

University of Groningen

The Impact of Virtual Exchange on Student Learning in Higher Education

EVOLVE Project Team

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

EVOLVE Project Team (2020). *The Impact of Virtual Exchange on Student Learning in Higher Education: EVOLVE Project Report*.

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The Impact of Virtual Exchange on Student Learning in Higher Education

EVOLVE Project Report

December 2020

EVOLVE Project Team



Evidence-Validated Online Learning through Virtual Exchange

About this publication

This study is an output of the Erasmus+ Forward Forward-Looking Cooperation Project EVOLVE (www.evolve-erasmus.eu), under Erasmus+ Key Action 3: Support for policy reform, Priority 5 – Achieving the aims of the renewed EU strategy for higher education (Erasmus+ project: 590174-EPP-1-2017-1-NL-EPPKA3-PI-FORWARD).

The project aims to mainstream Virtual Exchange (VE) as an innovative educational practice in Higher Education Institutes (HEIs) across Europe and runs from 1 January 2018 to 31 December 2020. It is coordinated by the University of Groningen, The Netherlands. The other partners in the project are: The University of León (Spain), Université Grenoble Alpes (France), The Open University (United Kingdom), Jan Dlugosz University (Poland), University of Padua (Italy), University of Warwick (United Kingdom), Malmö University (Sweden), Sharing Perspectives Foundation (the Netherlands), Soliya/Search for Common Ground (Belgium), Coimbra Group (Belgium) and SGroup (Belgium).



With the support of the Erasmus+ programme of the European Union.

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EVOLVE Project Team. (2020). *The Impact of Virtual Exchange on Student Learning in Higher Education*. EVOLVE Project publication. <http://hdl.handle.net/11370/d69d9923-8a9c-4b37-91c6-326ebbd14f17>

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Acknowledgements

We owe great thanks to the teachers and students from the following universities who participated in the current study: Adam Mickiewicz University, Poland; University of Bath, UK; Cyprus University of Technology, Cyprus; Institut Supérieur de Etudes Technologiques de Béja, Tunisia; University of Latvia, Latvia; Malmö Universitet, Sweden; Nanzan University, Japan; Pädagogische Hochschule Heidelberg, Germany; Princess Sumaya University for Technology, Jordan; Sampoerna University, Indonesia; Tel Aviv University, Israel; TED University, Turkey; Taipei Medical University, Taiwan; Technical University of Ostrava, Czech Republic; Université de Chypre, Cyprus; Université Grenoble Alpes, France; University of Goettingen, Germany; Jan Dlugosz University, Poland; Universidad de León, Spain; University of Maryland, Baltimore County, USA; Universidade Estadual Paulista 'Julio de Mesquita Filho', Brazil; Universidad Nacional de San Martin, Argentina.

We also thank the teachers and students from the universities which participated in the pilot round to this study: Adam Mickiewicz University, Poland; Malmö University, Sweden; Newcastle University, United Kingdom; Ohalo Academic College, Israel; Open University Catalunya, Spain; Technical University of Ostrava, Czech Republic; TED University, Turkey; Université Grenoble Alpes, France; University of Bordeaux, France; University of Groningen, the Netherlands; University of Jyväskylä, Finland; University of León, Spain.

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Many thanks also go out to the colleagues but who helped us prepare the current report by designing and running the training, contributing to the development of the research protocols or assisting with the collection, management and analysis of the data: Alice Baroni, Salma Elbeblawi, Rozenn Gautier, Casper van der Heijden, Francesca Helm, Sabine Lhotellier, Malgorzata Kurek, Augustin Lefèbvre, Tim Lewis, Teresa Mackinnon, Sophie Millner, Quan Nguyen, Hongying Peng, André Rosendaal, Steve Thorne, Ana Rosa Arias Gago, Isabelle Rousset, Rafael Tyszblat, and Bart van der Velden.

We should also like to thank Fester Possel, Catarina Moleiro, Mariana Sousa and Valère Meus who helped us organise and disseminate our work.

Finally, we owe gratitude to our institutions and organisations for contributing time and funds for us to work on the project and the European Union for funding this Erasmus+ project through the grant 590174-EPP-1-2017-1-NL-EPPKA3-PI-FORWARD.

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Executive summary

Sake Jager and Elke Nissen

Introduction

This report presents the findings of one of the studies carried out by the Erasmus+ KA3 project EVOLVE (www.evolve-erasmus.eu). Situated in the project's wider context of mainstreaming VE as innovative practice in HE in Europe and beyond, the focus of the current study is on the impact of Virtual Exchange (VE) on student learning in Higher Education (HE). Based on student data collected from 16 exchange projects between 34 partners from HEIs in Europe and other parts of the globe, it looks into students' general perceptions and appreciation of VE and the development of intercultural competences, critical digital literacy, language skills and disciplinary learning.

The study was aimed at learning more about student perspectives on VE and competence development facilitated through VE in the aforesaid areas across a wide range of academic disciplines and courses. The researchers worked closely with teachers of these courses, several of whom had been trained through the Co-Laboratory training developed as another activity in the EVOLVE project or through training provided by the concurrent Erasmus+ Virtual Exchange project.

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The instruments used for assessing the impact on student learning consisted of pre- and post-test surveys administered to all students in our sample, student portfolios completed by students whose teachers opted for using these, and post-hoc interviews with students. We also had access to VE information gathering sheets, containing descriptions of the VE project, which had been completed by the teachers running the VEs. The study comprises the data of 248 students in the 16 exchanges by 34 partners across the world, in all cases except one including a European partner.

Students' general perceptions of VE

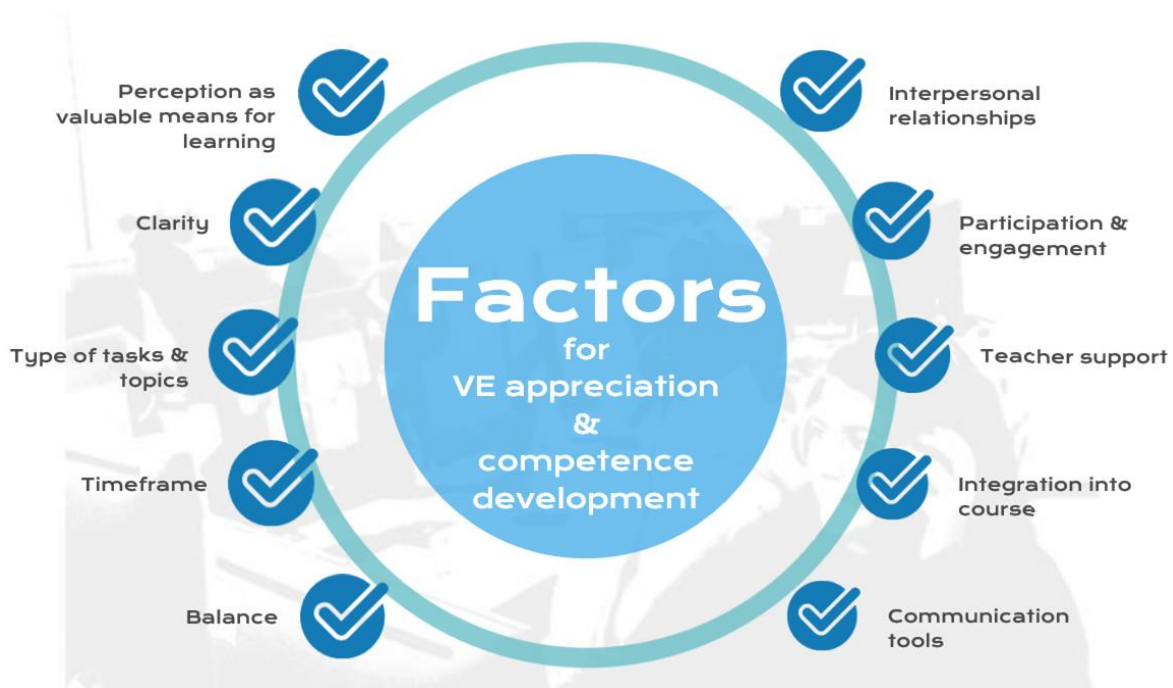
The first part of our study, presented in chapter 4, looked at students' overall perceptions of VE and its impact on learning outcomes in general. The researchers, Elke Nissen, Catherine Felce, and Catherine Muller, looked into general appreciation in relation to additional factors of satisfaction, implementation and design, which may foster or hinder the development of the specific competences targeted. They found that appreciation is clearly linked to levels of engagement and participation, but also to the perceived level of competence development.

The students in our sample by a large majority appreciated participating in the exchanges; they would, in fact, value the opportunity of participating in new exchanges and considered VE a valuable component of their courses. A somewhat smaller proportion of the students indicated that the experience had increased their interest in physical mobility.

Students' responses further suggest that they generally regard it as a good opportunity to develop transversal and disciplinary-specific skills. Student engagement and participation are closely related to appreciation.

Many factors turn out to be relevant for students' appreciation of VE and competence development. These are shown in Figure 1 and briefly discussed below.

Figure 1: Factors conducive to students' appreciation of VE and competence development



VE task design and organisation were found to be directly related to students' appreciation. This is a particularly relevant finding because well-constructed tasks and well-organised VEs are considered essential for achieving the cognitive engagement and participation, which are a pre-condition for competence development. The aspect of time plays multiple roles in task design: some students reported that participating in the VE was challenging because of the general workload for their course for their studies; due dates have to be communicated clearly and time zones differences need to be taken into account properly. Overall, however, students were positive about the tasks created by the teachers. Clear instructions and teacher support were mentioned as important, but also finding a proper balance between formal course work and more informal aspects of VE, such as the opportunity for personal communication and relationship-building. Integration into the course is an important factor for student satisfaction, but some students raised objections to mandatory aspects of VE and proposed that some tasks should rather be proposed as voluntary.

Technology was another determinant of appreciation, engagement and participation. Technology should be easy to use and work without the problems which some students experienced while participating in the exchanges. While synchronous videoconferencing appears to be an indispensable tool for socialising and relationship-building, it is one of the more technologically vulnerable tools at the same time. This is an aspect to be considered.

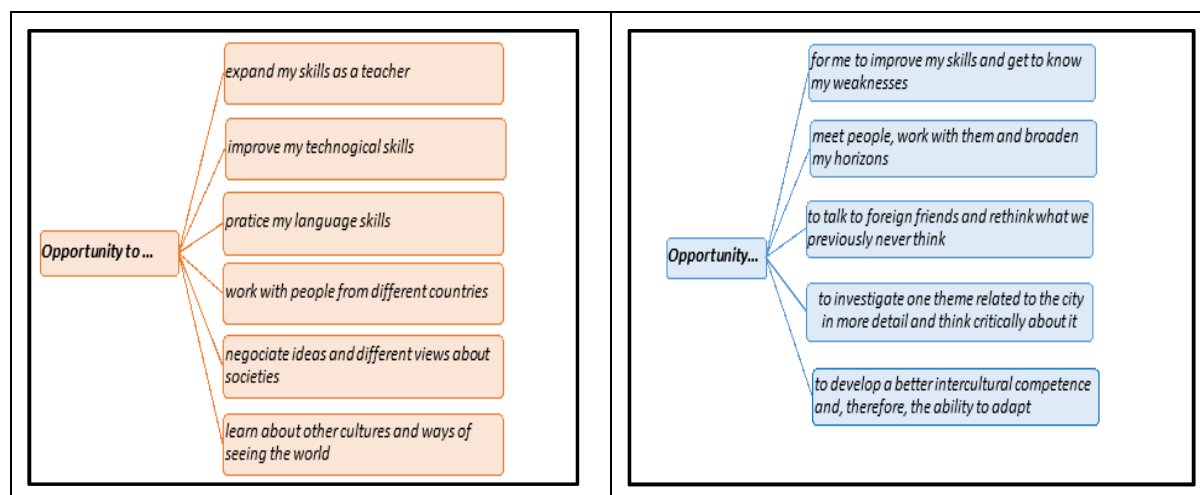
The associated problems, however, were minor for the entire group and most students managed to achieve high levels of participation, both by themselves and by their exchange partners. This created good conditions for collaborative teamwork and interpersonal relationships, which emerged as important factors for success in the exchanges. The data suggest that the possibility for authentic communication and gaining international and intercultural experience in realistic settings without visiting the partner's country are specifically appreciated by the students.

A particular situation occurred when two exchanges were struck by the COVID-19 pandemic, which affected both the design and the outcomes of the exchanges. This global crisis necessitated last-minute changes to the courses, which like most education worldwide had to be pivoted fully online. However, as suggested by the student reactions, these online exchanges turned out to be a great opportunity for bringing in cross-cultural, cross-disciplinary and personal perspectives on this crisis which affected the lives of students and teachers in different corners of the world. The way in which the teachers adapted the design of the exchange to the situation not only shows the versatility and robustness of VE as an educational tool, but also how it may create bonds between students as they are dealing with global problems which have an impact on all.

When looking at the development of learning outcomes through pre and post-survey analysis, the researchers found statistically significant differences for most of the constructs measured. These relate to working with peers within cultural diverse groups; communicating effectively and easily; developing intercultural skills; gaining knowledge and skills associated to disciplinary contents; and engaging critically with digital tools. The development of these competences, which are interconnected and partly overlapping, are summarised below and will be discussed in-depth in chapters 5, 6, 7 and 8. For some items within these domains we could not observe significant differences. These include teamwork and problem-solving during collaborative tasks; critical appreciation of own or peers' work; and perception of others' world views. These findings appear to be contradicted by the qualitative results on these same aspects. It may well be that local aspects or issues with specific exchanges may have affected these scores overall.

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Figure 2: VEs as opportunity for course-related and personal development



An important outcome, however, is that students generally find that the VEs met both course objectives and personal objectives and that they provide many opportunities for developing course-related and personal competences, as shown in Figure 2 above.

VE is regarded as a tool for learning-by-doing and applying in practice knowledge and skills previously acquired. The qualitative data in this part of the study provide positive evidence of the development of intercultural awareness, including openness to diversity and other worldviews. There are also strong indications of the development of communicative skills, accompanied by gains in self-confidence and other skills to interact successfully in teams. These aspects were researched more extensively in our substudies in these areas. The results of these are summarised below.

Intercultural competences

For studying the development of intercultural competences, our researchers Robert O’Dowd, Catherine Muller and Begoña Fernandez Gutierrez used the Council of Europe’s model of Competences for Democratic Culture (Council of Europe, 2016) as framework of reference. Apart from the common competence sets based on intercultural attitudes and cultural knowledge, this model also includes a focus on collaboration skills and conflict resolution. Although previous studies have shown that VE may contribute significantly to intercultural competence development, research also suggests that these outcomes are far from automatic. This is why in addition to studying the extent and nature of intercultural competence in terms of the Competences for Democratic Culture framework, we also examined contextual factors of VEs which might either support or hinder student learning in this area.

The quantitative results from the pre- and post-test survey comparisons did not provide conclusive evidence of progress in relation to the items measured. There was significant evidence that after the VEs students perceived themselves as being more confident in communicating and working in a culturally diverse environment than at the start of the exchanges; and that they felt more able to engage in open, appropriate and effective interactions with people from different cultures. They had also developed appropriate mediation skills (translation, interpretation, explanation) for successful intercultural communication. However, although there was some progress throughout, no significant differences were found in the quantitative data with regard to their ability to better understand their own beliefs, world views and practices and the development of empathy when disagreement arose. The same held true of a number of other indicators of intercultural competence, including students’ ability to notice how speakers of other languages express politeness in different ways and their interest in learning about people’s beliefs, values, traditions and worldviews. These results may be partly explained by the fact that students’ pre-test scores of these items were already quite high.

From the qualitative results, however, a richer picture emerges, yielding substantial evidence of development of ICC attributes which our quantitative research could only reveal partially.

With regard to collaborative and conflict resolution skills, the qualitative data from the open questions, portfolio and interviews show that the cooperative skills needed for the functioning of group work are indeed well in evidence. The data indicate that students learn to listen and observe, and to place value in each other’s contributions. That they are willing to learn from each other and develop the key competencies of flexibility, adaptability and empathy. Students manage to deal with conflicts, seeking compromise and encouraging mutual understanding. As a potential barrier for intercultural learning, however, conflict avoidance also occurs.

When it comes to acquiring cultural knowledge and reacting to otherness, students from our cross-section of subject areas and international partnerships reported learning ‘factual’ information about many topics and social issues including immigration, religion, gender roles and the differing national reactions to the COVID-19 crisis. Students learnt that their ways of seeing and doing things were different from those of others. The experiences made them more open-minded and flexible. Of particular note is the personalised nature of VE on students’ learning. Working with partners, they received first-hand examples of things they might otherwise only encounter in course books or other media. This allowed them to gain personalised insights on social and political issues in their partner’s country. However, in some instances, working in this



personalised setting, also led students to overgeneralise and the data also showed several examples of minimization of difference.

