

## ORIGINAL RESEARCH ARTICLE

### Learner skills in open virtual mobility

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Internationalisation has been a key theme in higher education (HE) for decades. Multiple initiatives across the world have contributed to creating offerings of high-quality online education, with collaborations across national borders. Two of the concepts that have proved to be influential are Virtual Mobility (VM) and Open Education (OE). Virtual mobility refers to study activities that students enrolled in HE in one country undertake online in other countries without physically moving. Such activities are certified and mutually acknowledged by participating institutions. Open education covers global initiatives increasing access to free online quality education, without or with alternative forms of certification.

The research presented in this article identifies the learner skills and competences that are supported by Open Virtual Mobility (OpenVM), a new trend in online education that builds upon these two concepts. A group concept mapping study based on the contributions of experts in both VM and OE resulted in defining seven learner skills and competence areas including: intercultural skills and attitudes; networked learning; active self-regulated learner skills; media and digital literacy; autonomy-driven learning, interactive and collaborative learning in an authentic international environment and open-mindedness. The study provided input for further conceptualising of OpenVM as a bridge between VM and OE.

**Keywords:** virtual mobility; open education; open virtual mobility; group concept mapping; learner skills; competence framework

### Introduction

Internationalisation has been a key theme in higher education (HE) for many centuries, from student mobility in the Middle Ages in Europe, to the access to high-quality content from the most innovative American universities in the 21st century. What internationalisation 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 internationalisation: 'Internationalization at the national/sector/institutional levels is defined as the process of integrating an international,

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intercultural or global dimension into the purpose, functions or delivery of post-secondary education'. (Knight 2003, p. 2)

Internationalisation needs to be distinguished from globalisation (Varghese 2018). The globalisation of HE views higher educational institutions (HEIs) as an important group of organisations in the current global educational market. From this perspective, HEIs are key suppliers of high-quality human resources to a globalised knowledge economic market. As such, globalisation emphasises the economic role and commercial function of HEIs, whereas internationalisation looks at the socio-cultural aspects of education.

Internationalisation has taken many forms in implementation, from student exchanges, student and teacher mobility, to cross-border collaborative projects (Varghese 2008, 2018). However, these activities also emerge as an implementation of HEIs taking up their supplier role in the globalised educational market. Often, offering these activities and courses to learners strengthens HEIs' reputation as high-quality human resource and knowledge-developing institutions.

Internationalisation has been developing on the back of three disruptive drivers currently running through the global educational landscape: increased possibilities through digitalisation (Flavin and Quintero 2018), increased interest in global collaboration at the individual and institutional levels (Blight, Davis and Olsen 1999; Nascimbeni *et al.*, 2018; Ryan *et al.* 2017; van Tryon, McDonald & Hirumi 2018) and the drive to openness to widen access to HE (Wiley 2010; Wiley and Hilton III 2009). 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.

In this article, we will focus on the specific context of Europe, with its transnational cooperation under the auspices of the European Union. The European strategy on HE 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 HE 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 internationalisation 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 Skłodowska–Curie staff exchanges and individual fellowships.

We focus on two phenomena implementing internationalisation at HE institutions within the EHEA that build on the drivers of digitalisation, collaboration and openness: virtual mobility (VM) and Open Education (OE).

The first phenomenon related to implementing internationalisation of higher educational curricula within the EHEA, is the concept of VM, 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 2018). This concept has been promoted with dedicated policies and funding. Virtual mobility is a form of mobility between two or more (often European) HE 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 (Bijnens, Boussemaere, and Rajagopal 2006). 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 and Henderikx 2018). Virtual mobility therefore integrates the concepts of institutional collaboration and cooperation through digitalisation. 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.

The second phenomenon supporting internationalisation in the EHEA is OE. In the last two decades, there has been an upsurge in open online learning developed and offered by a range of HE institutions, including the world's most prestigious universities. Most notably, massive open online courses (MOOCs) and open educational resources (OER) have significantly influenced the global educational scene (Daniel 2012; Jansen and Schuwer 2015; Orr, Weller and Farrow 2018). During this period MOOCs in a multitude of instantiations of different scale have developed from a possibly 'disruptive' factor to a widely accepted form of learning in development existing next to, intermingled with and with varying links to formal curricula (Rohs and Ganz 2015).

