framework builds on several other frameworks working in lifelong learning skills and competences. It is aimed at individuals and focuses on 8 key competences: • Literacy • Languages competence • Science, technological, engineering and mathematical competence • Digital competence • Personal, Social and Learning competence • Civic competence • Entrepreneurship Competence • Cultural Awareness and expression
Knowledge, Skills and Attitudes in Intercultural Competence Development	Intercultural competence frameworks were selected that were based on work by Deardorff (2020).
Opening Up Education	There is only one framework on Open Education that can be used. **"Opening Up Education"** is a recommendation and support framework aimed at institutions in Higher Education to open up education (Inamorato dos Santos, Punie & Castano-Munoz, 2016). It looks at 10 dimensions of open education: Core dimensions: o Access, o Content, o Pedagogy, o Recognition, o Collaboration, o Research Transversal dimensions: o Strategy, o Technology, o Quality, o Leadership

The OpenVM Competence Areas show overlap with these existing frameworks in several ways.

Aspects of ***Digital & Media Literacy, Autonomy-driven Learning*** and ***Open-mindedness*** are in line with several parts of the competency frameworks introduced above, in particular:

- Ø DigiComp 2.1
  - o Competence Area 1: Information and data literacy
  - o Competence Area 2: Communication and collaboration
- Ø DigiCompEdu:
  - o Digital Resources (creators and re-users of digital content)
  - o Learning Designers (e.g. collaborative learners)
  - o Expert users to empower learners
- Ø Key Competences Framework
  - o Digital competence
  - o Media Literacy
  - o (openness is only interpreted as part of openness towards cultural diversity)

These Competence Areas contain skills relevant to individual digital competence but also specifically digital competence within an open environment, requiring particular mindsets on reusing, sharing and creating open materials and within open pedagogies. It is interesting to note that these issues are not yet covered by existing frameworks aimed at the individual.

The framework on Open Education aimed at HE Institutions and organisations discussed digital competence across several dimensions and views technology as a transversal dimension. The relevant competence for educational institutions is:

- Ø Digital skills in an Open Environment
  - o Access
  - o Content
  - o Pedagogy
  - o Recognition
  - o Transversal dimension: technology

Key aspects of OpenVM Competence areas, such as ***Open-mindedness, Networked Learning, Intercultural Skills and Attitudes and Collaborative Learning***, focus on tolerance towards ambiguity in social relationships in learning, are partially covered by some frameworks mentioned above. The competences are referred to on an individual's level in the Key Competences Framework (Languages; Cultural Awareness and Expression). Although there is a technology aspect to this combination of competence areas, this theme does not appear in the Digital competence frameworks, as those are primarily focused on the development of digital competences.

On an institutional level, OpenEDU does discuss Collaboration in Openness in an Open Environment The OpenEDU framework discusses situations and scenarios of institutional collaboration where openness on an individual's level will become important.

Interestingly, the skills covered in this combination of OpenVM skills are strongly related to the Attitude component of Deardorff's model on intercultural competence.

Aspects of ***Self-regulated learning*** and ***Digital and Media Literacy*** are in line with several parts of the competence frameworks introduced above, in particular:

- Ø DigiCompEdu:
  - o Teaching and Learning: Self-regulated learning
  - o Empowering Learners
- Ø Key Competences Framework
  - o Self-regulation is part of the Entrepreneurship competence
  - o Also covered by Personal, Social and Learning competence

Although self-regulation is not explicitly mentioned in the OpenEDU framework for institutions, the individual-level competence is a prerequisite for the strategies recommended in this framework (e.g. personalized teaching, use of modular curricula, etc.).

OpenVM skills ***Intercultural skills and attitude, Open-mindedness, Networked Learning*** cover intercultural skills, awareness of cultural context/others' world, self-awareness and developing confidence in dealing with people from other countries. A prerequisite for this is proficiency in several languages. These issues are covered under the following frameworks:

- Ø Key Competences Framework
  - o Civic competency: values, attitudes, skills, knowledge and critical understanding
  - o Cultural awareness and expression
  - o Issues on Literacy
  - o Issues covered by Personal, Social and Learning competence

Although the digital competence frameworks do not cover topics, this grouping of skills is strongly related to the Knowledge and Skills components of Deardorff's model on intercultural competence (Deadroff, 2020).