The data further suggest that students did indeed develop critical understanding of cultures and reflection on their own culture. Students appear to be aware of culture as a complex notion, but when misunderstandings occur they may attribute these to culture when other factors may be at play, using culture as an excuse. There is clear evidence of how VE has helped them accept cultural diversity, and to become aware of multiple identities, and avoid regarding cultures as monolithic. Participating in the VEs has helped them overcome cultural stereotypes and develop critical understanding of self.

Several factors were identified which support or hinder student learning of ICC. Building interpersonal relationships came out as a strong impact factor for success or failure. Students' concerns about working with unknown partners actually favoured the bonding process as they realised they shared the same feelings of fear and insecurity. Being able to socialise is very important and some students would have liked more time for working on a personal level. However, negative feelings were also seen to emerge when tensions arose, also in VEs where the atmosphere had been more friendly at first. It was also noted how different task types or topics could impact learning outcomes in ICC. Information exchanges regarding material life might cause students' interactions to remain to the surface or focus on commonalities, rather than induce profound understanding of the partner's perspectives. By contrast, controversial topics helped students to see the world more through their partners' eyes, provided the students get along well. Finally, videoconferencing was reported to lead to friendlier relationships, more fluent communication and fewer intercultural misunderstandings. Although research has shown that text-based communication may also have specific cognitive and logistical benefits, this leads us to conclude that, whenever possible, videoconferencing should be incorporated into VEs in order to support the development of partner relationships and more fluid communication.

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In sum then, our study on the development of intercultural competences, framed in the Council of Europe's model of Competences for Democratic Culture, provides evidence that: 1) students learn to develop the skills for successful intercultural interaction and the ability to manage and resolve conflicts which may occur; 2) that they acquire different aspects of cultural knowledge and learn to adapt to cultural perspectives and practices different from their own; and 3) that they develop a critical understanding of cultures, including reflection on their own perceptions and distancing from some of their worldviews.

The evidence for these findings arises mainly from the qualitative data, not from the quantitative pre- and post-test results. The reason for this difference may be due to an initial over-estimation of these skills and attitudes by the informants in the pre-test.

Critical digital literacy

This part of our study, conducted by the researchers Mirjam Hauck, Linda Plowright-Pepper and Teresa MacKinnon, examined how participating in VE may contribute to the development of students' Critical digital literacy (CDL). Digital contexts shape ways of thinking, knowledge, identities, and social relations which often privilege some and marginalize others. CDL prepares learners to examine the linguistic and non-linguistic features of digital media, to identify their embedded biases and assumptions, in order to better inform their activities and judgments (Darvin, 2017). Looking at VE through the lens of CDL, we wanted to investigate if and how VE contributes to developing this critical dimension of digital literacy. We looked at evidence of emerging skills as framed by Darvin (2017) with a particular focus on learners' efforts in establishing their online presence and finding their voice online as well as their efforts in supporting others who are trying to do the same (Morris, 2017).

The statistical results showed that students had made significant progress in each of the areas defined, except one. The largest increase was in their ability to 'curate and create online resources to communicate with a wider audience' which had the lowest score of all the measures at the start of the exchange. The question "I am able to support others in establishing and maintaining their online presence in similar ways" was the only item where the t-test results could not show a significant increase. As with the items on ICC discussed above, the initial score for this and other CDL items had been relatively high.

Our qualitative analysis of the students' CDL experiences followed three main strands of analysis:

- Establishing a connection with others
- Helping others establish presence and a voice
- Critical engagement with computer mediated communication

Establishing a connection with others

Students generally reported positive experiences in connecting with VE partners. Students were proactive and reflexive and used friendly language and personal information to make connections. They presented themselves as approachable and included artefacts, such as songs from their personal lives to establish common ground. Introductory videos, which were part of the assigned work, were regarded positively for making connections in spite of some concerns about presenting themselves well. Emojis, emoticons, memes and other expressive media were used for establishing themselves, improving the effectiveness of communication, maintaining a positive tone or group relationship, and as a technical communication tool in its own right. Some students mentioned not being great fans of these tools, while others saw them as a way to establish future connections. Photographs and personal information helped to bridge different linguistic levels and made it easier to work together. In some cases students reported that their personal pictures of the world around them might give students a better impression than photos from the Internet. Shared humour and the use of jokes, facilitated by video and supported by emoji's and memes, were reported to be effective for bonding and creating group identity, providing a lighter note before and during more serious task work.

The tools selected generally supported fast and frequent communication, which facilitated responsiveness in pair and group work and added to more interactive and democratic exchanges. Multimodal communication was found to be effective for maintaining connections and assisting



understanding by providing multiple channels of expression and interpretation. Videoconferencing reinforced the personal element of learning. WhatsApp was also used for this, since it strengthened the immediacy of contact with peers. However, for overcoming time zone differences and preparing responses in their own time, students also resorted to text messaging and other forms of asynchronous communication.

Challenges in establishing connections included poor internet connection, insufficient familiarity with tools used and communication issues in using video conferencing (shyness, pauses and misunderstandings when using translation software). Although combinations of text and voice generally worked well, opinion on best modes of communication remained divided. Students' concerns about communication problems were strengthened by their overall strong commitment to completing the tasks successfully.

Helping others establish presence and voice

Student exchanges were characterised by a reflexive attitude, showing empathy and respect between group members. They were aware of the danger of power dynamics and generally open to the opinions and needs of their partners, also recognising their preferences for particular channels of communication. The data show ample evidence of giving others space, praise and encouragement and inviting them to make contributions to the project in respectful and supportive manners, including adaptations of language to pursue shared understanding.

Critical engagement with CMC

Participants' strong focus on completing the tasks favoured tools which helped maintain effective social relationships and facilitated efficient and effective group work. The ability to see each other came out as an important quality in this respect. It determined both the choice of videoconferencing and the selection of recorded videos for introducing themselves. By establishing social contact visually, favourable conditions were created for asynchronous sharing, editing and completion of written documents as follow-up. For strong connectivity to be successful, availability and familiarity of communication tools to all partners was a prerequisite. Students also perceived the affordances of CMC for creating positive affective states, although the use of emoji's and other expressive means on some occasions also caused misunderstanding and confusion. Participants did not engage strongly in considering cultural aspects of technologies. There is evidence that absence of initial visual contact made it more difficult to make connections, but this did not keep students with a strong focus on task completion to work together on tasks successfully. The sharing of online cultural resources does not appear to have led to deep cultural understanding, although it facilitated humour and was a good way of presenting their countries. There was awareness of cultural differences associated with the use of emoji's.

We conclude then by stating that the overall increase in CDL demonstrated in our quantitative results is substantiated and clarified by our qualitative findings. This also goes for the ability to support others in establishing and maintaining their online presence, where our quantitative data remained inconclusive. Participants demonstrated high levels of reflexivity and empathy which are required for CDL. Participants were responsive to partners' preferences of communication channels and showed creativity and flexibility in supporting effective exchanges by combinations of digital communication tools. This was demonstrated by a high value placed on establishing and maintaining positive personal and social relationships using technologies which enabled the use of humour and sharing of personal information. The use of tasks facilitative of fostering CDL was generally positive, but it also increased concerns about completing these tasks successfully within the time frames imposed. This may have led to a focus on effective, rather than culturally rich

communication. The portfolios further revealed how these time pressures may have stood in the way of more spontaneous interactions, which elicited deeper cultural exchange and shared understanding when they occurred. In addition to further studying the impact of multiple tools and technologies and facilitating development of reflexivity, future studies might also focus more specifically on the cultural dimension of CDL and leave group members to negotiate their own tasks.

Language skills

For the study of development of language skills, the researchers Shannon Sauro and Catherine Felce used as a reference the Common European Framework of Reference for Languages (Council of Europe, 2001) and the Companion Volume (Council of Europe, 2018).

The growth of language skills is well attested in the long tradition of Virtual Exchange (or Telecollaboration) in language education, in areas such as pragmatics, grammar, vocabulary, reception and interaction in the target language, oral skills and overall language proficiency. The current study was intended to extend this knowledge base in VEs across a wider range of disciplines and student populations. The study focused specifically on whether VE facilitated the improvement of participants' language skills and knowledge and, if so, what skills and knowledge were developed.

The statistical results were drawn from 10 items, based on literature and research-findings, relating to different aspects of participants' communicative ability. The statistical comparison showed significant progress in confidence, vocabulary control, interaction, propositional precision and thematic development, goal-oriented collaboration, spoken fluency, and grammatical range and control. Surprisingly, development of vocabulary range and adapting / mediating were the two items not validated statistically.

Qualitative analysis of the same items and additional items formulated on the basis of the CEFR and the 2018 Companion Volume showed ample evidence of VEs supporting students' overall spoken or written production and reception. In addition to mentioning general examples of improved production or reception, students referred to more nuanced aspects such as the VE or digital platform (e.g. WhatsApp) enforcing the use of a particular communication modality (e.g. writing). Benefits for reception were associated with the fact that lingua franca communication with learners from another country necessitated dealing with different accents and pushed them to comprehension in spite of imperfect grammar or vocabulary produced by their partners.

An unexpected outcome was that there were relatively frequent reports of no language development. These were sometimes by the same students. Three reasons were identified for this: for some participants the language used in the exchanges was their native language; for a second group, the language level of the exchanges was not challenging enough; and for a third category, problems in the VE or in the relationship between participants prohibited language development.

However, from the qualitative data, a positive impact of VE tasks on language competence emerges overall. Students expect VE to contribute to their language development and find that it does. VE provides an authentic and benevolent environment for foreign language practice with peers or native speakers, which allows them to make mistakes and to realise that they were still able to get meaning across. It contributes to lowering their (initial) anxiety and boosts their confidence to express themselves, thereby meeting important conditions for successful language



learning, as evidenced in the literature (Dewaele and MacIntyre, 2014; Dörnyei and Ryan, 2015; Horwitz, 2010). The data also suggest that students use all the means they have to ensure successful communication and mutual understanding, including body language, gestures and expressive tonalities. VE pushes learners to go beyond their limitations and get them out of their comfort zone. These results confirm findings from other large-scale studies on VE (The EVALUATE group, 2019).

Similar to ICC competency reported on above, in some cases our qualitative outcomes appeared to be at odds with the quantitative findings. In regard to language competence, this was the case for vocabulary range and adapting. The gains in vocabulary range reported by students of a lower proficiency (which included use of slang and informal language, but also task and topic specific phrases and expressions) appear to have been offset in the overall quantification by the scores of students who had a good command of vocabulary already, possibly as native speakers. When it comes to adapting, the quantitative measure included three separate constructs (comfort with plurilingual contexts, adapting and mediating), not all of which applied to all participants. This may have affected the quantitative score. From the qualitative data, however, we found that highly proficient participants adapted linguistically and conceptually to the levels of their less advanced peers. We also found shifts in modality in videoconferencing, intentional re-use of words and expressions, and rephrasing of language to facilitate effective communication. From this we inferred that during VE tasks these participants sought to adapt themselves linguistically in response to the perceived needs of others. We regard this adaptability (context-sensitivity and flexibility) as an important transferable skill, which is key to successful communication and collaboration in plurilingual settings.

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Summing up the results then: similar to other research in the field, our study of language development across a wide range of disciplines and student populations showed that VE facilitated the development of participants' language skills and knowledge for each of the subcompetences researched. Where this was not immediately clear from the statistical analysis (for instance for vocabulary range and adaptability), our qualitative data suggest that contextual factors, such as students' level of proficiency may have played a role. In this respect, it is noteworthy that highly proficient or even native speakers of the language also show language development in the sense that they learn to adapt to the requirements of less proficient users of the language.

Disciplinary skills and knowledge

The final focus area for competence development, researched by Sake Jager, Juan Albá Duran and Gerdientje Oggel, concerned disciplinary learning, i.e. the skills and knowledge which are considered relevant for the academic disciplines and courses taught. Given the cross-disciplinary orientation of the EVOLVE project, it was considered particularly relevant how VE contributes to specific disciplinary learning outcomes and course objectives. Some research on online international student collaboration is available in economics and business, medical sciences and nursing, geography and some STEM disciplines, but to our knowledge large-scale studies of VE looking at disciplinary learning across disciplines have not yet been undertaken.

We investigated which disciplinary skills and knowledge, if any, students developed and how these relate to course objectives defined by the teachers. Similar to the other competencies

presented here, statistical comparison showed that students found themselves more competent in the knowledge and skills identified by the course objectives after completing the VEs.

The range of disciplines captured in our study was more limited than we had hoped for when we designed the study. Nevertheless, we believe that this part of the study greatly added to our insights of the impact of VE on disciplinary learning, particularly in relation to transversal learning.

Most of the courses included in our data were in teacher education and second language learning. Eight courses were in other disciplines. The objectives and desired learning outcomes for these courses, as stated in the VE information gathering sheets, reflect the commonly targeted competences for VE in intercultural competence, digital literacy and language presented above. For teacher education, learning about innovative teaching methods and providing hands-on practice, working together effectively and being able to plan and organise were also mentioned. For language learning, fluency development and confidence building in authentic settings were also reported and for the other disciplines, providing a space for discussing social, political or environmental issues were also included.

Due to its weight in our sample, the qualitative data from the student responses showed a clear strand of competences associated with teacher education. Ranking high among these were developing new types of activities for students and discovering new tools for teaching and learning. Students learnt to apply in practice concepts acquired as theory. They reported being able to create activating and collaborative work forms in a safe practice environment which helped them perform better as future teachers. The tools they learnt to use were not only newly discovered technologies, but also applications which so far they had not used for education. They also learnt to integrate intercultural learning and to adapt to their students' needs.

Other than for teacher education, no clear disciplinary profiles emerged. However, when asked about specific disciplinary learning, many students reported what we would rather call transversal skills and knowledge, i.e. competences and knowledge relevant to a broad range of occupations and economic sectors, which are the cornerstone for personal development (European Commission, 2019, p. 21). Communicative competence, intercultural competence, group work, self-management and digital competence clearly emerged from the student data as distinct areas which had been strengthened by participation in VEs. Empathy and preparedness to help each other, which came out as specific competences in other parts of our research too, also came to the fore in this part of the study. The same goes for group collaboration and management skills (including time management) and digital proficiency which are also reported on in the other substudies.

We therefore conclude that the development of disciplinary learning for teacher education, as the best represented subject in our sample, is clearly borne out by our data. However, the majority of gains in disciplinary skills and knowledge reported by the students was found to be in the area of transversal learning, which we defined as competences and skills *not specific to particular disciplines*. In addition to facilitating transversal learning in the context of disciplinary learning, VE also makes it possible to connect discipline-specific content with language and culture learning. VE is an excellent tool for students to develop their skills in the L2 while at the same time discussing topics that fall within their discipline. We argue that for integration across disciplines, it is particularly relevant that students report these learning outcomes as disciplinary learning, since it demonstrates that they perceive them as being learnt as part of learning in the



discipline, not as something separate from it. For assessing to which extent these findings represent general, cross-disciplinary outcomes of VE, we recommend follow-up studies across a wider range of subjects.

Conclusion

This study has assessed the impact of VE on student learning through quantitative and qualitative research which looked at students' general perceptions and appreciation and complemented this with studies in which independent teams, each from their particular expertise and through their specific theoretical lenses, investigated the development of intercultural competence, critical digital literacy, language proficiency and disciplinary knowledge and skills respectively.

To a large extent, our research confirms insights from previous studies, which have often been conducted on a smaller scale and corroborates and adds to insights from other large-scale projects, such as EVALUATE and Erasmus+ Virtual Exchange (The EVALUATE Group, 2019; Helm & Van der Velden, 2019; Helm & Van der Velden, 2020). We believe that the data from our cross-section of disciplines provide further evidence of the strong potential of VE as a vehicle for the development of highly relevant student competences. The authenticity of the VE learning experience, which calls upon a wide range of skills which students have to exercise all at the same time, and the overall positive student impressions of VE strengthens the case for implementing VE on a larger scale. The development of these student outcomes is by no means automatic and depends on effective task design, appropriate technology selection and proper organisation of the exchanges. Teacher support and guidance of students during the exchanges are indispensable.

We should also acknowledge limitations of our research. The VEs studied were situated in the context of intact courses at the participating institutions. Although this enhanced the ecological validity of the study, it made it impossible to set up control groups for validating our data further. In addition, the courses which we managed to bring together cannot be regarded as representative of all disciplines in Higher Education. Finally, there are inherent limitations to using students' self-reported perceptions as an instrument in our study.

We therefore recommend further research on the impact of VE on learning across disciplines. To this end, our research instruments are shared through the EVOLVE website so that other researchers may use them for follow-up studies, in a new range of settings and disciplines. We are also considering the options for making the research data obtained for the current study available as open data for the VE research community at large, so that aspects which our study has not been able to address in detail, such as the variability between the exchanges, may be examined more closely. We hope that these efforts will further contribute to mainstreaming VE as educational practice in Higher Education as intended by the objectives of the EVOLVE project.