This upsurge in OE can clearly be seen as a consequence of the globalised educational market (Varghese 2018). Universities invest in online and blended learning in OE formats for diverse purposes, improving accessibility to high-quality education. They see the potential of open online education and OER in innovating HE, developing and testing new designs and new educational formats. Furthermore, universities use open online courses to present and promote their curricular offering (Castano Munos *et al.* 2016; Hollands and Tirthali 2014; Kiers 2016) and enrich or extend curricula or create an additional offering for graduates (Pickering and Swinnerton 2017). Collaboration between OE providers can be organised on an individual level, for example in the form of reuse of OER and practices, and at an institutional level, for example through recognition of selected MOOCs offered by other institutions (Cronin 2017; Hew and Cheung 2014; Loeckx 2016). Thus, OER and MOOCs have offered HEIs the means for establishing themselves as global organisations in a global educational market (Varghese 2018).

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

Momentarily, VM as a form of cross-border online learning and OE, which is both online and borderless by default, notwithstanding their significant similarities,

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	++ Formalised 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 higher education

are two distinctly different strands, each with its own rich potential of contributing to the internationalisation of HE (Daniel 2012; Ubachs and Henderikx 2018). Both these phenomena also fulfil 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 globalised world. However, the communities around the two phenomena are also relatively distinct from each other.

From a learner's perspective, VM and OE 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 regarding which learner skills and competences are acquired and built by these activities, nor what the pre-requisite learner skills for successfully completing these activities are. Few studies look at virtual collaboration within the international context. Júnior and Finardi (2018) look at a categorisation of the international collaborations based on minimal design features but do not consider learner skills or competences. Van Gaalen (2009) describes the MINT tool used by Nuffic in the Netherlands for characterising internationalisation. 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 internationalisation. Green (2012) presents a quality framework that can support curriculum design and evaluation for internationalisation, but it does not integrate the broader competence development perspective. De Kraker, Cörvers, and Lansu (2014) discuss the potential of virtual mobility to develop transboundary competence within the field of sustainable development.

The specific contexts of OE 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 OE is challenged by the very variability of OE, from the personal perspective, to start with the drive to enrol, learn from OE (Henderikx, Kreijns and Kalz 2017) to the institutional perspective, the drive to develop and deliver OE.

A deeper understanding of how VM and OE relate to each other can inform a more profound appreciation of the complexities caused by digitalisation, institutional collaboration and openness and the effects on what individual learners and society in general learn and gain from them. In this highly dynamic context, re-conceptualising VM against the backdrop of OE (as open virtual mobility (OpenVM)) increases the sustainability of this form of learning. In the frame of the Erasmus+ strategic partnership OpenVM 9 European partner organisations from HE set the goals of developing a shared understanding of the concept of OpenVM and its core characteristics (Buchem *et al.* 2018).

This article describes an exploratory qualitative research conducted to establish the conceptual framework on OpenVM learner skills and competences. The research questions dealt with in this study are:

- Which skills and competences do learners acquire and build when participating in OpenVM activities?
- What are the facilitation needs at an institutional level for OpenVM activities?

## Method

To answer the research questions, standpoints of experts on VM and OE were sought. Knowledge and expertise on these phenomena is diffuse and scattered among individuals and institutions, university international offices, European networks and research

centres in different countries. Therefore, a methodological approach was sought which supports not only online data collection but also joint knowledge construction and addresses validity checks to ensure the quality of outcomes.

**Group concept mapping**

The applied methodology, the group concept mapping (GCM, Kane and Trochim 2007), supports knowledge construction through collecting and organising ideas of individuals so that a collective visual geography of a concept can be created to be further analysed, 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 analysed using 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 and Rosas 2018; Kane and Trochim 2007).

**Participants**

Expertise on and affinity with the VM and OE at the conceptual level or in the educational practice formed the pre-requisite of the participation. Such experts are scarce; therefore, for each phase in the study, additional recruitment was undertaken to complement the expertise within the OpenVM project. Each project partner invited experts from their respective national networks for brainstorming, sorting and rating. OE global conference (oeglobal.org) was used as the venue for validation and the outcomes were finalised in a focus group with experts linked to the OpenVM project.