In this paragraph, we have presented the relationship between the OpenVM Learner Competence Framework and some existing frameworks on individual competences and institutional best practices. **Although the OpenVM Learner Competence Framework shows some aspects of overlap, it presents a new competence grouping that is as yet uncovered in other similar frameworks.**

4.2. Mapping of the OpenVM competence framework to ESCO

ESCO (European Skills, Competences, Qualifications and Occupations) is an initiative supported by the European Commission, to build upon existing competence frameworks. It is a European multilingual classification that "works as a dictionary, describing, identifying and classifying professional occupations, skills, and qualifications relevant for the EU labour market and education and training".
Currently ESCO provides descriptions of almost 3000 occupations and 14000 skills linked to these occupations, translated into all official EU languages. Its aim is to offer Europeans a "common language" on occupations and skills that can be used by different stakeholders on employment and education and training topics.

A mapping of OpenVM skills and competences upon ESCO competences was undertaken in order to explore the extent to which this expert framework fits into a general European competence framework.

4.2.1 Method

Four members of the OpenVM project team conducted the mapping and a fifth OpenVM project team member analysed the results. The procedure consisted of three steps (table 4).

Table 4 Mapping of OpenVM framework to ESCO framework

Steps	Description
Step1: Shortlisting	The ESCO framework was downloaded from the online portal in March 2019. Each of the four participants created separately an exhaustive list of ESCO descriptors on all themes that he/she considered relevant. The four lists were merged, duplicates were deleted. The resulting list was used for further steps.
Step 2: Coding	For each of the eight OpenVM competence areas, ESCO descriptors from the complete list were coded on the extent to which it belonged within category 1 (the ESCO descriptor describes (part of) the OpenVM competence area) or 0 (the ESCO descriptor does not describe (part of) the OpenVM competence area").
Step 3: Calculating reliability	Interrater reliability between the four coders was calculated to arrive at a minimal set of descriptors on which at least three participants agreed that the descriptor described (part of) the OpenVM competence area.

4.2.3 Results

An initial exploration of the ESCO skills pillar resulted in an extensive list of ESCO skills and competences for each of the eight OpenVM competences. The number of potential ESCO skills that according to the four participants taken together overlapped with the 8 OpenVM competence areas varied from 1 to 22 (see table 5). Some of the ESCO skills were listed with more than one OpenVM competence.

Although the initial shortlisting of ESCO already took OpenVM competences into account, the level of consensus on coding varied per OpenVM competence.

The level of initially shortlisted descriptors constituted 90-94% (0.9) for active self-regulated skills and media and digital literacy, for other OpenVM competences a far lower proportion of ESCO skills was retained. Table 5 demonstrates that coders differed in deciding whether particular ESCO descriptors described OpenVM competences, from 40% (intercultural skills) to 100% (gaining knowledge of Virtual Mobility and Open Education). Several ESCO skills have been mapped to multiple OpenVM competences.

Table 5. Number of ESCO skills initially shortlisted for the mapping and agreement between coders

	ESCO skills(1)	ESCO agreed(2)	Proportion (3)	4 (4)	3 (5)	not relevant
Intercultural skills & attitudes	22	9	0.4	4	5	1
Interactive & collaborative learning	13	5	0.4	3	2	0
Autonomy-driven Learning	8	4	0.5	2	2	1
Networked Learning	11	7	**0.6**	1	6	0
Media and Digital Literacy	17	15	**0.9**	7	8	0

Active self-regulated learner skills	10	9	**0.9**	6	3	0
Open-mindedness	5	4	**0.8**	2	2	0
Gaining Knowledge of Virtual Mobility and Open Education	1	1	**1.0**	0	1	0

[1] Number of ESCO skills shortlisted for mapping; [2] Number of ESCO skills at least three coders agreed on; [3] Number of ESCO skills the four coders agreed on; [4] Number of ESCO skills three coders agreed on (in addition to codes with full agreement); [5] Number of ESCO skills all coders agreed on as not describing OpenVM competences

It was not possible to calculate a correlation based on values being either 0 (ESCO descriptor does not describe an OpenVM competence) or 1 (ESCO description does describe an OpenVM competence), therefore we looked at the number of coders who agreed upon a specific ESCO descriptor and accepted sufficient agreement when at least three coders agreed.