1. Introduction to the study

Elke Nissen and Sake Jager

Virtual exchange, or telecollaboration, is a pedagogical practice of organised and curriculum-integrated online collaboration between geographically distant students, sustained by educators. One of its main advantages is its adaptability to diverse contexts and to diverse learning objectives. It is hence practised under various forms, and increasingly, at Higher Educational (HE) level in Europe and beyond (O'Dowd, 2018). As a pedagogical practice, a major question is how it is perceived by students and whether it effectively contributes to students' competence development, and, if so, under which conditions.

1.1. Focus of this study

This report presents a large-scale study on the impact of Virtual Exchange (VE) on student learning in Higher Education, within a range of different VEs, conducted by the EVOLVE research team. It puts specific focus on the development of competences that are widely acknowledged, mostly on the basis of case-studies, as being potentially fostered through VE: intercultural competence, critical digital literacy, language skills and disciplinary skills, but it also takes into account more general learning outcomes. This report outlines the initial questions, methodology, collected data and results of this study. It also points out several factors that appear to be crucial for students' competence development through VE. These make it evident that, even though VE can be a powerful way for fostering student learning, its success cannot be taken for granted but is dependent on adequate design, support, and online interaction.

VE is considered in this research as a means to developing competences for the participating HE students. A competence is defined here, in line with the recommendations of the European Parliament and the council of the European Union (2006/962/EC) as "a combination of knowledge, skills and attitudes appropriate to the context" (European Union, 2006). To gather evidence for our initial working basis and hypothesis, two rounds of data collection were carried out. A first EVOLVE pilot study with a limited number of participants was conducted between autumn 2018 and June 2019. Its goal was twofold: first, to test the protocols for data collection and analyses that the project members had designed and adjust them for the second round if needed. And, second, to get the first results. The current report is based on a second round of data collection, which took place from autumn 2019 to May 2020 and adopted the adjusted protocols. By using these on a larger number of students and teachers, it seeks to provide the large-scale evidence for the benefits of VE that EVOLVE reaches out for.

1.2. What is Virtual Exchange?

Virtual Exchange (VE) is a specific form of online communication and collaboration between students that is put into place, as stated above, in various forms in educational contexts. The underlying definition of VE that will be used in this report was developed at the very beginning of the EVOLVE project in January 2018 by the EVOLVE consortium. It is published on the project website:



Virtual Exchange (VE) is a practice, supported by research, that consists of sustained, technology-enabled, people-to-people education programmes or activities in which constructive communication and interaction takes place between individuals or groups who are geographically separated and/or from different cultural backgrounds, with the support of educators or facilitators. Virtual Exchange combines the deep impact of intercultural dialogue and exchange with the broad reach of digital technology.

(<https://evolve-erasmus.eu/about-evolve/what-is-virtual-exchange/>)

1.3. Background to the study: the EVOLVE project

The EVOLVE project aims at contributing to implementing Virtual Exchange (VE) in Higher Education (HE) at a larger scale, since this innovative collaborative international form of learning is still underused in HE learning contexts to date. This goal is to be reached through 1) raising awareness among HE institutes within Europe and beyond of VE as a tool for internationalisation, 2) setting up and providing online training for educators, 3) and providing decision-makers at international, national and local levels with large-scale evidence of the benefits of VE for the development of student and teacher competences at higher educational level. This way, EVOLVE seeks to contribute to providing elements that will “empower key stakeholders in developing and mainstreaming policy innovation” (Priority 5 of the Erasmus+ KA3 call for projects).

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This report, which focuses on the students’ perspective and competence development, is a central part of the EVOLVE research. Other parts of the EVOLVE research concentrate, respectively, on the development of teacher competences and pedagogical approaches through VE (see separate EVOLVE report, Nissen & Kurek, 2020¹) and, through a baseline study, on measuring the current state of awareness of VE as a tool for internationalisation within HE. The results of a first baseline survey, conducted in September/October 2018, are available as a separate report (Jager *et al.* 2019). Furthermore, complementary case studies on institutional integration and support of VE were undertaken (see Case-study report), and a second iteration of the baseline survey will take place in autumn 2020). These data allow us to measure the impact of the current initiatives aiming at awareness-raising and upscaling VE, and to gain a better understanding of the keys to institutional implementation of VE.

In parallel to EVOLVE, other projects and initiatives have been undertaken that contribute to better implementing VE within HE, but which have a more specific focus, such as the recently finished EVALUATE project² which targets more specifically initial teacher training, and the concurrent Erasmus+ Virtual Exchange project³ which targets VE between European and Southern Mediterranean countries and which includes synchronous online sessions, facilitated by a moderator, focusing on intercultural issues. Both these projects have in the meantime demonstrated the impact of VE through specific impact studies (The EVALUATE Group, 2019; Helm & Van der Velden, 2019; Helm & Van der Velden, 2020).

¹ See EVOLVE report *The impact of Virtual Exchange on the development or refinement of teachers’ pedagogical competences and pedagogical approach*

² <https://www.evaluateproject.eu/>

³ https://europa.eu/youth/erasmusvirtual_en

1.4. Structure of this report

Chapter 2 of this report outlines the research questions regarding student competence development and the research protocols designed in order to answer these questions. Chapter 3 provides an overview of the collected data on which this study is based.

Chapter 4 allows a general insight into students' perception of the VEs they experienced, and outlines major factors that influence, either positively or negatively, this perception. Furthermore, it points out general learning outcomes mentioned by the students.

Chapters 5, 6, 7 and 8 look at the development of specific competences in more detail through the critical lenses of intercultural competence, critical digital literacy, language skills, and disciplinary skills respectively. The chapters provide definitions for each of these competences and indicate in more detail why this study focuses on that particular competence. In each of these chapters, after outlining the specific research questions related to them, the relevant quantitative and qualitative results are presented and discussed.

Chapter 9 concludes by providing a general discussion of the results of our study, placing them in the context of previous work and providing suggestions for follow-up research.



2. Research methodology

Elke Nissen and Sake Jager

2.1. General research questions

The overarching research question guiding this study is whether VE appears to be a valuable means for student competence development, and whether this is the case, not only in specific case studies that might have been singular success stories, but also on a large scale in different VEs, different contexts, and different disciplines.

The competences EVOLVE looks at were established in previous, often smaller scale, studies, where these are commonly acknowledged competencies fostered through VEs: intercultural competences, critical digital literacy, language skills, and disciplinary skills. A “core” part of the survey and interview questions seek, in parallel, to gain a more general picture, but also to collect general information that would allow us, for instance, to better understand potential obstacles in achieving the expected learning outcomes.

2.2. Research methodology

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In order to address the research questions, the EVOLVE team set up several types of data collection tools: surveys, interviews and portfolios. This section gives an overview of the method of conceiving these tools (see 2.2.2), the process of data collection (see 2.2.3) and their preparation for analysis (see 2.2.4), and of the quantitative and qualitative analyses that were conducted (see 2.2.5) in a mixed methods approach (see 2.2.1). In addition, it outlines potential limitations of this study (see 2.2.6).

2.2.1. Type of research

The study underlying this report is carried out as descriptive research (Catroux 2018: 13). It describes and analyses facts and perceptions in order to gain a better understanding of VE and its potential to foster competence development, from the viewpoint of students. It follows a mixed methods approach, combining the collection and analysis of quantitative and qualitative data (Brown & Coombe, 2015: 79). Whereas our quantitative analyses aim at large-scale objective measures, our qualitative analyses are intended to gain deeper insights which allow for elaboration, clarification and exemplification of the quantitative data. In some cases (e.g. intercultural competence, see Section 5.1), it also allows us to examine apparent divergence between quantitative and qualitative results.

The research is based on empirical data in the form of student perceptions. It compares these perceptions at a pre and a post stage through surveys and interviews, but also looks at students' evolution as a process, by means of a reflective portfolio.

2.2.2. Method of conception of data collection protocols

In order to gather different types of data, diverse tools for data collection were conceived with regard to the research questions and the literature in the field: surveys, interview questions and reflective student portfolios. Previous literature and research findings, which are usually based

on smaller case studies and conducted within certain disciplines, have brought to light specific domains of competences which can be enhanced through VE: intercultural competence, disciplinary competence in the field of the course in which the VE is implemented, critical digital literacy and language skills. All the EVOLVE tools for data collection target, in different ways, these specific domains of competences. In addition to these specific domains, we reached out for more general information (see 2.2.3) that would allow for gaining a broader picture of the students' VE experience, and to better understand potential obstacles.

Surveys were designed for collecting quantitative and qualitative data. For the quantitative data, participants were required, for sets of items pertaining to a specific competency or topic, to indicate their self-perceived level of competence on Likert-scales. Most of these items were used in both the pre- and post-survey to measure the development of students' perceived competencies between the start and the end of their VE. Open-ended questions complemented the Likert-scale questions for each of the competences and general information topics in the survey. The post-survey included additional questions and items which were not in the pre-test. These were intended to collect further data on students' experiences and perceptions after completing the VE. The surveys were administered online through Qualtrics XM⁴. A copy of the pre and post-survey questions can be found in the Appendix.

Interview questions were set up for post-VE interviews which covered the four specifically targeted fields of competences (intercultural competence, critical digital literacy, language skills and disciplinary skills) as well as students' general impressions, expectations and perceived outcomes, and comments on the design of the VE. The questions were kept to a minimum (usually one or two questions for each topic). The interviews were aimed at gaining a deeper insight into students' perceptions of the VE they had participated in, thus helping the researchers to better interpret the findings from the other qualitative and quantitative data. The interview questions can be found in the Appendix.

A portfolio was conceived for two purposes: as a reflective tool which can be used as a teaching tool to sustain learning, and as a research tool for data collection. It was set up as digital text file which could be downloaded by teachers, presented and transmitted to their students, who could then in turn download and complete it offline. It included four sections, each dedicated to one of the four major focuses of this study (intercultural competence, critical digital literacy, language skills and disciplinary skills). Teachers were asked to adapt the portfolio before handing it over to their respective students by selecting only two out of the four sections that were relevant with regard to their targeted VE objectives. A copy of the portfolio can be found in the Appendix.

These tools can all be re-used by other researchers under a creative commons license.

The EVOLVE team conducted a first **pilot round of data collection and analysis** with a limited number of VEs (N=6), in 2018/2019. This aimed not only at gaining first results, but above all to test and adjust the research protocols. On the basis of the first pilot results, the team was able to identify items, questions and explanations within the protocol that needed to be clarified, changed, or added before starting the second round of data collection. The complexity of data gathering in the pilot round further necessitated changes in the design for the main data collection process. Surveys had initially been adapted for each VE to their respective, targeted learning outcomes. Moreover, as is explained in greater detail below (see Section 5.4), items for disciplinary skills had been formulated separately for each VE in question (depending on the

⁴ <https://www.qualtrics.com/uk>



discipline), which complicated the process of standardising the surveys. As a consequence, the data collection process was simplified for this second round, carried out in 2019/2020.

2.2.3. Data collection and types of data

With a view to student data collection, the EVOLVE team reached out to HE teachers who intended to put into place VE embedded within their local institutional courses. In the initial pilot project phase, the targeted teachers were the participants of an EVOLVE online teacher training. But this linear process of first training teachers, who would then implement a VE that the project team could use for research within the timespan of the EVOLVE project, turned out not to be systematically feasible. Some teachers could not finish the training due to the necessary time investment, or could not schedule their VE within the lifetime of the project, others did not find or else lost their VE partner e.g. because of health reasons or because, for institutional reasons, they could no longer deliver the course the VE was planned in. Therefore, the EVOLVE team, for the current round, reached out not only to teachers who had accomplished the training during the current year, but also to others who had participated in the training in the year before, to teachers who had taken part in other VE trainings (such as UNICollaboration or Erasmus+ Virtual Exchange training), and more generally to teachers in the UNICollaboration network who had experience in VE and showed an interest in participating in our study with their students. Table 4 (in chapter 3) gives an overview of the number, countries and courses of the participating teachers.

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The participating teachers benefited, if they wished, from mentoring provided by EVOLVE team members for the VE planning and running phase. Regarding data collection, they were asked to fill in an **information gathering sheet** on their VE and the courses it was embedded in, providing information on the institutions, disciplines, targeted learning objectives, VE duration, types of tasks, VE design, and communication tools students used in the VE (Appendix A).

The teachers asked their students to fill in the **pre-survey** before starting their online exchange and the **post-survey** right after ending their VE. Students were requested to enter the user ID which the data management team had sent to them individually via e-mail, not only to ensure anonymity, but also to link pre- and post-surveys to the same student. As indicated above, these pre- and post-surveys contained closed items for which students were requested to indicate their degree of agreement on a 5-point Likert scale (1 = no, not at all, 5 = yes, absolutely), and open-ended questions encouraging them to give feedback on the four specifically targeted fields of competences (intercultural competence, critical digital literacy, language skills and disciplinary skills) and other aspects relating to their VE experience more generally: students' initial VE expectations (pre-survey), their general appreciation and comments on the VE experience, its perceived outcomes, and their views on the respective VE's design and the technology use it entailed (post-survey).

Table 1: Type and moment of data collection

Tool for data collection	Type of collected data	Moment (2019/2020)	Details
Pre-survey	<ul style="list-style-type: none"> Quantitative data (by means of a Likert scale) Qualitative data (by means of open questions) 	Right before the start of each VE	All students were requested to answer both surveys, but could choose to express their wish not to participate in the study by ticking a box on the survey starting page, leading them directly to the end page without providing further data.
Post-survey		Right after the end of each VE	
Interview	Qualitative data retrieved through semi-guided questions	In April 2020	
Portfolio	Qualitative data on 2 types of competences selected by teachers (intercultural, language or disciplinary competence, or critical digital literacy)	During / after the VE	Several teachers asked their students to fill in a portfolio. Students were free to decide to hand it over to the EVOLVE team or not.
VE information gathering sheet	Information on VE provided by teachers (partners, objectives, duration, tasks, tools, etc.)	Before or during the VE	

The interviews were carried out online and recorded with diverse videoconferencing tools, according to students' technical constraints and preferences (Bluejeans, Zoom or Skype). Teachers had been asked in March/April 2020 to identify students willing to participate in the interviews, in order for them to be contacted and interviewed by the EVOLVE team. The researchers' criteria for selecting students for the interview were to interview only those students who had filled in both pre- and post-survey, and to interview students from as many of the 16 VEs as possible. The questions for the semi-structured interview can be found in the Appendix.

The use of the EVOLVE **portfolio** with their students was recommended to the teachers, as a data collection and at the same time a reflective tool for students. In order not to overburden the teachers and students, and because some teachers had their own portfolios, using the portfolio was not made compulsory. Students from 9 VEs completed it.

An overview of the number of collected data is provided in chapter 3. For every type of gathered data, the participants were informed about the purpose of the data collection process and required to fill in relevant consent forms.

2.2.4. Preparation of data for analysis

The student pre- and post-survey data from each VE were extracted from Qualtrics and merged into one datafile for each exchange. Only respondents who had completed both the pre- and post-survey were included for analysis. The student portfolios were collected through the Qualtrics post-survey, so that they could be associated with the correct ID-code and the students' consent for using the data. The 19 recorded student interviews were transcribed in full.



For the purpose of statistical analyses, the answers to the closed questions (mainly Likert-scale items) from the 16 pre- and 16 post-surveys were imported into a single file for pre- and post-comparison in R⁵ and R Studio⁶.

For qualitative analysis of the open-ended questions, the surveys were also imported in NVivo 12, where they were combined with the 19 interview files and 99 portfolio files. By associating the data with the pertinent student ID-codes, unique cases were created for every student, comprising all the data for each individual student as one node in NVivo 12. To this were added 16 information gathering sheets for each exchange, containing information on the exchange and the participating institutions and courses. This NVivo file was used by the EVOLVE researchers in subteams for the deciding on the coding categories, and subsequent coding and analysis of the data.

2.2.5. Types of analyses that were conducted

This study combines quantitative and qualitative analyses (see also section 2.2.1). These are briefly presented here.

Quantitative analysis

Our quantitative observation of the development of participants' competences is based on a comparison of their self-declared competences by means of 5-point- Likert-scales before and after their VE, with help of the pre- and post-surveys. The data was checked for distribution and outliers. After that paired t-tests were used to measure the differences between participants' pre and post self-assessment in relation to each statement. Statistical significance was calculated at $p < 0.05$. The variables were normally distributed based on skewness and kurtosis values and the sample size was larger than 15 throughout (see Mircioiu & Atkinson, 2017). This rendered unnecessary the use of non-parametric tests (e.g. Wilcoxon), contrary to the pilot study where the sample size was in some cases small and data highly skewed.

To check for statistical correlations between several quantitative post-survey items, Pearson's correlation test was used.

Qualitative analysis

The qualitative data, understood as verbal data here, stem from pre- and post-surveys, interviews and portfolios. They were analysed with the help of NVivo 12. To this end, the coding teams first identified categories (or "codes") in relation to the respective research question and scope. The elaboration of these categories followed a twofold approach. It was based on a literature review and former studies, on the one hand. On the other hand, it was based on successive phases of analysis of the EVOLVE data set, and adjusted to occurring findings. A category, or "code", is therefore considered in this report as "a researcher-generated construct that symbolizes and thus attributes interpreted meaning to each individual datum for later purposes of pattern detection, categorization, theory building, and other analytic processes" (Saldaña, 2013, p. 4).