Table 2 gives an overview of the GCM study participants at different stages of the study. Table 3 presents the occupational background of the respondents.

Table 2. Participation in different phases of the GCM on open virtual mobility.

Participants	Brainstorm in GCM	Sorting in GCM	Rating in GCM	Validation activity (OE global conference)	Consolidation activity (finalising outcomes)
OpenVM project members	11	13	12	6	5
Non-members	8	15	12	3	0
Total	19	28	24	9	5

Table 3. Background characteristics of GCM participants per phase.

Background characteristics	Responded to invitation	Completed sorting activity	Completed rating on at least one dimension	Completed status for all online activities together	Took part in the OE global validation workshop	Took part in the final consolidation
University professors	19	14	14	15	6	2
Researcher	7	5	5	5	2	1
International office staff	6	2	0	2	0	0
University board/policy makers	2	1	2	2	0	0
Educational support staff	4	3	2	3	1	2
ICT support staff	4	3	0	3	0	0
Other	4	0	4	4	0	0
Total	46	28	27	34	9	5

The question about experience in education is answered by half of the participants most of whom have more than 10 years of experience in university teaching. Most participants indicated that they have experience related to both concepts of VM and OE.

### *Instruments*

The Concept System® Global MAX™ (2016) online environment (<https://concept-systemsglobal.com/>) was used for data generation and analysis. Printouts of the generated visual representations of the results (various maps) were used at the validation and interpretation workshop.

### *Procedure*

1. **Recruiting participants.** All OpenVM project members were invited to participate in the study and were requested to share the invitation in their respective networks including representatives of the research community, educators, internationalisation officers at higher education institutions, HE boards representatives and policy makers. Project members approached their contacts through e-mail with a reminder in case of non-response and invited to participate in the sorting and rating activities through the online tool. Informed consent request was requested through the GCM tool.
2. **Idea generation.** Idea generation was steered by the focus prompt. Please, complete the statement ‘In the context of Open Education, Virtual Mobility implies that students ...’. Participants were invited to give as many answers as they wished in the form of short direct statements. In total, 101 statements were generated in the idea-generation phase of the study.

3. **Data cleaning and removal duplicates.** All duplicate statements were removed. Statements were checked for repetition or ambiguity issues by two project members separately, results were compared and full agreement was reached on statements to be removed. The final set included 90 unique statements.
4. **Sorting and rating.** Participants were invited to group statements based on their similarity in meaning, provide the groups with meaningful labels and to evaluate each statement on dimensions of importance and feasibility on a scale from 1 (not important/feasible) to 5 (highly important/feasible).
5. **Analysis.** MDS and HCA analyses were conducted by using the GCM tool, and visual representations of the data were generated for conceptual analysis, interpretation and validation with the stakeholders. Preliminary data interpretation was conducted by the two lead authors in preparation for the validation and consolidation phase.
6. **Interpretation, validation and consolidation.** Two sessions were held to interpret, validate and consolidate the outcomes of the analysis. An OE global conference 2018, an Action Lab activity, was used as an interpretation and validation workshop. During the workshop visual representations of preliminary clusters, the respective statements and key statistics were presented to the workshop participants who discussed the presented data and provided feedback. Contributions of the participants were written down and analysed by the lead authors. Based on the outcomes of the validation workshop an overview of the clusters with tentative labels was carried out to support the final step – a consolidation workshop that was held with five selected project members with both theoretical and practical expertise on VM. The outcomes of the consolidation workshop are considered final results of the GCM study.

## Results

A total of 90 statements generated in GCM are presented in a detailed point map in quadrant 1 of Figure 1. The point map visualises the position of individual statements in relation to each other that results from the MDS analysis. Statements that are situated closer to each other on this map are grouped together by individual participants more often. When clusters are defined, such statements have a greater chance to be put in the same cluster.

The extent to which the data point map represents the way individual participants sorted the data is tested with the help of Kruskal's stress value statistic that indicates the goodness-of-fit of the data. A lower stress value is an indication of a better fit which should be in the range between 0.205 and 0.365 (Kane and Trochim 2007). In this study, the stress value constituted a goodness-of-fit of an acceptable level of 0.2531.