Table 5. The proportion of ESCO skills indicated to describe OpenVM competences

	# ESCO skills	Coder 1	Coder 2	Coder 3	Coder 4	Average
Intercultural skills & attitudes	22	0.3	0.6	0.5	0.9	0.6
Interactive and collaborative learning	13	0.2	0.7	0.5	0.8	0.6
Autonomy-driven Learning	8	0.5	0.6	0.4	0.9	0.6
Networked Learning	11	0.7	**1.0**	0.1	0.9	0.7
Media and Digital Literacy	17	**1.0**	0.8	0.7	0.8	0.8
Active self-regulated learner skills	10	**1.0**	0.9	0.6	0.9	0.9

Open-mindedness	5	0.8	**1.0**	0.4	0.8	0.8
Gaining Knowledge of Virtual Mobility and Open Education	1	**1.0**	**1.0**	0.0	**1.0**	0.8

4.2.3 Challenges and limitations of the conducted mapping

Differences between the sources in ESCO constituted a major bottleneck in the analysis. The ESCO directory has a broad aim and is being constructed with input of a large number of involved and not specifically defined stakeholder groups and participants. The ESCO directory is being defined and adjusted continuously. The OpenVM competence framework is developed within a well-defined European consortium through a well-defined methodology and is based on contributions of a limited group of experts as defined and described in the Open access documents and publications (a.o. Rajagopal, e.a., 2020).

Exhaustiveness of ESCO framework: The development of the ESCO directory is an on-going process aiming at creating an exhaustive directory in which as many occupations as possible are represented as completely as possible. The OpenVM competence framework is a one moment snapshot conducted among a limited number of experts with the goal of designing a feasible number of training and assessment learning experiences.

This analysis reflects the findings based on the state of the directory in February-March 2019 when the mapping exercise was conducted. The ESCO directory is being continuously updated, therefore the current directory may contain different competence descriptions.

5. Conclusions

Output 1 Activity 1 (O1-A1) focussed on gaining more insight into the concepts of Virtual Mobility and Open Education, to understand the relationship between these concepts, to look at the opportunities that they offer teachers, students and other stakeholders and the needs they create, in order to build a Conceptual Framework on OpenVM. This output has set the stage for the development of the other outputs in the project, in particular, the OpenVM MOOCs and the related Open Credentials.

The originally proposed Delphi study of a limited number of experts with a roadmapping exercise was transformed into a large scale online Group Concept Mapping study among different categories of stakeholders (researchers, educators, international officers and school policy makers) with two

live components: a workshop at an international conference and a expert meeting. The outcomes of this output open the scope for further knowledge development both in educational practice as well as educational research.

Although the OpenVM Learner Competence Framework was developed in the context of Virtual Mobility and Open Education, its application can be wider. More specifically, we see opportunities in using (parts of) the OpenVM Learner Competence Framework to **understand and qualify the value** of physical mobility, virtual exchange programmes, blended learning contexts, etc.

The outcomes of the study allow us to draw a number of conclusions about conceptualizing Open Virtual Mobility and establishing its focus and locus as part of the educational scene of the 21st century and formulate recommendations for further research.

The conceptual crossing of Virtual Mobility and Open Education as new educational strands has brought to the fore a number of generic learner skills and competences as a distinct set of skills and competences that Open Virtual Mobility supports. These competences represent generic competences coined as 21st century learner skills and combine aspects of the three disruptive drivers in the current higher education landscape: digitalization, collaboration and openness, to varying degrees. These are all complex skills that require complex and varied learning contexts, multiple application contexts and extended practice.

We do not say that Open Virtual Mobility is the only way to develop these skills, nor that the insights that this study provided are exhaustive and conclusive. Rather than that, the results of this study point to a viable direction for a discussion on the development of transversal skills and competences needed in a variety of 21st century professions and forming a good fit to the generic learning goals of internationalized, globalized higher education. Thus, **Open Virtual Mobility can be seen as a viable method in tackling the challenging tasks of supporting and enhancing development of these learner skills**.

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