⁵ <https://cran.rproject.org/bin/windows/base/>

⁶ <https://www.rstudio.com/products/rstudio/download/>

Triangulation of data

In a mixed methods approach, data collected by means of different tools (surveys, interviews, portfolios), at different moments (see section 2.2.3), from different VE contexts (see overview on retrieved data in section 3) and of different nature (quantitative, qualitative) were combined and compared in our research.

2.2.6. Limitations of the study

This study is based on students' perceptions, expressed through their written observations and ranking on Likert scales. This may be considered as a bias. But, because of the various fields, courses and contexts the observed VEs are implemented in, and the variety of levels, languages and targeted competences, setting up another type of common protocol, including pre-tests and post-tests on effective student competences before and after participating in a VE, would not have been a realistic option. Not only would it not have been feasible in view of the research team's workforce within the timespan of the EVOLVE project, but also the results would have been only very partially comparable between the 16 VEs. This, in turn, would have rendered it difficult to draw broader conclusions on the basis of our results.

Moreover, setting up a valid experimental design, where the development of competences could be compared with that of another group, would require not only to find another similar group but also to have a control group. This could be either students in the same course who would not carry out the VE. Or could it be students in a comparable parallel course targeting the same learning objectives. But, both these cases are rather unrealistic, too, due to the fact, first, that this research design would have led teachers to either split up their class (what they most often do not do when putting into place a VE) and therefore overburden teachers with extra work, thus reducing the chance to find teachers who would participate in our research with their students. Second, it is not frequent to find parallel comparable courses in HEI curricula where one integrates VE and the other not. In both cases, these conditions are difficult to conciliate with the requirements of a large-scale study.

Another limitation of this study is linked to the extent of disciplines the implicated VEs are implemented in. The majority of the VEs are, indeed, in the field of second language (L2) learning, language and literature studies, teacher training, e-learning design and education. Other represented disciplines are management and intercultural studies. In order to fully attest the possible generalization of our results to a broader scope of disciplines, we therefore warmly encourage further research on VEs in other fields, adopting our research protocols.

It must also be stated that this study looks exclusively at VEs set up between partner teachers, and not at other VE types, such as online dialogue between students from different institutions, facilitated by a moderator and organised by VE providing organisations. And, the scope of this study is VE in HEI contexts, not in other contexts such as primary or secondary school education.

3. Overview of retrieved data

Elke Nissen and Sake Jager

The second round of EVOLVE data collection took place from September 2019 until April 2020. Data were gathered from 16 VEs with 34 partners, 33 partners of which asked their students to participate in our data collection (Table 2). These partners work in 20 different countries (Argentina, Brazil, Cyprus, Czech Republic, France, Germany, Indonesia, Israel, Japan, Jordan, Latvia, Palestine, Poland, Spain, Sweden, Taiwan, Tunisia, Turkey, United Kingdom (UK), United States of America (USA)). 10 of these are located in Europe and 10 beyond. 15 of the 16 VEs include at least one partner institution in Europe. Most of these VEs take place between two partner HE institutions (N=14); in two of the VEs three partner HE institutions are involved. In total, 24 different HE institutions are involved (AMU, BATH, CUT, ISET, LU, MAU (3), NCL, NU, PHH, PSUT, SU, TAU, TEDU, TMU, TUO (2), UAN, UCY, UGA (6), UGOE, UJD, ULE, UMBC (3), UNESP, UNSAM), with 23 out of these having students participating in our research.

Table 2: HEIs of the students participating in this study

HEI	HEI full name	Country	HEI	HEI full name	Country
AMU	Adam Mickiewicz University	Poland	TEDU	TED University	Turkey
BATH	University of Bath	UK	TMU	Taipei Medical University	Taiwan
CUT	Cyprus University of Technology	Cyprus	TUO	Technical University of Ostrava	Czech Republic
ISET	Institut Supérieur de Etudes Technologiques de Béja	Tunisia	UCY	Université de Chypre	Cyprus
LU	University of Latvia	Latvia	UGA	Université Grenoble Alpes	France
MAU	Malmö Universitet	Sweden	UGOE	University of Goettingen	Germany
NU	Nanzan University	Japan	UJD	Jan Dlugosz University	Poland
PHH	Pädagogische Hochschule Heidelberg	Germany	ULE	Universidad de León	Spain
PSUT	Princess Sumaya University for Technology	Jordan	UMBC	University of Maryland Baltimore County	USA
SU	Sampoerna University	Indonesia	UNESP	Universidade Estadual Paulista 'Julio de Mesquita Filho'	Brazil
TAU	Tel Aviv University	Israel	UNSAM	Universidad Nacional de San Martin	Argentina

The VEs' duration ranges from 1.5 to 14 weeks, with an average duration of 7.3 weeks. In most cases, the VEs ran for the duration planned, which is largely determined by the time window for collaboration available on the calendars of the participating institutions (Helm, 2015; Jager *et al.*, 2019), but in one case a VE had to be terminated prematurely due to the Covid19-pandemic, as indicated in Table 3.

The VEs were integrated, on either partner's side, into regular curricular courses. In our sample, the disciplines covered by these courses mainly target future educators and teachers, language and literature students, language courses for students of other fields- these target students within various fields such as economics and tourism, or students in other fields taking an L2 course

together. Other represented disciplines are management studies, intercultural studies, linguistics and e-learning design.

Table 3: General description of the 16 VEs the student data stem from

VE ID	N VE partners	Countries	Disciplines / course names	VE duration (N weeks)	Title of VE (if applicable)
AMU-MAU-UNSAM-1000	3	Poland Sweden Argentina	English for Tourism Teacher training: English Studies and Education Discursos Multimodales	6	Reading the City. Popular, personal and critical perspectives on urban life
BATH-PSUT-1000	2	UK Jordan	Languages Languages	8	-
CUT-TMU-1000	2	Cyprus Taiwan	English for Chemical Engineering Languages: English Conversation and English Presentation skills	5	Reflecting Intercultural Communicative Competence in a Foreign Language Class
MAU-SU-1000	2	Sweden Indonesia	Teacher training: English Studies and Education Teacher training: Literature for young and older children	6	-
NCL-TEDU-2000	2	UK Turkey	Teacher training: Computer-Assisted Language Learning Teacher training: Technology-enhanced Language Learning	3*	Virtual exchange for future TESOL/ELT students: critical digital literacy
UGA-UAN-1000	2**	France Palestine	E-learning design: Télécollaboration en langues Language and literature	7	-
UGOE-ISET-1000	2	Germany Tunisia	Intercultural Competence Focus: Arab*ic-West*ern Cultural Relationship Management and administration: intercultural communication workshop	1.5	Arab*ic West*ern Cultural Relationships
UMBC-MAU-1000	2	USA Sweden	Education: Theories of Language Learning in the ESOL Classroom Education: English Studies and Education: Language Development, Equivalence and Language Teaching	7	Equality and Diversity in Teacher Education
TAU-ULE-UMBC-1000	3	Israel Spain USA	Teacher training: Curriculum Design and Material Development Teacher training: Innovacion docente e iniciacion a la investigacion educativa (inglés) Teacher training: Theories of Language Learning in the ESOL Classroom	5	Innovation in Foreign Language Education (2019-2020)
UGA-LU-1000	2	France Latvia	Teacher training: Online language learning and teaching French as an L2	12	Riga - Grenoble 2019



VE ID	N VE partners	Countries	Disciplines / course names	VE duration (N weeks)	Title of VE (if applicable)
UGA-TUO-1000	2	France Czech Republic	German as an L2 German as an L2 for Economics students	12	Let's go study in Germany
UGA-TUO-2000	2	France Czech Republic	German as an L2 German language	12	-
UGA-UCY-1000	2	France Cyprus	Teacher training: Online language learning and teaching French as an L2	9	Nicosie - Grenoble 2019
UGA-UNESP-1000	2	France Brazil	E-learning design: Télécollaboration en langues Teacher training: English	6	VE task design
UJD-PHH-1000	2	Poland Germany	Teacher training Teacher training: Telecollaboration – Foreign Language Learning through International Encounters	14	Telecollaboration – Foreign Language Learning through International Encounters
UMBC-NU-1000	2	USA Japan	Language acquisition: Japanese Language in Society British and American Studies	4	-

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Note. *) The VE was shortened because of the pandemic

***) One partner did not participate in data collection

The data were collected from students participating in the 16 VEs described above. As shown in Table 4, the EVOLVE team retrieved 321 pre-surveys and 290 post-surveys in total. Statistical data analysis was based exclusively on the 248 cases of students who answered both pre- and post-surveys. Semi-guided interviews were conducted with 19 students, who had participated in total in 10 of the 16 VEs. Within 5 VEs, 99 portfolios using the EVOLVE template were retrieved. 17 supplementary portfolios using another template were gathered from one other VE.

Table 4: Overview of retrieved student data

VE ID	N students who answered pre-survey	N students who answered post-survey	N students who answered both pre- and post survey	N student interviews	N collected student portfolios
AMU-MAU-UNSAM-1000	50	38	33	-	50
BATH-PSUT-1000	12	11	9	-	-
CUT-TMU-1000	28	28	26	-	-
MAU-SU-1000	14	20	14	3	19
NCL-TEDU-2000	11	2	1	-	2
UGA-UAN-1000	16	15	15	(2)*	-
UGOE-ISET-1000	16	14	12	2	10
UMBC-MAU-1000	7	7	7	1	-
TAU-ULE-UMBC-1000	29	26	22	2	(17)**
UGA-LU-1000	10	10	6	1	-
UGA-TUO-1000	14	20	14	1	18
UGA-TUO-2000	21	8	7	-	-
UGA-UCY-1000	29	28	24	4	-
UGA-UNESP-1000	29	28	27	3	-
UJD-PHH-1000	14	12	10	2	-
UMBC-NU-1000	21	23	21	-	-
Total	321	290	248	19	99

Note. *) These 2 students also participated in the UGA-UNESP-1000 exchange

***) These portfolios use another template than the EVOLVE standard template



4. Students' general perceptions

Elke Nissen, Catherine Felce and Catherine Muller

The main focus of this study is to identify the impact of VEs on the development of student competences. In this context it is also important to identify factors that foster or prevent the development of such competences. General VE appreciation is one of these, since, in such an online learning context, it may lower students' "affective filter" (Moore, 1993) and hence is a requirement for their readiness to interact online and to learn within such a setting.

This chapter 4 is therefore dedicated to describing students' general perception of the VE they participated in, the major factors that appear to influence their - positive or negative - appreciation of the VE, and their overall perception of VE as a learning experience. It is based on the analysis of relevant sections in the pre- and post-survey and answers to specific interview questions.

It was expected that the tendencies identified in the multiple, diverse VE contexts of our study would corroborate, on a large scale, other literature and research findings in the field (e.g. Müller-Hartmann & Kurek, 2019; O'Dowd & Ritter, 2006; The EVALUATE group, 2019; Helm & Van der Velden, 2019; Helm & Van der Velden, 2020; Stevens Initiative, 2019), thus underpinning the robustness of these tendencies. Furthermore, we hoped to identify additional aspects of design, implementation and satisfaction, and most importantly, to reveal links between the factors which influence students' engagement and learning outcomes within these pedagogical settings based on socio-constructivist theories. Peer-to-peer interaction is at the heart of VE, where students not only learn from each other, but also develop knowledge and skills jointly through collaborative teamwork. One of the main findings from this section is, indeed, that students' general appreciation of the VE is linked not only to their reported degree of engagement and participation, but also to their perceived level of competences after the VE (see below).

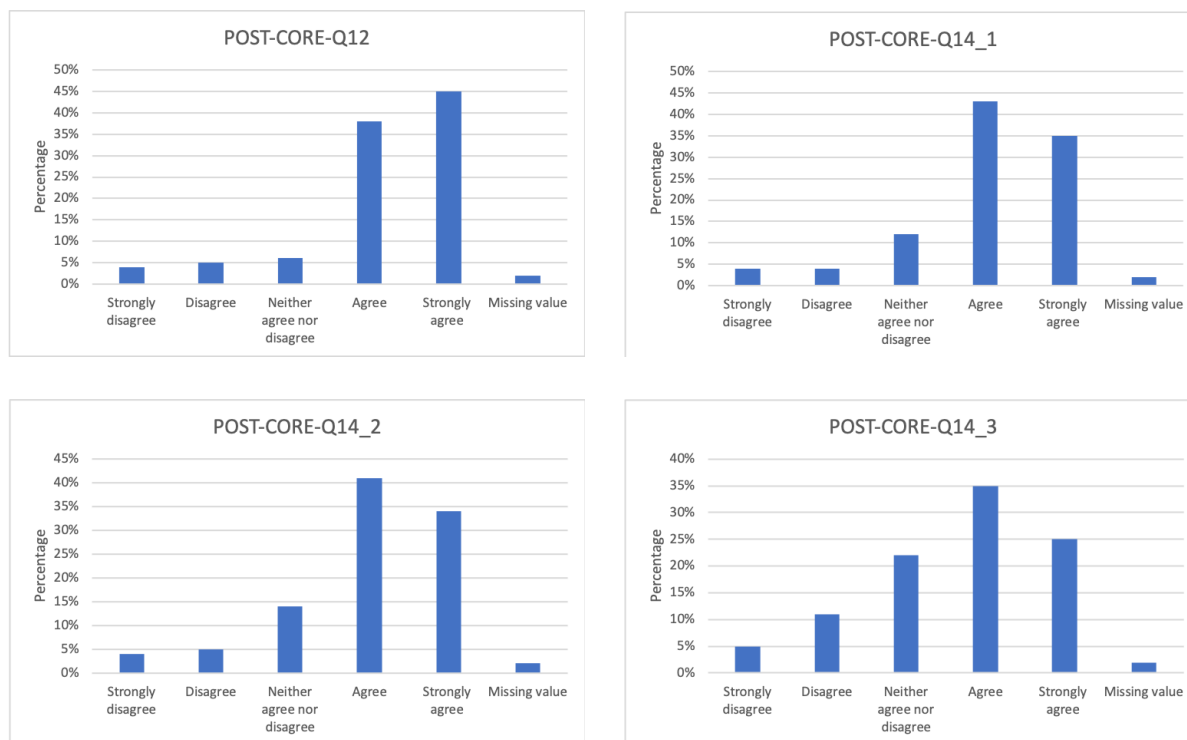
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4.1. General appreciation

4.1.1. A mostly positive general appreciation

Students predominantly consider VE as a positive experience in their HE curriculum: 83.5 percent of the students who participated in one of the 16 VEs of our corpus give a positive feedback overall in the post-survey: they "agree" (37.9%) or "strongly agree" (45.6%) with the item "Overall, I appreciated participating in this Virtual Exchange" (see Figure 3). Many would like to experience a further VE, as the average score (see Table 5) and the degrees of agreement (see Figure 3 and section 4.1.2) for the item "I am interested in having further opportunities to engage in dialogue through Virtual Exchange" shows, and as a number of students spontaneously state. The majority think that VE is a valuable part of their HE course and should be continued in the future.

When asked for positive and negative comments about their VE experience in the open-ended questions and interviews, students generally mention negative aspects only after giving a general positive statement, the negative comments being relatively brief and targeting specific aspects rather than the global VE. Opposed to this, when students are asked to provide general comments on their VE experience, a majority spontaneously make a general positive comment, using terms such as "new experience", "discover" or "a great experience", "interesting", etc.

Figure 3: Post-survey scores for appreciation and further opportunities VE

Note. Students' agreement with the item "Overall, I appreciated participating in this Virtual Exchange" (POST-CORE-Q12) and items on interest in VE or physical mobility ("The Virtual Exchange should be continued in the future in this course", POST-CORE-Q14.1; "I am interested in having further opportunities to engage in dialogue through Virtual Exchange", POST-CORE-Q14.2; "Participating in this Virtual Exchange increased my interest in physical mobility", POST-CORE-Q14.3)

4.1.2. What influences students' general VE appreciation?

The analysis of our data allows us to identify, on the basis of VEs implemented in different forms in various educational settings and disciplines, several recurrent factors that - either positively or negatively - influence students' VE perception and appreciation. These factors are presented separately in this report for the sake of clarity, but they are in fact interlinked and often interdependent.

Among these, a major factor influencing students' general VE appreciation appears to be their perception of the VE being an opportunity for developing transversal and discipline specific skills (see also chapter 8). The scores for general appreciation and for "I am competent in the knowledge and skills identified by the course objectives", "I am able to communicate adequately in the language of the Virtual Exchange", "I am able to communicate effectively through online tools" and "I am able to take initiatives when working with others" after the VE, for instance, show significant correlations (see Table 9). Moreover, students' comments in the open-ended questions often describe VE as a learning opportunity. These will be presented in more detail in section 4.3.