Quadrant 2 of Figure 1 presents a visualisation of thematic groupings of ideas in 10 clusters. The 10-cluster solution results from the analysis of the individual sorting activity with HCA supported by the bridging value statistic and the outcomes of the validation workshop.

The bridging value index (Table 3) indicates to what extent a cluster is a consistent and coherent entity, separate from other clusters. The lower the bridging value, the higher the level of cluster consistency is; the higher the bridging value, the more the cluster and its constituent elements (statements) are related to statements in other clusters.

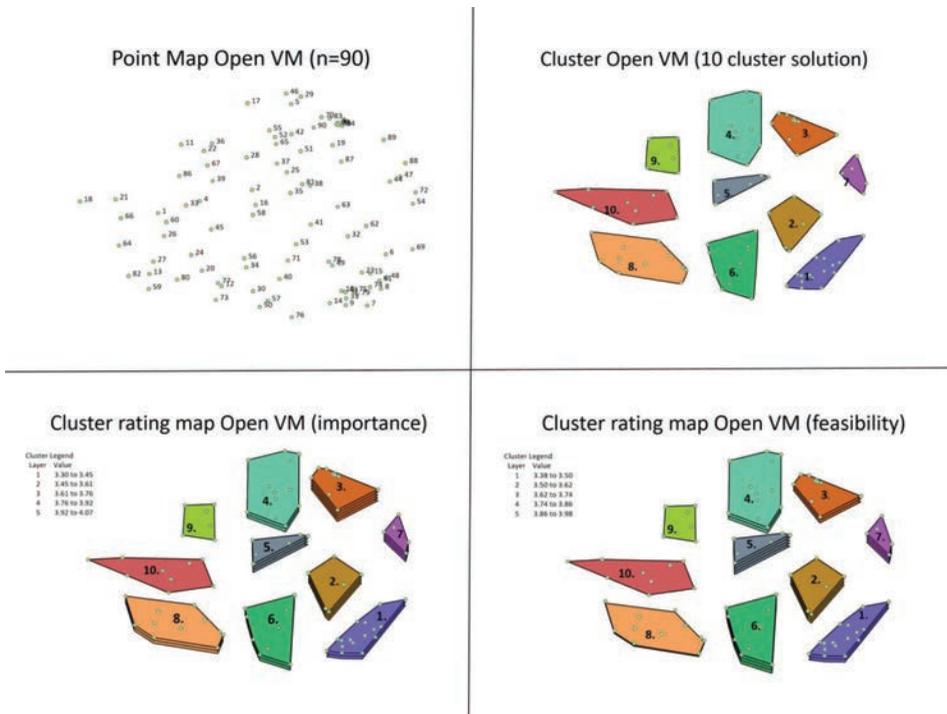


Figure 1. The outcomes of the Group Concept Mapping study on OpenVM. Quadrant 1, the point map; quadrant 2, the cluster map; quadrant 3, the rating map on the dimension of importance and quadrant 4, the rating map on the dimension of feasibility.

In the 10-cluster model of OpenVM competences, the average bridging values vary from 0.12 (a highly consistent cluster) to 0.54 (a moderately consistent cluster).

As the clusters present thematic groupings, defining the name or the cluster label is relevant. The GCM tool suggests ‘a best match’ label to the clusters based on the individual sorting activity. This ‘best match’ option is used to steer discussion and reach agreement at the interpretation and validation workshops. The final labels resulting from the expert consolidation session are based on agreement of all five participating experts. Table 3 shows the clusters with their labels, the respective bridging values and exemplary statements per cluster; Figure 3 is a visualisation of the outcomes.

The other two quadrants of Figure 1 present respectively results of rating the statements on dimensions of importance (q3) and feasibility (q4). The more layers the cluster has, the higher the average rating index of the cluster which is an indication that a particular cluster combines items that are rated higher on importance of feasibility dimensions.

As data presented in Table 4 indicate, there is a high level of agreement between the participants in the GCM study on clusters 1, 2, 3, 4, 5 and 6. As labels of the clusters indicate, these clusters describe the skills that learners develop in OpenVM and the skills that they need to succeed in OpenVM. Cluster 7 (open-mindedness) which has a higher though still moderate bridging value describes an attitude.

Table 4. OpenVM clusters with exemplary statements per cluster with their respective bridging values.