General appreciation, in turn, influences engagement and participation (see section 4.2.3). Other major factors influencing general appreciation revealed by our results are VE and task design and organisation, technology, and participation and communication between the partners. These are discussed in section 4.2.



A majority of students show interest, or even great interest, in VE in the future and in physical mobility (see Figure 3 above and Table 5 below):

- 78.23% agree or strongly agree that “The Virtual Exchange should be continued in the future in this course” (POST-CORE-Q14.1)
- 74.2% agree or strongly agree with the statement “I am interested in having further opportunities to engage in dialogue through Virtual Exchange” (POST-CORE-Q14.2)
- 59.68% agree or strongly agree with the sentence “Participating in this Virtual Exchange increased my interest in physical mobility” (POST-CORE-Q14.3)

The increase of interest in going abroad is slightly less positive compared to the other two questions. Two possible explanations can be given for this. First, the academic disciplines of our research participants, and more particularly language studies, teacher education and e-learning design (both often in the language area) as well as intercultural studies and management as such include an international component and orientation. Students in these fields often already wish to go abroad during or after their studies, even before their VE experience. Second, some VEs finished in times of the Covid-crisis, when it became clear that options for physical mobility would be worldwide reduced. This might also have led several students to not hoping for physical mobility in a near future.

Table 5: Post-survey items on general appreciation and interest in VE or physical mobility

Item number	Item	mean value
POST-CORE-Q12	Overall, I appreciated participating in this Virtual Exchange	4.19
POST-CORE-Q14.1	The Virtual Exchange should be continued in the future in this course	4.03
POST-CORE-Q14.2	I am interested in having further opportunities to engage in dialogue through Virtual Exchange	3.95
POST-CORE-Q14.3	Participating in this Virtual Exchange increased my interest in physical mobility	3.65

4.1.3. Influence of the COVID-pandemic on VE, from a student perspective

The 16 VEs in this study were all carried out in the timespan of autumn 2019 to spring 2020. This coincided with the outbreak of the COVID-pandemic, which started in January 2020 in China and then progressively affected other parts of the world. Most of the VEs were finished at the time when the pandemic started to affect the VE partner countries.

There were two exchanges, however, where the pandemic had an impact on both the design implemented by the teachers and the learning outcomes reported by students. In the CUT-TMU-1000 exchange, the teachers seized this major global “event”, which is holding the world in its grip, as an opportunity for students to share their perspectives regarding the virus and related political local decisions, and how this affected their personal lives and the lives of others. Students from both partner institutions mention COVID in the learning outcomes of their VE, referred to by one of them as knowledge on “global issues”. “*When we talked about how our countries tackled the COVID-19 outbreak, we exchanged our perspectives and all got new thoughts after the exchange*”. Another student sums up in more detail his/her personal outcomes of the VE as follows:

“New people, the culture of Taiwan, how they celebrate, the nutrition the Taiwan people have, how do they celebrate special occasions. Also its easier to find a job in Taiwan than in Cyprus in the health sector. How do they respond against a pandemic disease(COVID-19). How can chemical engineers and doctors work together to fight against the COVID-19”.

In the other exchange, AMU-MAU-UNSAM-1000, the pandemic is also reflected in the data from students in the three partner institutions involved. It is, as in the other VE, a topic of discussion. Moreover, the pandemic forced teachers to modify the initially planned design of the VE tasks, since even local physical mobility was reduced, hindering students to gather information in their respective towns as originally planned. *“Things were good but covid-19 complicated things, especially because the idea from the start was to explore/move around in our cities”.* In fact, the whole teaching setting was modified because of the pandemic, and this was mentioned by the students. Due to local health safety measures courses in which the VEs were integrated could not take place in a face-to-face setting any more, but were carried out entirely online. With regard to this, one student addressing the teachers in the EVOLVE survey, remarked how COVID-19 contributed to the success of the VE experience:

“I think you handled the shift from the Covid-19 situation very well, you should be proud of that. Perhaps even, the Covid-19 fit the project better, while presenting challenges such as not seeing your group members (i.e the one from your country), the telecollaboration certainly came alive.”

On the other hand, COVID-19 is also associated with breakdowns in Internet connections as too many people were working, studying or playing online from home at the same time, as reflected in this student portfolio:

“The collaboration overall went well, we had some technical issues leading to breakdowns in communication but it still panned out just fine. What happened was that several group members at different times got disconnected from our conference call, froze, and so on. We couldn't really do much about it, we waited a bit, they wrote in the chat that their connection is worse than usual (likely because of covid-19 restrictions and heavy internet usage) and we continued without them until they sometimes came back”.

According to one student, an Argentinian member of their small VE group was infected by the virus and hospitalised, being therefore unable to continue the exchange. The group was consequently obliged to carry on the discussion and work without her.

What these data excerpts show is that the impact of the pandemic on VE can be diverse and multi-layered. It impacted VE design and the way in which it could be included in university courses. Moreover, in some cases, it affected students at the personal level and at the level of group work, causing issues in student participation. Yet, it is not an exclusively negative experience in the eyes of the students. Many state, on the contrary, that they are interested in VE as a learning method, particularly in these times of the pandemic. Above all, it provides a topic for discussion, comparison and analysis of topics which many students realise are of major global relevance, since this *“can lead us to conclusion that no matter who we are, no matter where we are, some problems (such as pandemia of COVID-19) affect all of us”.*

4.2. Factors that influence students' general VE appreciation

This section presents the major factors other than the perception of VE as a learning experience that could be identified through our study.

4.2.1. VE design / task design and organisation

Students express a positive opinion overall of the design of the VE they participated in and of the tasks included in it: the mean score for the related items (see Table 6) range from 3.79 to 4.36 on our 5-point-scale. What their positive comments mainly refer to is the clarity of this VE- and task design.

Table 6: *Post-survey items on VE or task design and organisation*

Item number	Item	mean value	Correlation to gen. appreciation Q12 (sig) - N=243	Correlation to own participation Q3.1 (sig) - N=243	Correlation to own engagement Q3.2 (sig) - N=243
POST-CORE-Q7.1	The Virtual Exchange tasks met the learning objectives of my course	3.97	.562*	.292*	.357*
POST-CORE-Q7.2	The Virtual Exchange tasks met my personal learning objectives	3.79	.558*	.292*	.357*
POST-CORE-Q7.3	The tasks and Virtual Exchange instructions were clear and easy to understand	3.86	.323*	.253*	.414*
POST-CORE-Q7.4	The due dates and time frames for Virtual Exchange activities were indicated clearly	4.09	.259*	.340*	.324*
POST-CORE-Q7.5	The Virtual Exchange offered a learning experience that would not have been possible otherwise	3.93	.545*	.223*	.300*
POST-CORE-Q7.6	The level of difficulty of the tasks was appropriate for the course	3.99	.486*	.179*	.391*
POST-CORE-Q7.7	The Virtual Exchange was well integrated into the course (e.g. through guiding activities, time dedicated to discussing the Virtual Exchange)	4.00	.515*	.215*	.367*
POST-CORE-Q7.8	My teacher / the moderator provided appropriate support when necessary	4.36	.391*	.214*	.309*
POST-CORE-Q7.9	Overall, the Virtual Exchange was well organised	4.00	.494*	.263*	.370*

Note: * Significant at $p < 0.05$

Students' perception of a well organised VE and their general VE appreciation are correlated. In addition to student comments suggesting the same, this underpins the importance of design issues for students' VE experience. More importantly, students' perception of a well organised VE, on the one hand, and their declared personal (own) participation and engagement in the VE tasks and communication, on the other are also correlated (Table 6 below).

This finding is particularly relevant for future VE design since in a pedagogical setting such as VE, where learning is first and foremost based on the interaction between students, cognitive engagement and participation in the exchange are the basis for students' development of competences.

The question of own and partner's' participation will be dealt with later on (section 4.2.3).

Several important aspects that influence, either positively or negatively, the students' VE experience, could be identified on the basis of our quantitative and qualitative data on the VE and/or task design and organisation. These are dealt with below and in the following section (4.2.2).

Time frame and time issues

Time is a recurring topic in our data set. The students agree by majority that "The due dates and time frames for Virtual Exchange activities were indicated clearly" (see Table 6).

The students are nevertheless critical of several issues related to time. One of these is the workload due to the VE, particularly with regard to the deadlines and workload in other courses in the students' curriculum. In the same vein, when due-dates are considered too tight, this leads to dissatisfaction and is regarded as a potentially missed opportunity for learning : "*I think, as busy as we were, that participating ourselves in the VE was simply not productive*". In line with this, VEs with a short duration lead to expressions of regret, and requests for longer-lasting exchanges in order to learn more, thus indicating the students' interest in the VE.

Since online communication is the basis of VE, students point out that time zone differences between partners from distant countries, as well as more general lack of overlap of possible time windows in their schedules were a potential issue, especially with regard to synchronous group work. Several students therefore claim their local schedules should be better taken into account.

Tasks

Overall, students provide positive feedback on the VE tasks they experienced. They agree by majority that "The level of difficulty of the tasks was appropriate for the course" (see Table 6). Moreover, they mostly agree with the statement "The Virtual Exchange offered a learning experience that would not have been possible otherwise" (see Table 6). This relates to the tasks being meaningful to them, within the course and in the particular frame of a VE - as opposed to tasks that could have been carried out in a classroom context. Very consistently, this item is thus also correlated to "The VE tasks met the learning objectives of my course" (N=243, r=.592) and "The VE tasks met my personal learning objectives" (N=243, r=.613).

Although the tasks lead to general student satisfaction overall, in several VEs students state that the design of the VE does not allow for sufficient interaction and contact with peers. This highlights the need for an adequate balance between course-oriented tasks and 1) informal exchange, in order to "*build closer relationships with our peers*", or else 2) more "*involve our personal culture and world*". In line with this, students have requested initial synchronous ice-breaking videoconferencing meetings with their partners as occasions for informal and relationship-building communication, in those VEs where no initial videoconferencing sessions took place.

Teacher support

Teachers hold a crucial position in the success of a VE since they plan, organise and tutor it. Students' feedback corroborates this view. They are highly satisfied overall with the support their teachers provided (see average score for "My teacher / the moderator provided appropriate support when necessary" in Table 6), and some comments underpin this: "*all the teachers were committed to their students giving them support and understanding in difficult moments, they*

answered our questions when we did not know how to continue” However, five students express dissatisfaction due to perceived lack of teacher support (from their own or from the partner institution), always linked to a specific aspect or moment within their VE.

Clear instructions

Most of the students state that “The tasks and VE instructions were clear and easy to understand” (see Table 6). This item, as all those figuring in the table above, is correlated to students’ general VE appreciation. Several students, however, perceive a lack of clarity in the instructions, and consequently some feel they “*end[ed] up doing another thing completely opposite from what [they] were expected to do*”. In some cases, this is due to “*difference in the teachers’ requests*” between the classes, referring to a need for detailed teacher coordination. But, rather independently from instructions and explanations given in the different VEs, several students state that it takes them some time to fully understand how the VE functions and what they are expected to do.

Integration of the VE within the course

Another factor influencing student satisfaction and participation is the purposeful integration of VE within their course, as indicated by the correlations in Table 6, regarding the two items “The VE was well integrated into the course (e.g. through guiding activities, time dedicated to discussing the Virtual Exchange)” and “The VE tasks met the learning objectives of my course”. Yet, several student voices are raised against VE or VE activities being mandatory rather than voluntary, such as “*Introduce myself in public, use web services I didn't agree with*”.

4.2.2. Technology

Technology plays an important role in students’ perception of their VE experience, since it mediates their communication and group work. Their perception of the VE tools being appropriate to the VE tasks, being easy to use and working well is consistently correlated at significant levels to their general VE appreciation, but also to their reported degree of personal participation and engagement (see Table 7).

Table 7: Post-survey items on technology

Item number	Item	mean value	Correlation to gen. appreciation Q12 (sig) - N=243	Correlation to own participation Q3.1 (sig) - N=243	Correlation to own engagement Q3.2 (sig) - N=243
POST-CORE-Q9.1	Did you use video-conferencing tools for the Virtual Exchange (e.g. Skype, Zoom)?	3.31	.250*	.029	.028
POST-CORE-Q9.2	Did you use quasi-synchronous group discussion tools (e.g. Messenger, Whatsapp) for the Virtual Exchange?	3.74	.016	.075	.028
POST-CORE-Q10.1	The technology I used for the Virtual Exchange worked well	3.96	.386*	.308*	.254*
POST-CORE-Q10.2	The tools were easy to use	4.12	.272*	.310*	.234*
POST-CORE-Q10.3	In my eyes, these tools were appropriate for the Virtual Exchange tasks	4.07	.334*	.334*	.299*

Note: * Significant at $p < 0.05$

Material conditions

Most students report the technology they used for the VE worked well (see Table 7). But our qualitative data also reveal issues regarding material conditions. Most of the technical problems students mention are linked to synchronous videoconferencing sessions: insufficient quality of headsets, microphone, or more generally sound problems. And regarding specific VEs, and hence local institutional equipment and conditions, internet connection and background noise problems are mentioned. Whereas some students indicate their technical problems were only minor and did not prevent them from having fruitful communication and teamwork, others complain these affected their VE experience negatively.

Choice of the tools used

A minority of students state either the communication tool or other tools or functions dedicated to task completion (e.g. video editing program, program for multimodal presentation) are not easy to handle. Others indicate either they or their partners are lacking digital skills, which underpins the importance of initial technical training in technology sustained learning situations. But sometimes it is the choice of tools that students question, e.g. when they dislike using a tool that they normally use for personal communication, when “Zoom has some security issue now”, when they consider they are requested to use too many different tools, or when they consider another video conferencing tool would allow for better sound or video quality.

By contrast, other students state tools are “*useful and easy to use*”. This is the majority’s point of view, as the answers to the items “In my eyes, these tools were appropriate for the Virtual Exchange tasks” and “The tools were easy to use” (see Table 7) show. Several teacher trainees state they appreciated discovering new tools for their future professional purposes.

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Videoconferencing

According to the students’ answers, 3 VEs are mainly based on asynchronous communication. All the others include regular synchronous communication, using quasi-synchronous group discussion tools (e.g. Messenger, WhatsApp), video conferencing tools (e.g. Skype, Zoom), or both.

As pointed out above, integrating videoconferencing sessions into VE design, at the very least at an initial stage, is requested by students having experienced VEs that did not entail such videoconferences. Synchronous multimodal communication allows for more spontaneous relationship building: “*I think a videoconference would have been appreciated before starting the VE, in order to introduce ourselves. It would probably have been more efficient than the texts.*” Furthermore, it allows for audio-visual clues that facilitate capturing the partner’s communicative intentions: “*Using WhatsApp is good but it’s just a writing exchange, we can not see the emotional part of a normal communication.*”

4.2.3. Own and partner’s participation

Participation and communication between the partners are key elements that influenced the students’ perception of the VE. It is worth noticing here that the scores for questions about one’s own active participation (POST-CORE-Q3.1) and engagement (POST-CORE-Q3.2) are quite high. The same goes for the perception of one’s partners’ active participation (POST-CORE-Q3.3), comfort in interaction (POST-CORE-Q3.4, and the building of positive relationships (POST-CORE-Q3.5). An analysis of the quantitative data shows that participation and engagement (own and partners’) are closely related to the general appreciation of the VE (see table below). The same



applies to social presence (see items “My partners participated actively in the Virtual Exchange” and “I felt comfortable interacting with my partners (my opinion was taken into account, it was possible to express disagreement while still having a sense of trust)” in Table 8). These items are also correlated to almost all of the items related to student competences in the post survey (POST-CORE-Q1.1 to 1.12). Since interaction between students is the major means of learning within a VE, we can draw the conclusion that participation and engagement (own and partners’) are crucial to the learning outcomes. This result is also supported by the analysis of qualitative data (see below).

Table 8: Post-survey items on participation and social presence in the VE

Item number	Item	mean value	Correlation to gen. appreciation Q12 (sig) - N=243
POST-CORE-Q3.1	I participated actively in the Virtual Exchange (eg. by regularly posting messages)	4.24	.217*
POST-CORE-Q3.2	I was actively engaged in the Virtual Exchange (eg. by regularly reading the others’ contributions, by feeling concerned/involved, etc.)	4.22	.355*
POST-CORE-Q3.3	My partners participated actively in the Virtual Exchange	4.00	.383*
POST-CORE-Q3.4	I felt comfortable interacting with my partners (my opinion was taken into account, it was possible to express disagreement while still having a sense of trust)	4.16	.437*
POST-CORE-Q3.5	I built positive/meaningful relationships with one or several partners by participating in this Virtual Exchange	3.80	.438*

Note: * Significant at $p < 0.05$

Collaborative teamwork

The first element to be developed here is collaborative teamwork. A majority of students recognise their own investment as well as their partners’ and are very satisfied with it. More specifically, they appreciate their partners’ contribution, punctuality and readiness to work efficiently. Some participants notice a positive evolution and are happy with “[h]ow the group work turned out to be in the end”. They are positively surprised to have “*actually managed to do something collaboratively!*” When the different sides are actively engaged, they feel comfortable and a sense of mutual help prevails: “*I think we were able to work in good terms, respecting everyone and giving each one the opportunity to speak their minds. Everyone was really nice, and helped when (...) the language barrier was challenging*”. As a result, peer learning is achieved through active participation.