Cluster with per cluster exemplary statements with their respective bridging values as an answer to the prompt <b>In the context of Open Education, Virtual Mobility implies that students [develop]...</b>	M bridging values(SD)	N statements per cluster
1. Intercultural skills & attitudes <ul style="list-style-type: none"> <li>• gain knowledge about the culture they ‘visit’</li> <li>• have exposure to different working and cultural backgrounds, which could raise both new potentials and barriers at the same time</li> <li>• feel confident in interacting with people from other cultures after a VM experience</li> </ul>	0.12 (0.13)	16
2. Networked learning <ul style="list-style-type: none"> <li>• learn to work and cooperate in an international setting with the use of ICT and social platforms</li> <li>• learn about dealing with complex situations through the VM activity</li> <li>• learn about dealing with ambiguity through the VM activity</li> </ul>	0.25 (0.05)	6
3. Active self-regulated learner skills <ul style="list-style-type: none"> <li>• should be able to plan and organise their own learning process</li> <li>• are able to self-reflect</li> <li>• aims of VM in student development -self-discipline in learning</li> </ul>	0.16 (0.13)	10
4. Media and digital literacy <ul style="list-style-type: none"> <li>• are proficient in searching for good quality courses and resources</li> <li>• are digitally literate</li> <li>• are proficient in using digital platforms</li> </ul>	0.22 (0.08)	12
5. Autonomy-driven learning <ul style="list-style-type: none"> <li>• develop persistence and creativity in organising their own study, that is they might need to find suitable and feasible courses on their own and convince curriculum boards of the quality of learning in OE contexts</li> <li>• can enhance their lifelong learning skills</li> <li>• can learn in an open digital context</li> </ul>	0.21 (0.07)	6
6. Interactive and collaborative learning in an authentic international environment <ul style="list-style-type: none"> <li>• exchange knowledge with peers from different disciplines</li> <li>• collaborate with peers from different disciplines</li> <li>• the open digital context facilitates collaboration about international students</li> </ul>	0.31 (0.07)	9
7. Open-mindedness <ul style="list-style-type: none"> <li>• are open minded</li> <li>• are not afraid of interacting with peers and teaching staff at other institutions</li> <li>• are willing to improve their proficiency in foreign languages</li> </ul>	0.53 (0.07)	5

Table 4. (Continued)

Cluster with per cluster exemplary statements with their respective bridging values as an answer to the prompt <b>In the context of Open Education, Virtual Mobility implies that students [develop]...</b>	M bridging values(SD)	N statements per cluster
8. Potentials of OpenVM <ul style="list-style-type: none"> <li>• have access to high quality learning processes that otherwise would not be possible for them</li> <li>• do not have to pay any fees for attending a virtual mobility course of a foreign institution</li> <li>• receive academic recognition for participating in virtual mobility</li> </ul>	0.39 (0.11)	11
9. OpenVM study characteristics <ul style="list-style-type: none"> <li>• carry out the learning process under the characteristics of open education</li> <li>• students create their digital identity through the open context</li> <li>• using IT tools in a transparent and efficient way to interact with other participants and the learning material</li> </ul>	0.53 (0.11)	6
10. OpenVM programme design characteristics <ul style="list-style-type: none"> <li>• are involved in predetermined learning activities, open and collaborative, through which they can acquired knowledge thanks to innovative learning methods</li> <li>• the construction of a well-defined learning path in which collaborative and international activities are pivotal</li> <li>• needs guidance and support to make the right choices and to stay motivated</li> </ul>	0.54 (0.20)	9

The three remaining clusters also have higher, though still moderate bridging values. These clusters seem more related to external aspects of OpenVM such as programme characteristics or pre-requisites of VM.

Importance and feasibility ratings (see Figure 1, quadrants 3 and 4) indicate that clusters that represent skills and attitudes (clusters 1–7) score higher both on importance and feasibility while the three clusters that represent external factors are considered relatively less important and at the time same less feasible.

These results allow us to answer the two research questions posed above in a reasonably straightforward way. According to the conducted GCM study, OpenVM 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). Figure 2 gives an overview of these skills and competences, with definitions formulated in the consolidation workshop. These skills seem to form a plausible point of departure in building a conceptual framework of OpenVM.

The GCM study also points to three separate clusters that represent conditions and pre-requisites for development of OpenVM, namely: the added value of OpenVM (8); the way the study and learning process is organised in OpenVM (9) and OpenVM design characteristics (10). Figure 3 is a graphical representation of the resulting concept map of the OpenVM.

**An overview of Open VM competences according to the conducted GCM study**

1. **Intercultural skills & attitudes:** Developing intercultural skills and attitude implies that the student acquires cultural knowledge and a better understanding of cultural perspectives, including understanding of own cultural identity, that the student enhances and demonstrates cultural understanding and can apply intercultural awareness in culturally challenging circumstances.
2. **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.
3. **Active self-regulated learner skills:** Being an active self-regulated learner implies that the student is able to self-regulate 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.
4. **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".
5. **Autonomy-driven learning:** Being able to learn in an autonomy-driven way implies that the student self directs, and regulates 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.
6. **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.
7. **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.

Figure 2. An overview of skills and competences relevant in Open Virtual Mobility contexts as emerged from the GCM study.

## Discussion

From the point of view of conceptualising OpenVM as a new phenomenon related to but distinct from both VM and OE, the visual geography of GCM clusters and distance between them seems meaningful. As the visualisation in Figure 4 demonstrates, the generic learner competences (1–6) occupy the central position forming the core of the OpenVM framework in the most direct sense of the word. The central position of clusters representing these competences is combined with high levels of agreement between contributing experts on these clusters, as low bridging values indicate. The seventh competence area (open mindedness) seems both statistically and geographically a borderline cluster. Higher bridging values indicate that different experts relate the cluster and the underlying statements to different statements in different clusters. This cluster is less consistent, more diffuse, suggesting that there is less clarity on what it constitutes. Semantically, though, a connection to OE is meaningful.

## Open VM concept model

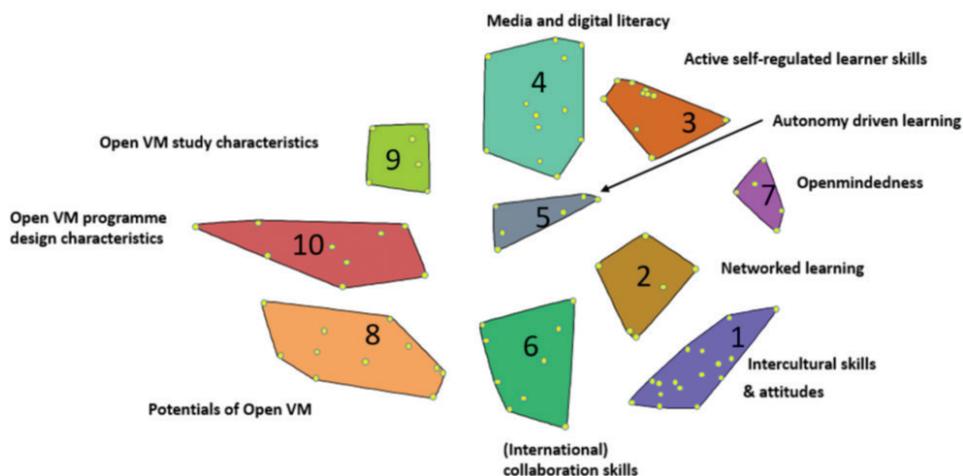


Figure 3. Resulting map of the Open Virtual Mobility concept.

Furthermore, open mindedness as a competence cluster occupies the furthest position from the clusters representing contextual and institutional determinants (conditions, prerequisites and study characteristics) of OpenVM. The framework points to a gradual trend from institution-related to individual (X-axis). The trend from institution to individual in Figure 4 also suggests a trend from design-related to emerging (learner behaviour/learner attitudes). The statements in the three clusters representing contextual and institutional determinants discuss the context that supports learning and how an ideal context could be designed. The core competence clusters situated towards the left (clusters 9, 5 and 4) depend on instructional design of the VM activities to support them. Clusters 8, 6, 10 and 7 however, deal much more with the development of individual learner attitudes and related behaviour 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 (clusters 1, 2 and 6) more at the bottom to skills related to individual learner competences (clusters 5, 3 and 4) at the top.