Although respondents generally express a positive perception of their own and their partners’ participation, others are disappointed by collaborative teamwork and this has undoubtedly influenced their whole perception of the VE. Several participants have made general negative comments on working in groups or specific comments on the effects of cooperation. They are dissatisfied with the misunderstandings between them and their partners. These issues are often related to what was perceived as a lack of motivation or participation from the other side (“*It was exhausting when people not reacted or participated*”) and has had direct consequences for them (“*Finishing the work at 22h because your partners didn't sent their part of the job in time*”). Working in groups also implies reaching agreement and several students expose their difficulties to do so.

As a participant sums it up: *"I think the personal experience is very influenced by the people who form the group, and unfortunately this was a main factor for mine"*.

Interpersonal relationship between partners

The interpersonal relationship between partners then appears essential to the perception of the VE. Numerous quotes underline the interpersonal dimension that the students mostly value and appreciate. The opportunity to meet new people is repeatedly mentioned. The contact with peers sharing the same interests or the same perspectives (e.g. mostly future educators) is especially highlighted: *"It was also great to connect with people that are basically on the other side of the planet and hear their stories and experiences in studying to become teachers"*. Students are grateful when the relationships are harmonious and this is probably to be linked with the quality of participation (politeness, mutual respect) and high engagement of partners: *"My partner and I both participated very well in this program and we could both share our thoughts and ideas together, both of us respected each other and we openly shared our conversations"*. Consequently, the VE has enabled students to build new friendships. Generally speaking, the "[h]uman exchange" was greatly appreciated.

However, the quality of interpersonal relationships was sometimes perceived as low. For instance, a student considered that the participation *"was very minimal. It felt contrived, and I think everyone sensed that. Our interaction was kept to the basic "as needed" level"*. Another participant has noticed that *"Some meetings were actually awkward because they [their partners] barely talked"*. This influence of the quality of interpersonal relationships on the perception of the VE is definitely an element to bear in mind when conducting such a project for it can be seen as a weakness.

Perceived and appreciated opportunity to communicate

On top of that, the perception of an opportunity to communicate and to feel pleasure from it influences the appreciation of the VEs. A positive development over time is sometimes noticed by students (*"At first, I felt like it will not be ok because it was the first time for me that we interact with from other country though it was good and we make it."*). As a result, participants gain self-confidence. Students report sharing views with their partners. This communication is presented as a source of enjoyment. Students are impressed to be able to do so in spite of the physical distance. The fact that some participants are disappointed by insufficient informal interaction (*"I would prefer focusing on interacting with each other rather than carrying out tasks."*) reveals the importance to them of interpersonal communication.

Still, communication also entails negative comments from participants. An issue raised by some of them is more intrapersonal and has to do with the necessity of using a foreign language to communicate and a lack of self-confidence. This sometimes gives rise to difficulties to communicate; however as a student has interestingly put it: *"Sometimes the communication with partners was difficult, but this is the part of the process that helps us to be more intercultural competent"*. The perceived obstacles to communication are inherent to VEs, namely the online setting and the presence of people coming from different cultural backgrounds (*"The high risk for misunderstandings due to either lack of English skills, or just the cultural difference. Certain phrases, or even jokes, were at times conceived a different way than intended. This risk of conflict and misunderstandings was always present, so this was a small inconvenience"*).



Opportunity for international experience without travelling

Besides, the VEs are viewed by many participants as a way to gain international experience and an alternative to physical mobility, which helps them get a good impression of the exchanges. As such, they are seen as a unique opportunity: *“I would have never been in contact with palestinian students if not for this telecollaboration”*. Students enjoy broadening their horizons: *“I liked being part of a diverse team that could use our diversity as a creative strength. Bringing different educational and cultural understanding to lesson design allows for the ability to “think outside the box” of one’s culturally-prescribed view of education”*. The easiness of having contacts with peers abroad without travelling is greatly appreciated: *“I liked a lot that I was able to communicate and connect with someone in a different part of the world. Normally, it would be difficult to do that unless I had participated in some program or went outside of the country.”* However, far from preventing them to have a direct international experience, it *“inspired [some of them] to travel and to learn about other cultures”*. This quote nuances the students’ slightly less positive increase of interest in going abroad (see section 4.1.2.).

An intercultural experience

In relation to the international experience, the perception of having an intercultural experience definitely influences students’ general VE appreciation. The discovery of cultural facts is enjoyed: *“The opportunity to learn about other cultures and ways of seeing the world. It made me understand that there are people who live on the other side of the planet, who have different languages, customs, ideas and life experiences than me”*. The idea of exchanging and sharing views with one’s partners also appears regularly. These different elements are related to the opportunity to meet, interact and work with people from different cultures: *“Engaging with people of different cultures and values which in turn gave me more insight”*. Students highlight their openness and their critical thinking: *“The opportunity to talk to foreign friends and rethink what we previously never think about”*. They have also become aware of the risk of generalization: *“So, I only met two students and then I tend to generalize on the whole country. [...] But if I keep this in mind, it’s just I have to be open”*. On the contrary, when the intercultural experience is not perceived, students have expressed their disappointment.

‘Real’ practice

The last factor related to participation and communication between partners that influences the whole perception of the VEs is the sense of ‘real’ practice. Numerous students highlight their development of skills thanks to the exchange (*“I did acquire skills I would not have been able to acquire otherwise”*) and consider them useful for the future. Several participants report a gain of collaboration skills. The possibility to practice a foreign language is greatly appreciated: *“I faced some problems with expressing my idea because it’s been a long time that I didn’t practice English. So, I faced some problems but there is really a remarkable difference after the virtual exchange. I think that it’s a very good way to have more confidence on oneself, to talk in public and to give one opinion”*. Preservice teachers are particularly grateful for this concrete experience: *“It was a very practical course in that sense, because it is something I can replicate in my teaching”*.

4.3. General learning outcomes

4.3.1. Quantitative results on predetermined learning outcomes

In this section, a broad description of what students report as having gained through their participation in Virtual Exchange is presented. This overview is based on data collection within the general “core” sections of our data collection protocols, where students were asked about their global perception of the VE they participated in, and the general learning and other outcomes related to this experience. More precisely, it is based on quantitative results that indicate whether improvement in predefined learning outcomes can be measured, and on qualitative analysis of open-ended questions, which provide further information about the specific construct measured quantitatively.

Closer analyses and insights related to specific student competences that the EVOLVE project focuses on will be presented in Section 5.

Table 9: Comparison of pre- and post-survey items on general learning outcomes

Item number	Item	Presurvey means	Postsurvey means
CORE-Q1.1	I am able to work in teams and solve problems collaboratively.	4.30	4.31
CORE-Q1.2	I am able to take initiatives when working with others.	4.10	4.27*
CORE-Q1.3	I am able to reflect critically on my or others' work.	4.13	4.21
CORE-Q1.4	I am able to communicate effectively through online tools.	3.97	4.15*
CORE-Q1.5	I find it is easy to talk with people from different cultures.	3.75	3.96*
CORE-Q1.6	I am able to express my ideas clearly when interacting with people from different cultures.	3.67	3.93*
CORE-Q1.7	I have the confidence to communicate or work in a culturally diverse setting.	3.86	4.03*
CORE-Q1.8	I am able to understand the perspectives and worldviews of others.	4.24	4.25
CORE-Q1.9	I am able to engage in open, appropriate and effective interactions with people from different cultures	4.12	4.26*
CORE-Q.1.10	I am able to select digital technologies to suit my communicative purpose online with consideration of how their use may impact on others.	3.85	4.09*
CORE-Q.1.11	I am competent in the knowledge and skills identified by the course objectives.	3.77	4.04*
CORE-Q1.12	I am able to communicate adequately in the language of the Virtual Exchange.	3.90	4.15*

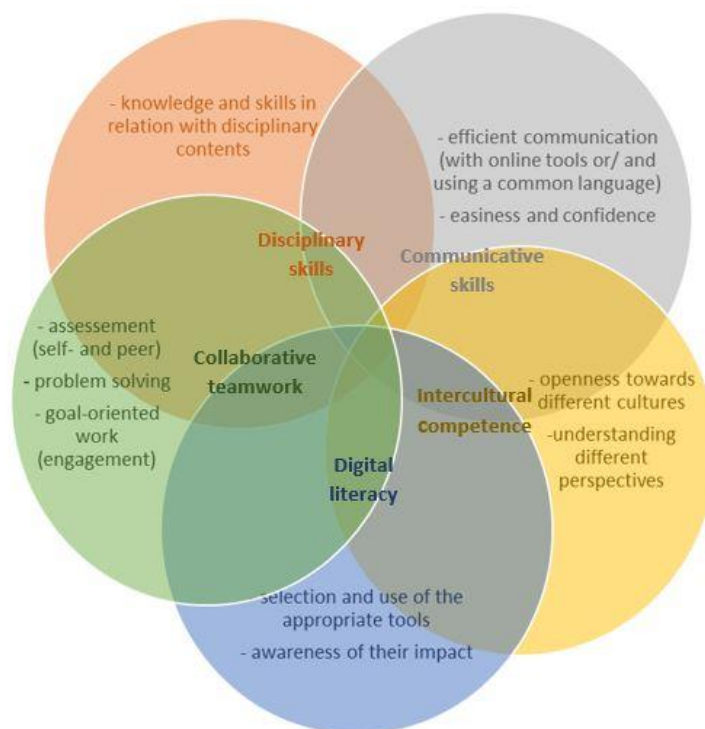
Note: * Significant at $p < 0.05$

The questions administered through pre-and post-surveys (Table 9) intend to provide an overview of learning aspects, which are likely to be affected by the VE experience, such as the ability to:

- work with peers within cultural diverse groups (CORE-Q1.1-2-3-7)
- communicate effectively and easily with the partners (CORE-Q1.4-6-7-9-12)
- develop intercultural skills (CORE-Q1.5-6-7-8-9)
- gain knowledge and skills associated to disciplinary contents (CORE-Q1.11)
- engage critically with digital tools (CORE-Q1.4-10)

These questions do not refer to any single competence by itself, in view of the fact that the competences and skills at play and developed during VE must be considered as interconnected and intertwined, as illustrated in Figure 2.

Figure 4: Domains targeted by the pre- and post-survey questions



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For the above listed aspects, participation in and completion of VE activities seem to have a positive impact on learning, as a difference between pre- and post-test can be spotted in all associated core questions, except three.

Scores in the pre-test are in all domains generally quite high, but the difference with results from the post-test show a moderate but nevertheless significant progress in the competences at play during VE. Greater difference between pre- and post-test mean values exist in the broad domains of digital literacy, competences linked to the discipline of the course the VE is embedded in, and language skills.

Regarding transversal skills, such as engagement in collaborative work, or intercultural online communication, mean scores are narrower, but are still indicating improvement. The participants' responses to three questions show only slight increase of the mean score, and no significant difference; these refer to specific sub-components of two domains (i.e. collaboration skills and intercultural competence). These aspects are:

- teamworking and problem-solving during collaborative tasks (CORE-Q1.1),
- reflecting critically on one's own or on the peers' work (CORE-Q1.3),
- understanding others' perspectives and worldviews (CORE-Q1.8).

Considering the various settings of the different VEs and the complex interaction of skills, attitudes and beliefs occurring during the exchanges, it would be abusive to seek to provide straightforward explanations to these results. Yet, they can be related to issues students report

having faced, such as time, partners' participation, communication or technical issues (see section 4.2.), or to other critical issues related to intercultural awareness and competence as outlined by O'Dowd and Dooly (2020, 365-367). Such issues and challenges may have affected the work or the communication within some teams and might therefore constitute hindering factors in the collaboration or the intercultural dialogue. Furthermore, the VE is part of a disciplinary course and the outcomes depend not only on the VE itself, but also on learning objectives targeted by the course.

Nevertheless, based on these first statistical results, participation in VE activities appears to have positively affected student learning in all domains targeted by the core questions (disciplinary, digital, communicative, collaborative and intercultural) and to contribute to enhance most of the associated skills.

Moreover, other general results confirm that for a majority of students, disciplinary learning objectives set in the course were met after completion of the VE tasks (Figure 5), as well as personal learning objectives (Figure 6).

Figure 5: Perceived learning outcomes regarding course objectives

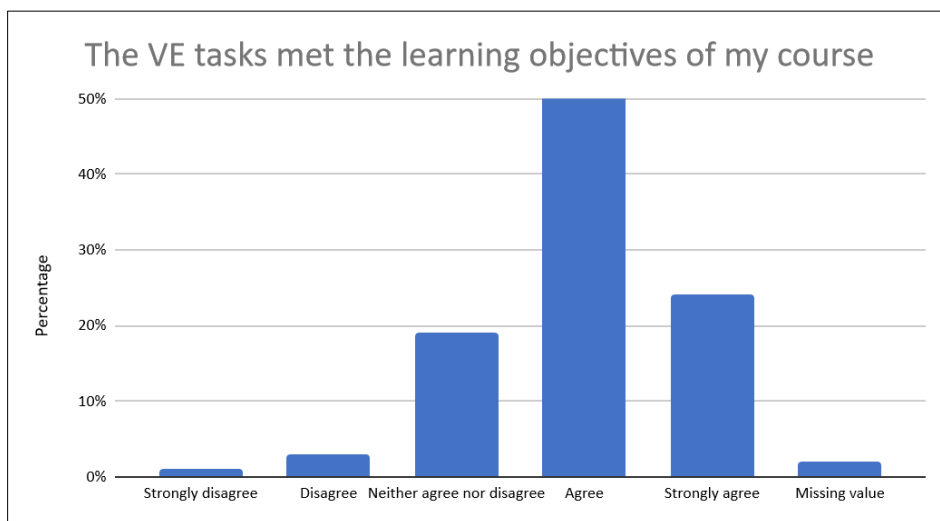
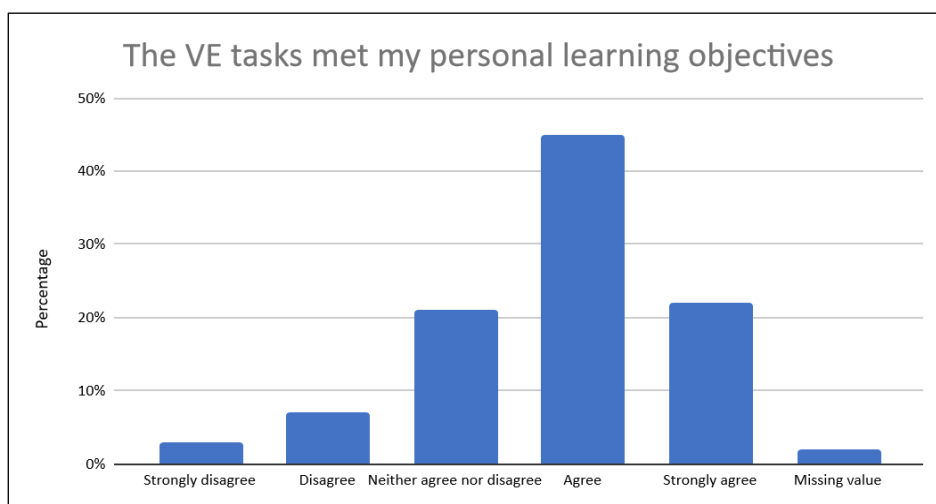


Figure 6: Perceived learning outcomes regarding personal objectives



4.3.2. Qualitative findings on students' perceived outcomes

In order to draw avenues for interpretation of the quantitative results based on predefined items, qualitative analyses of the open-ended questions of the core part (here POST INTR Q6: “What did you get out or learn from this Virtual Exchange?”) enable to gain deeper insight in the students' perceived outcomes.

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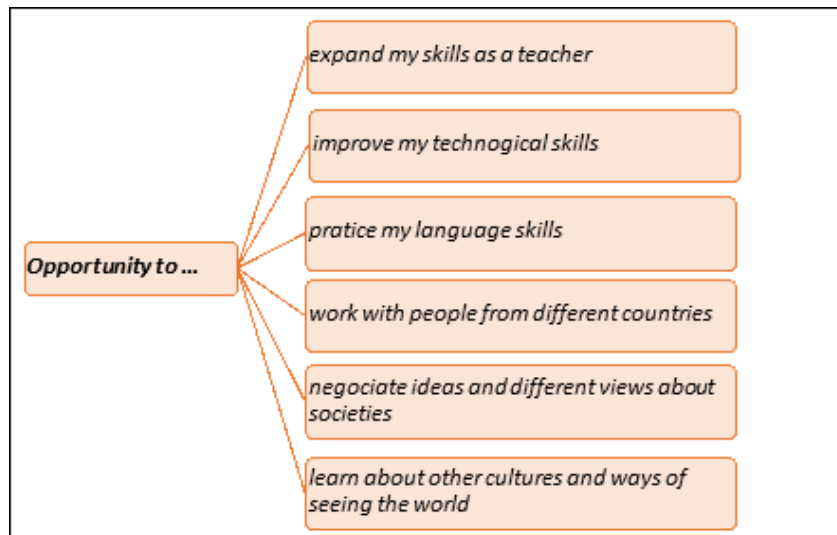
Students often mention more than one single outcome when they report on their experience. In doing so, they highlight the potential of VE to develop a combination of skills: digital literacy enhances teaching skills of future educators, language competence increases with the collaborative skills needed for the project, communication opportunities foster fluency and confidence and, in addition, interpersonal relationships are built between peers with different cultural backgrounds. The plurality of learning outcomes support the development of a set of skills required to become a “telecollaboratively efficient person” (Dooly, 2016).