Interestingly, this distinction between institution and an individual is also noticeable in the established competence and support frameworks within the EHEA. The central competences emerging from the GCM study on OpenVM activities are related to skills and competences defined in existing individual competence frameworks, such as digital skills and competences covered in DigComp 2.1 (Carretero, Vuorikari and Punie 2017) and the European Reference Framework on Key Competences for Lifelong Learning of ESCO (ESCO European Skills/Competences, qualifications and Occupations 2018). The individual learner competences from our study – autonomy-driven learning, active self-regulated learning and media and digital literacy – take a prime position in these frameworks.

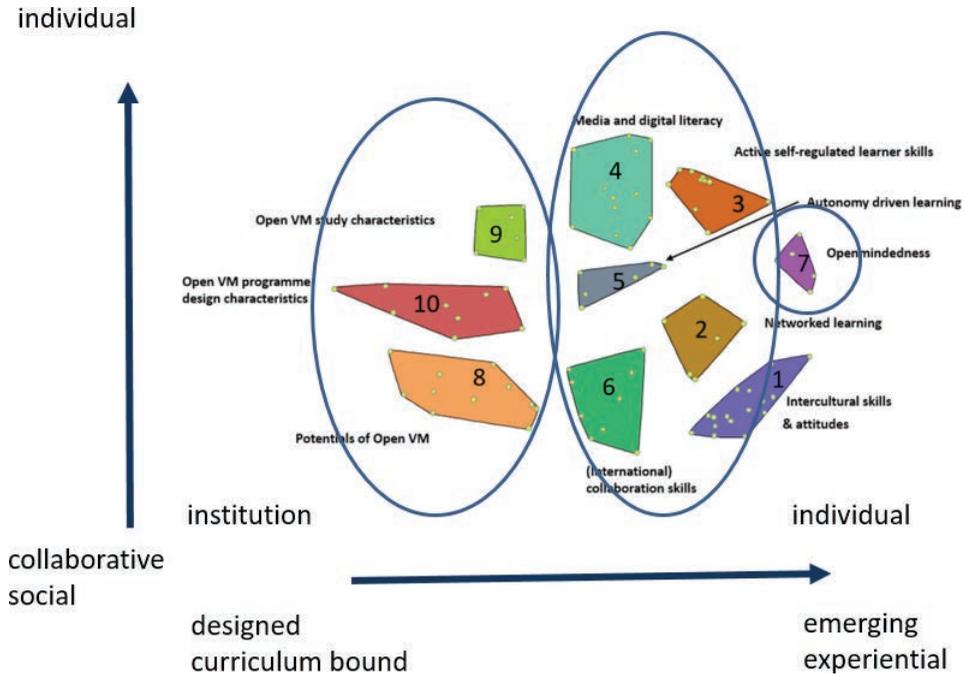


Figure 4. Analysis of the OpenVM concept map: visible trends.

The three clusters representing contextual and institutional determinants and their underlying statements are mirrored in the OpenEDU support framework (Inamorato dos Santos and Punie 2016). This framework is aimed at the institutional level to describe the desired and aspired-to level of openness. It is interesting that openness does not yet feature in a competence framework at the individual learner’s level as a competence area or attitude – as it emerges as ‘openmindedness’ from this GCM study.

The generic learner competences in our GCM study show overlap with six of the eight Key Competences for Lifelong Learning determined by the European Union (European Union 2019), including Personal, Social and Learning to Learn Competence, Cultural Awareness and Expression Competence and Citizenship Competence.

There are limitations to this study:

The experts who participated in in the study as experts on the topics of OE and VM are primarily university teachers or researchers. Other ‘adult’ stakeholders including internationalisation policy officials are marginally represented and students, who form the main target group of OpenVM activities, are not represented. An inclusion of students in the study might have identified different priorities and interests. Such inclusion may be possible in the context of current VM activities and exchanges in new or existing consortia of universities. Student perspective on VM competences deserves to become a new focus in future research of VM as a strand in HE internationalisation.

Caution is needed in interpreting the outcomes on which there is less agreement between the participants, that is, open mindedness as an individual characteristic and the institutional characteristics. It is not only that more research is needed, the need is

of different kind of research, based on data analytics, based on analysis of experiences of participants involved in OpenVM trajectories (foremost students but also those who organise and support VM) and analysis of effectiveness of varying design solutions.

## Conclusions

The outcomes of the study allow us to draw a number of conclusions about conceptualising OpenVM 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 VM and OE 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 OpenVM supports. These competences represent generic competences coined as 21st-century learner skills (Trilling and Fadel 2009; Voogt and Pareja Roblin 2010) and combine aspects of the three disruptive drivers in the current HE landscape: digitalisation, collaboration and openness, to varying degrees. These are all complex skills that require complex and varied learning contexts, multiple application contexts and extended practice (van Merriënboer and Kirschner 2018).

We do not say that OpenVM 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 internationalised, globalised HE. Thus, OpenVM can be seen as a viable method in tackling the challenging tasks of supporting and enhancing development of these learner skills.

Further research can advance on our work in various ways. The first avenue for research concerns the challenge of validation of this study. One possible qualitative method to do this is to look at the extent to which the outcomes of the GCM study can be mapped to existing OpenVM activities. More quantitative methods require better measuring instruments – which we discuss further.

A second option for further research concerns a categorisation of these types of activities. Although the concepts of VM and OpenVM have a European foundation, and are embedded in European policies, we see many examples of these concepts in other parts of the world. Notable examples are KIRON Open HE (Kiron 2019), an NGO working towards high-quality educational opportunities for refugees and underserved communities: by making individual learning programmes and paths using Open Education Models, they support prospective learners in preparation for and enrolment in formalised learning programmes at established universities across the world.

Organisations such as Soliya and UNICollaboration, with their various formats to encourage intercultural dialogue across the globe, now partner in the Erasmus+ Virtual Exchange, aimed at EU member states and countries of the South Mediterranean region, to gain more traction for these forms of mobility (Erasmus+ Virtual Exchange 2019; Soliya 2019). These examples bring up the issue of definition and naming: we see various terms being used to name the same type of activities, with different nuances in design and formats (e.g. Collaborative Online International Learning (COIL) in Rubin and Guth 2016; Telecollaboration in Dooly 2017; Globally Networked Teaching and Learning in Starke-Meyerring *et al.* 2008; Online Intercultural Exchange in O'Dowd and Lewis 2016). The results of our study can be a starting point to create a categorisation or typology of these different formats in more nuanced ways.

A final avenue for further research concerns measuring proficiency in these learner skills, and relatedly, effectiveness of design of these activities. This GCM study only identifies which learner skills and competences occur in these new educational formats, and does not say anything about how these skills and competences can be developed further. Open Virtual Mobility learner activities give shape to a form of experiential learning, and the specific formats of the activities that students experience highly determine which skills are developed and to what extent they are acquired. Therefore, we expect a potential OpenVM competence framework will need further operationalisation of these skills and corresponding proficiency levels. However, measuring learner competence development is complex. First, there is the issue of what you measure. As our GCM study shows, OpenVM Activities afford the development of several complex learner competences. Measuring these learner competences can happen on the plane of individual competences, or be focused on how the different competences interrelate in design. It is important to note that not all of the competences can currently be measured using quantitative methods (Gosen and Washbush 2004). Secondly, the question arises of how you measure learning. Gosen and Washbush (2004) discuss the difficulties of measuring learning gains from experiential learning designs and indicate measures to overcome these difficulties, including clarity in design aims, highly interdisciplinary research approaches and data-driven work on large-scale test beds (Gosen and Washbush 2004). McNamara (2013) points to the importance of multiple sources of evidence including learner self-reflection and supervisor/educators' assessment.

There are few studies on the impact of (Open) Virtual Mobility activities on learner skills and competences (Leh, Grau and Guisepppe 2015; O'Dowd 2007). One relevant study is the 2018 Impact report on the Erasmus+ Virtual Exchange (Helm and van der Velden 2019), where a set of quantitative and qualitative instruments has been developed to assess the impact of participation in Erasmus+ Virtual Exchange activities on learners' soft skills (intercultural communicative competence, self-esteem, curiosity, affect towards other groups).

The current study opens the scope for a more nuanced method to determine the learner skills involved in (Open) Virtual Mobility activities, and to effectively assess emerging learner activity within a particular design (Goodyear and Carvalho 2013, 2014).

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