*“I got an opportunity to **use English** in a more authentic way by **cooperating** with people from other countries who also use English as a **lingua franca**. I learned how difficult it is to include 7 people in a project and make everyones voices heard. I learned more about how I function in a **group work** and **how I perceive my country and my culture** as well as **other countries and cultures.**”*

Virtual exchange as an opportunity

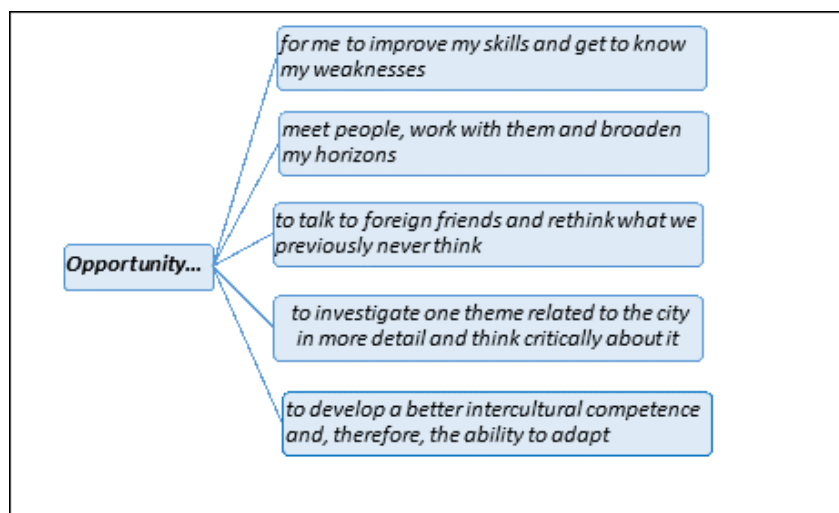
Among the aspects students report having particularly appreciated is the fact that the VE provides a wide range of opportunities (along with the learning objectives targeted in the enrolled courses) and enables them to get new experiences. As illustrated in Figure 7, these opportunities may lead to learning outcomes in each of the pre-identified competences (respectively disciplinary, digital, language, collaborative, communicative, intercultural competence), and occasionally be linked to the disciplines of the courses the VE was integrated in (referring for instance to intercultural competence, L2 competence or teaching competences).

Figure 7: VE as opportunity to develop the predetermined skills or competences



Gain or improvement can also concern more general or personal features. Several students evoke how the VE had an impact on their personal development, on their personality traits (by becoming more open-minded or overcoming shyness) or on their behaviour (being more flexible, able to cope with unexpected situations). In that sense, the VE may contribute to enhance transferable skills (such as mentioned in Figure 8), which are crucial in a life-long learning process or for future jobs in multicultural settings (21st century skills). These aspects are not key objectives across all VEs: for 8 exchanges among the 16 studied, mentions of reflexive attitude or critical thinking can be found. Information about the courses in which these VEs were integrated reveal that, to a greater extent in these VEs than in the others, intercultural communicative competence (ICC), intercultural awareness or a the development of reflection and critical thinking belong to the targeted learning outcomes. This supports the idea that the VE itself does not automatically lead to intercultural learning or critical understanding of other perspectives if it is not supported by pedagogical intervention and thought-out integration in the course (O’Dowd, Sauro, Spector-Cohen, 2020).

Figure 8: VE as opportunity to develop general / transferable skills





Furthermore, Virtual Exchange does not only mean learning through ‘real’ practice (see 4.2.3), but is also considered, conversely, as an appropriate setting to put knowledge and skills that were acquired previously or in parallel, into ‘real’ practice (*I put my theoretical knowledge into a practical use*). This can apply to language skills through the provided opportunity to practice L2 skills or to interact with native speakers, but also to disciplinary skills, as for instance in the case of preservice teachers:

“It was a first experience of teaching for me, even if it wasn't in a traditional way (in front of a class). Thanks to the VE I could use what I've learnt in other courses for the first time "for real"”.

Or when students linked their collaboration to the very actual and global pandemic crisis: *“How can chemical engineers and doctors work together to fight against the COVID-19.”*

Intercultural awareness through VE

In the reported learning outcomes, the aspect students mostly highlighted is the impact the VE had on the development of intercultural skills with an influence on all aspects summed up in the model of Competences for Democratic Culture used for this study (Council of Europe, 2018). Openness to cultural diversity and other worldviews are underlined in several students’ quotes and the number of references in the open-ended questions show how much the intercultural experience provided by the VE is valued. Many individual answers can be related to the different elements, which can be distinguished in intercultural competence (knowledge, skills, attitudes, values). The overwhelming mention of intercultural aspects is not surprising, as they also represent the most quoted expectation at the start of the VE and a targeted outcome (broadly defined) for all VEs in EVOLVE. Closer insights into the development of intercultural competence will be presented in section 5.1.

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VE for experiencing online collaboration in multicultural teams

In contrast, collaborative teamwork is less quoted in the expectations of the students than in the outcomes they acknowledge. In VE, according to the underlying collaborative approach of learning, task assignments require students to actively work with the partners in order to achieve a joint goal or elaborate a joint product. On the one hand, VE makes participants experience how challenging teamwork can be when dealing with distance, different time zones, unaligned schedules, various engagement of the participants or with different work and learning cultures. But on the other hand, it also helps many students develop appropriate skills and attitudes to cope with these challenges (*“I learned to work with people I did not know, who speak a language other than my own and who each have their views based on their contexts and beliefs”*). Collaborative work is often associated with more flexible, more inclusive attitudes and could lead to a shift in habits at working, linguistic, communicative, cultural or even digital levels.

Enhancing communicative skills through VE activities

As VE provides an opportunity to establish connections between geographically distant students using various means of communication, one other major outcome refers to the development of communicative skills. It can apply to the competence in the language(s) learned or/and used during the exchanges, but can also be associated with gains in self-confidence by experiencing successful communication despite difficulties or insufficient proficiency. *“During the meetings, I realized I could easily understand my partners as well as talk to them.”*

Moreover, the improvement of the students' ability to communicate encompass transferable skills (soft skills) as well, such as public speaking, intercultural communication, negotiation skills, appropriate communication style or the ability to lead or animate the discussions within the group.

In the next chapters, we will scrutinise more closely how these general learning outcomes reported here play out at the level of specific key competences.



5. Development of intercultural competences

Robert O'Dowd, Catherine Muller and Begoña Fernandez Gutierrez

5.1. Definition

For this part of the study we followed the Council of Europe's definition of Competences for Democratic Culture as "the ability to mobilise and deploy relevant values, attitudes, skills, knowledge and/or understanding in order to respond appropriately and effectively to the demands, challenges and opportunities that are presented by democratic and intercultural situations" (2016, p.10). While many models of global and intercultural competence exist (e.g. Byram, 1997, Dearnorff, 2004, Oatey and Stadler, 2009), the Council of Europe's model of Competences for Democratic Culture (Council of Europe, 2016) was chosen to guide our analysis as this model was developed through a systematic analysis of 101 existing models of global and intercultural competence and therefore was considered to be a comprehensive reflection of what are generally understood in the literature to be the key elements of intercultural competence within a global citizenship framework. Apart from the common competence sets based on intercultural attitudes and cultural knowledge, this model also includes a focus on collaboration skills and conflict resolution - competences which we viewed as being particularly relevant in the context of VE.

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5.2. Background

A widely held hypothesis which underlines the engagement of students in VE is that by taking part in sustained and mentored online communication with members of other cultures, students will gain more nuanced understanding of cultural difference, develop greater openness to other cultural perspectives, and will also develop their ability to collaborate effectively with people from other cultural backgrounds (de Wit, 2016; O'Dowd, 2019).

However, research suggests that these are far from being automatic outcomes of VE. Various studies have highlighted the tendency of students to use their online intercultural interactions to minimize cultural difference and to confirm stereotypes and prejudice (Kramsch, 2009; Ware & Kramsch, 2005). Nevertheless, large-scale qualitative studies have also shown that VE can best enhance students' intercultural competence when the participants are confronted with collaborative hurdles and challenges which require them to find creative ways to collaborate and communicate successfully with their international partners (The EVALUATE group, 2019; Guth & Helm, 2017). The impact of VE has also been seen to be particularly significant on students who come from homogeneous backgrounds and are not accustomed to interacting and collaborating with members of other cultures. In these cases, VE can be an important step in raising their curiosity and openness towards others, and also sparking interest in seeking more opportunities to engage with difference (The EVALUATE group, 2019; O'Dowd, 2020).

5.3. Specific research questions

Based on the Competences for Democratic Culture framework, the following research questions were developed:

1. To what extent did the VEs help students develop the skills necessary to collaborate successfully with others and to manage and resolve conflicts?
2. What type of cultural information did students encounter in their VEs? And how did students react to cultural otherness when they encountered it in their online interactions?
3. To what extent did the VE help students to develop their knowledge and critical understanding of culture and cultures? Did the exchange lead them to reflect critically on their own cultures in any way?

A fourth question related to the factors which contributed to intercultural learning was also added:

4. What contextual factors had an impact on the development of intercultural competence development? In other words, what aspects of the VEs supported or hindered student learning in this area?

Each of the three first questions is related to competences identified by the Competences for Democratic Culture framework. The first question implies co-operation skills, conflict-resolution skills, and empathy. The second one has to do, on the one hand, with openness to cultural otherness and to other beliefs, world views and practices, and, on the other hand, with knowledge and critical understanding of culture and cultures. The third one is related both to knowledge and critical understanding of the world, and to knowledge and critical understanding of the self.

5.4. Statistical results

The results of the comparison between pre- and post-intercultural competence survey elements show a significant increase in students' proficiency in different competence sets (see Table 10). With regard to cooperation skills (see Items CORE-Q1.7 and CORE-Q1.9), following their participation in the VEs, students perceived themselves as being more confident in communicating and working in a culturally diverse environment and more able to engage in open, appropriate and effective interactions with people from different cultures. At the same time, students reported that they had developed their mediation skills and had learned to use translation, interpretation and explanation techniques to make intercultural communication work (INTER-Q1.4)

However, the quantitative results also revealed no significant increase in students' perception of their empathic abilities in terms of their ability to understand the perspectives and worldviews of others (CORE-Q1.8) and their ability to understand their conversation partners when a disagreement arose in their communication (INTER-Q1.5), (see also section 4.3), or in their ability to understand the feelings and concerns of others when interacting with people from other cultures (INTER-Q1.6). Similarly, students did not feel that their ability to notice how speakers of other languages express politeness in different ways, when interacting with people from other cultures, had greatly improved.

The quantitative results also do not show a significant increase in participants' interest in understanding and learning about people's beliefs, values, traditions and worldviews (INTER-Q1-3; INTER-Q1.1). However, this may be explained by the fact that the initial interest, expressed in the pre-survey, was already very high.

**Table 10:** Pre- and post-survey scores intercultural competence

Item number	Item	Presurvey means	Postsurvey means
CORE-Q1.7	I have the confidence to communicate or work in a culturally diverse setting.	3.86	4.03*
CORE-Q1.8	I am able to understand the perspectives and world views of others.	4.24	4.25
CORE-Q1.9	I am able to engage in open, appropriate and effective interactions with people from different cultures	4.12	4.26*
INTER-Q1.1	I am interested in learning about people's beliefs, values, traditions and world views	4.64	4.57
INTER-Q1.2	When interacting with people from other cultures, I can notice how speakers of other languages express politeness in different ways.	4.29	4.33
INTER-Q1.3	I can understand how my own beliefs, world views and practices influence the way I communicate.	4.26	4.39
INTER-Q1.4	I can function in intercultural exchanges by translating, interpreting or explaining.	4.08	4.27*
INTER-Q1.5	When a disagreement appears in the communication, I try to understand my conversation partner.	4.32	4.40
INTER-Q1.6	When interacting with people from other cultures, I can understand other people's feelings and concerns.	4.19	4.20
POST-INTER-Q1.7	I discovered that some of my stereotypes about people from other cultures were not true through participating in the Virtual Exchange.		3.77
POST-INTER-Q1.8	I learned something positive about people from other cultures and places that I did not know before participating in this Virtual Exchange.		4.20
POST-INTER-Q1.9	I enjoyed working with people whose ideas and values were sometimes different to my own.		4.30

Note: * Significant at $p < 0.05$

5.5. Explanations based on qualitative results

How do these quantitative survey findings relate to the qualitative analysis of students' interviews and portfolios?

It is shown below that the qualitative results support those of the quantitative study when it comes to the gaining of confidence and ability to communicate and collaborate in an online and intercultural context.

However, in other areas, when non-significant progress appears in the quantitative analysis, the qualitative data sheds light on important findings. For example, students' reported lack of progress in their ability to understand the perspectives and worldviews of others, or their ability to notice how speakers of other languages express politeness differently is not in line with our qualitative findings. This may be due to students' overestimation of these aspects of intercultural competence in the pre-test. It has been widely reported in the literature (The EVALUATE group, 2019; Jackson, 2019) that students often overestimate their intercultural competence levels in pre-tests and then subsequently reassess these abilities following the challenges of real intercultural contact and collaboration.

In order to analyse the qualitative data, a set of codes was developed by the research team which was clearly linked to our research questions and the relevant competences from the model of Competences for Democratic Culture. This is summarised in the coding table below.

Table 11: Research questions, codes and examples based on Competences for Democratic Culture framework

Research question 1

To what extent has the VE helped students become aware not only of differences but also of similarities between their beliefs, world views, practices and those of their partner? [competences: Skills of listening and observing/Analytical and critical thinking skills]

1a- Developing awareness of differences between partners	<i>We all found relevant things to analyse and present to each other. We also noted that we all interpreted the websites based on where we are from so for example Polish students interpreted their city's website in different ways than we Finnish students did, which was nice because it gave use different perspectives.</i>
1b- Developing awareness of similarities between partners	<i>It amazed me that we could find commonalities so quickly, although we had only just met our partners from Turkey.</i>
1c - Negation of difference ("deep down we are all the same")	<i>J'ai découvert que nous ne sommes vraiment pas différents de nos partenaires tchèques. [I have discovered that we are not really different from our Czech partners]</i>

Research question 2

To what extent has the VE helped students reflect on their own beliefs, world views and practices? [competence: knowledge and critical understanding of the self]

2a. Reflection on one's own beliefs, world views and practices	<i>Outre le fait de découvrir une perception européenne quelque peu différente de la mienne, cela m'a fait réfléchir sur les mentalités de mon propre pays. [Beside the fact of discovering a European perception a bit different from mine, it helped me reflect on my own country's mentalities]</i>
	—
	<i>It is interesting to see how the history of each state can significantly influence opinions on things like the European Union. We agreed that because the Czechs were still in the relatively recent history of the Eastern bloc, they are more opposed to the EU than the French.</i>
2b. Interest in discovering one's partners' visions of one's own country	<i>I learned from this experience that it is important to view familiar things through the eyes of a tourist/stranger to get a new perspective and notice things I hadn't noticed before.</i>
2c. Superiority of one' own world view, practices etc.	

Research question 3

To what extent has the VE helped students become aware of multiple identities and avoid regarding cultures as monolith? [Competence: Knowledge and critical understanding of the world]

3a. Discovering one's partner's beliefs, world views and practices	<i>"I have learned more about Turkish cultures as well as Chinese cultures. During the meeting on Zoom, we talked about many topics and exchange our information. For example, we talked about religions and I learned that it is normal for Chinese people to have</i>
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no religion. I also learned more about Turkish coffee and Turkish delight.”

3b. Disappointment by lack of intercultural dialogue, interaction or learning in the exchange.

I don't think we learn about each other culture that much because we did not talk about cultures, but we focused on doing the task. There were some moments that we mentioned about our cultures. For example, when we talked about Google, Alice mentioned that Google is blocked in China. The other Turkish students asked her about the situation and then shared their experiences as well. It seems to me that we can learn about other culture when we explicitly brought the topic up.

3c. Lack of interest in discovering one's partners' visions of one's own country

Pas grand-chose, mon attention était portée sur le devoir que nous devions préparer, je n'ai donc pas pris de temps de m'intéresser aux éléments apportés par nos partenaires.

[Not much, my attention was focused on the work we had to prepare, as a result I did not take time to pay attention to the elements brought by our partners]

Research question 4

To what extent has the VE helped students become aware of multiple identities and avoid regarding cultures as monolith? [Competence: Knowledge and critical understanding of the world]

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4a. Willingness to go beyond cultural stereotypes to explain partner's behaviour

J'ai appris que nous avons une vision différente de certaines choses comme l'Europe par exemple, mais je me demande si ça vient de la culture de laquelle nous venons ou simplement de nos centres d'intérêts respectifs. Les Tchèques étant tous d'une faculté d'économie, peut être étaient-ils plus intéressés par la dimension économique que notre groupe composés d'étudiants de filières différentes.

[I have learnt that we had a different vision of certain things like Europe for instance, but I wonder if it comes from the culture from which we come from or simply of our respective interests. The Czech being in a faculty of economics, maybe they were more interested by the economical dimension that our groupe composed of students from different sectors]

4b. Use of stereotypes to explain one's partner's behaviour [neg]

I got the impression that the Fins were not very decision-making and did not want to be responsible for firm decisions. I had to drill down on the topic and gently force them to define their view. There is probably nothing you can do with this problem, because it is in the culture of Fins.

Research question 5

To what extent has the VE helped students understand their partner's point of view, including when disagreements appeared? [competences: Co-operation skills / Conflict-resolution skills / Empathy]

5a. Conflict resolution skills - facing problems and trying to solve them

This week we learned that sometimes, especially in long distance projects, there are moments when some people are not able to participate as much as expected. Still it is possible to finish such tasks, when planning the execution of the task properly.

5b. Conflict avoidance - not confronting problems and misunderstandings with their partners	<i>There was one part of the conversation which I felt a bit uncomfortable. The other four members of my group were talking about how becoming “native-like” was one of the reasons why most of them were working hard at their English proficiency. As a native speaking, I felt like it would be somewhat inappropriate for me to put forth my opinion on this matter for fear of feeling rude and a bit of an outsider.</i>
5.c Co-operation skills	<i>Overall, I personally feel that the posts with pictures, especially pictures of people, seem to engage me more than posts without pictures. I think pictures helps to draw attention and understand better. I will consider include pictures of people in my post next time.</i>

Research question 6

How important were personal relationships in influencing the intercultural learning experience?

6.a Development of interpersonal relationships during the exchange	<i>It was nice to take part in such a project. I hope we would talk from time to time with our Finnish group. My biggest regret is that we don't have an opportunity to visit Jyväskylä after the VE is over and that the Finnish students won't visit Poznań either.</i>
6b. Frustration at the low quality of the interpersonal relationships	<i>I am not saying that I dislike group work, but I find it difficult and somewhat stressful/infuriating at times when others in the group are not engaging on time. I do not want to be presenting myself in a way that appears slovenly because of my group mates lack of decision-making. Thankfully I managed to send the email just on time.</i>

In the following subsections, the main findings related to intercultural competence in the qualitative data will be discussed in more detail.

5.5.1. Development of collaborative and conflict resolution skills

The qualitative data show evidence that one of the main intercultural competence outcomes was the development of the set of cooperative skills needed for the proper functioning of group work. The Competences for Democratic Culture framework (2018) suggest that these include skills such as expressing oneself appropriately and effectively; actively listening to others and valuing and encouraging their contributions to the group; showing adaptability and empathy; and responding appropriately to conflict within the group.

A widespread concern among the participants and one that remained constant throughout the exchanges was to make their virtual partners feel at ease. With that purpose in mind, they deployed their skills of listening and observing, showed interest and placed value in each of their partners' contributions and often stressed the importance they placed in encouraging all group members to freely express themselves: *“I was very pleased to see all my peers get involved by adding their own opinions valuing and taking into account everything previously mentioned, not just independently”*. Interestingly, many of the participants expressed their willingness to learn from each other and accordingly applied a working strategy consistent with taking advantage of cultural and personal diversity as a way to get better results: *“We really did make use of our different strengths in this project. Since we received a lot of positive feedback on our project I feel like we succeeded. Therefore, I am very satisfied with the final outcome. I learned that our different*



strengths is what made this final outcome stand out". From this predisposition towards work for the common good it can be inferred that participants did indeed develop their flexibility and adaptability skills. More specifically, they showed evidence of having tried to adjust their different ways of working in groups as well as their different schedules and time zones so that they could reach a meeting point. At the same time, they expressed their efforts to be polite and to regulate their communication styles and behaviours according to the multicultural context: *"One thing that I thought a lot was about how to talk with this people because the culture is different from mine. Then, how to talk, how to be polite with this people, was a thing that I thought a lot."*

Similarly, participants also showed empathy in different ways. For example, they often reported reconsidering their own conceptions and adjusting their habitual way of thinking in order to negotiate meanings to facilitate cooperation with others: *"Our two groups had differing ideas about what the word "race" meant in terms of categorizing groups of people, these differing ideas needed to be discussed in order to talk about diversity in school. If we had not noticed those different ideas, we have continued assuming both groups were on the same page"*. But they also engaged in cognitive and affective perspective-taking: *"to appease the other and not make them uncomfortable with our question, it's better to say "If you don't know, it's okay."*

As far as intercultural communicative skills are concerned, it is worth noting the manner in which, in an altruistic and proactive way, some participants decided to act as linguistic and/or intercultural mediators to facilitate the interaction of their peers when they felt it was necessary. At the same time, participants developed the ability to express themselves effectively and appropriately in multicultural contexts by trying to express themselves as clearly as possible and applying different communication strategies such as paying attention to verbal and non-verbal cultural conventions or asking for clarification and repetition when communication breakdowns occurred: *"To be understandable to the others and also ask for clarification when the situation needs to. Due to the fact that none of us are English experts, we often needed to ask to repeat, speak slowly etc. So, I learned to do this in a polite and relaxed way"*.

Despite the fact that participants showed respect for their peers and tried to prevent conflict, at times students reported situations where conflict arose to a greater or lesser extent and participants needed to manage such situations through conflict resolution skills. Reaching a compromise when developing a task together was indeed often reported as the most difficult part of the process. In this sense, participants mentioned that their strategy was to maintain a neutral context and to encourage mutual understanding so that differing points of view could be expressed: *"Understanding that we don't have to always agree on something. The most important thing here is to have a conversation and explain your POV."* As personal qualities to face this kind of challenge, students stressed the importance of being open-minded, having patience and being self-aware to avoid personal triggers.

However, a point of reflection emerges from these data, as numerous examples have been found where participants in their desire to be respectful and prevent conflict, stopped expressing their opinions honestly and asking questions in which they had a real interest, or participating in one way or another. This can be interpreted as intercultural sensitivity, but, and at the same time, as conflict avoidance constituting a barrier to the potential for intercultural learning.

5.5.2. Acquiring cultural knowledge and reacting to cultural otherness

The Competences for Democratic Culture model (2018, p. 53-57) outlines that the knowledge set referred to as "Knowledge and critical understanding of the world" includes knowledge of a

variety of domains, including knowledge and critical understanding of politics and law, human rights, culture and cultures, religions, history, media and the environment. The VEs in the EVOLVE dataset covered a relatively wide range of subject areas and international partnerships and learning outcomes related to many of these knowledge domains were reported in student diaries and interviews. Students from different exchanges reported learning ‘factual’ information about a wide range of topics and social issues including immigration, religion, gender roles and, of course, the differing national reactions to the COVID-19 crisis (see section 4.1.3).

Certain other themes related to how students acquired knowledge in their online interactions were also observed in the data. These will now be outlined briefly.

First, there was significant evidence that VE provided students with ample opportunities not only to learn factual aspects about their partners’ culture but that this experience also helped students to realise that their cultural perspective or approach was not necessarily the only way of seeing or doing things. One student wrote *“I have learnt the different ways education is seen in other education systems and, as a teacher who is beginning to move into this world, it has been an incredible experience. It has opened my mind and now I can see so many things I was not able to perceive before: how different cultures can module [shape] the education system...”*

Similarly, in an interview following their exchange, another student who had collaborated with Palestinian students also confirmed that encountering alternative cultural practices and beliefs in their VE had encouraged them to become aware of cultural perspectives which may differ to the ‘western’ perspectives which they had assumed to be universal:

“... sometimes we can think that we are right because we have a point of view,let's say our western point of view, and as they [the Palestinian partners] belong to a completely different culture they might have their own opinions which can be different from ours. So, I think I learned to ...be more open-minded, to be more sensitive. And open-minded like not to have a strict point of view regarding a subject, like to be more flexible.”

It is clear from reflections such as these that VE offers students opportunities for encountering cultural perspectives and cultural practices which are different to their own and that this can encourage them to be more open-minded and flexible in their approach to difference. Flexibility and adaptability, the ability to adjust positively to novelty and change and to other people’s social or cultural behaviour, are considered key skills in the Competences for Democratic Culture framework (2018, p. 49).

A second theme which emerged in this area is related to the impact of the personalised nature of VE on students’ learning. The experience of engaging with student peers from other cultures (described by Belz, 2002 as ‘people who matter’) gave students the opportunity to see first-hand examples of what they may encounter in course books and the mass media. This often led them to move away from stereotypes and overgeneralizations. Students considered VE to be a great source of information about their partner cultures. They also felt that the online interactions had provided them with opportunities to gain contextualized, personalised insights into the social and political issues which were prevalent in their partner countries at the time.

One student from Spain concluded from their exchange that “There was a big contrast between studying web pages about the place and then listening to the real experiences of people that actually lived there. And I think that’s incredible”. Another student from Indonesia reflected on the value of the personalised information from her partner in Sweden in the following way: “What



I learned in this second assignment was that they were very understanding, not like what was seen in the media. I learned how to see the other side of the big city in Europe.”

Of course, a possible danger in this process is that students may overgeneralise about a country's cultural practices based on the experiences and attitudes of their partner (Suarez Garcia & Crapotta, 2007, Muller, 2015). For example, one student from France reported:

“... we had created a WhatsApp group and one girl messaged me in the morning on a Saturday morning. So, I asked her why she's already awake. And she told me that she went to church every Saturday. So that made me think a bit about the religion in Brazil, because I didn't think about this before the telecollaboration. And then she mentioned it just like a normal thing. So, it made me think about how, like where, where, how is the religion in Brazil and how is it compared to in France.”

Finally, it is important to point out a second negative tendency which was identified in our research. The dataset also contained considerable evidence of minimization of difference - a tendency which has been identified in other VE studies. This refers to the manner in which students concluded their reflections on their intercultural experience by engaging in a superficial interpretation of what cultural knowledge actually involves and thereby minimising cultural difference (Bennett, 1993). For example, this was evident in an exchange which had focused on the theme of student lifestyles between the two countries. Focusing on aspects of daily life between two classes of European countries seemed to allow them to avoid looking at more complex aspects of culture. One student, for example, concluded:

“First of all, student life in our countries is quite the same: the university year begins and ends the same month; they have quite the same schedules as us (15 hours a week), they have exams at the end of each semester like us.”

5.5.3. Critical understanding of cultures and critical reflection on one's own culture

The third aspect of the intercultural learning outcomes regards the development of a critical awareness. Thanks to the VEs, students learnt to see culture as a complex notion. Admittedly, when a misunderstanding appeared, partners were likely to give a cultural interpretation, using culture as an “excuse” to justify a specific behaviour (Muller, 2013). This was the case with an exchange between Brazil and France: *“Maybe Brazilian people are more shy than French people which would explain why two of the Brazilian participants did not really take part in the task”*. Here, the student tried to find an explanation for their partner's lack of participation, first a personality trait (shyness), then related to a cultural ethos. However, the use of the adverb “maybe” nuances this statement. Likewise, another student from the exchange who noticed differences between his/her working habits and those of their partner added *“I don't know if it's a cultural trait of Brazilian student culture though”*, emphasizing their effort not to generalize.

This willingness not to anticipate one's partners' behaviour because of their supposed culture clearly appears in the following extract from an interview with a student who was involved in this VE mentioned earlier: *“I think with every new meeting with another person from another culture, you have to start from zero and don't expect anything and don't judge them or have ideas in your head about what read in news or what you read about this country. You should not bring this into meeting other people.”* Other examples show how the VEs helped students become aware of multiple identities and avoid regarding cultures as monolithic: *“I understood this through some tasks that we had that were about some controversial topics - as i read the opinions on these topics, i understood that beliefs differ and two people from the same culture will not always have the same*

opinions.” Through the exchange, the student identified variety within cultures, which is in line with the importance stressed by the Competences for Democratic Culture model (2018, p.55) of developing an understanding that all cultural groups are internally variable and heterogeneous, and that they are constantly evolving and changing.

Another evidence of the growth of students’ critical understanding of the world and the self lies in the overcoming of stereotypes. If some participants were careful to avoid cultural preconceived ideas before meeting their partners, others became aware of the clichés they used to have about countries. This led them to express surprise when they perceived a discrepancy between what they initially thought and what the VE helped them discover. For instance, students from France realized they had misconceptions about women’s place in Latvia and Palestine societies. Similarly, participants committed to help their partners revise preconceptions they could have about their own countries. This was the case of a student from Poland who was determined “*to remove incorrect information*” when talking with his/her partners from Sweden and Argentina.

By overcoming their own stereotypes and their partners’ received ideas about their cultures, students definitely developed their critical understanding of the self. They also did so by reflecting on their own beliefs, worldviews and practices. The telecollaboration enabled them to become aware of their own visions that seemed obvious to them before: “*I learned to explain things about my culture that were simple for me, but not for others*”. In order to be able to talk about their own cultures with their partners, students also discovered the necessity to learn more about them: several statements regard the importance they gave to searching for information.

Distancing oneself from one’s own culture and noticing aspects never reflected upon also means becoming aware of the lenses through which one sees the world. A student from the United States thus explained how communicating with his/her partners from Sweden about gender led him/her to reflect on his/her own conservative background and open their eyes to “*all the positive impact that it could have when you treat boys and girls similarly*”. The advantages of discussing with their partners to develop refreshing perspectives were stressed upon: “*It is good to talk with others about the same topic as you may realize many things thanks to them. Sometimes we are thinking just in a certain way and we need others to open up us to other point of view, fresh one*”. Thanks to the exchanges, students perceived their own situation differently, considering after a VE with Palestine how “*fortunate*” they were “*for the opportunities [they] have had regarding access to education and other aspects that might be trivial for [them]*”.

5.6. What aspects of VEs supported or hindered student learning?

It is important to point out that not all the VE analysed here led to the same intercultural learning outcomes. We identified in the data three contextual factors which influenced the quality of the intercultural learning in the projects. These were the development of interpersonal relationships, the topics and the task types used in the exchanges and, finally, the impact of different communication tools. Each of these will now be looked at briefly.

5.6.1. Importance of interpersonal relationships - partners as ‘people who matter’

Prior to the start of the VEs, participants expressed some concern as to what it would be like to collaborate with people from different cultures online in addition to doing so while using a foreign language. However, this particular fact greatly favoured their bonding process as in the moment they began to get to know each other and discovered that most shared the same feelings of fear



and insecurity, they felt they had something in common. This feeling of mutual understanding is usually the first step in the development of interpersonal relationships in VEs, and it grows exponentially over time in the groups where things are going well.

The social side of VEs is very important to students. Meeting new people and making friends is often one of their main expectations and generally the most positive outcome for them. In fact, a fairly common reflection from the participants was that they regretted that the tasks of the project kept them so busy as they would have liked to have been able to spend more time getting to know their colleagues on a personal level. In this line of interest for the other, data have again confirmed what previous studies in the literature have pointed out: that participants in this type of experience often consider their peers as "people who matter" (Belz & Kinginger, 2003, 2006).

It is at the time when participants have to begin work in their groups to complete the tasks that interpersonal relationships begin to take two different paths. When things go well in group work, there is a friendly environment that favours bonding and friendships. On the contrary, when tensions arise or even conflict is generated by factors such as lack of participation or disagreement, then negative feelings towards the group and the experience begin to emerge: *"Virtual exchange can be extremely positive, as long as you find good partners. If there is someone in your group who does not want to work no matter how many times you explain it to her, it makes it very complicate and it is honestly not worth it"*. This is a significant finding, as the data seem to indicate that in cases where interpersonal relationships are not successful, this can lead to a misguided generalization that creates a negative impression about the cultures of their peers or more generally about intercultural contact and/or this type of exchange.

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It is also true that there has been a certain pattern of evolution throughout the exchanges and even in the groups where everything was going well, there was an increase in tension in the phases where everyone was working on the tasks. Once the academic issues had been resolved, the tension dropped dramatically and many of the negative feelings were left behind. It was only in the goodbye phase, when initial fears and collaborative tensions had passed, that many began to feel they had forged friendships: *"We have met for the last time(...) We met even closer than before and understood each other even more. When the whole project was finished, the blog was ready and all the stress went down, we showed who we are and what we want. I am proud, not only of myself, that I took part in such a project (although I would never have dared to do it before) (...) I am proud of all my group. Maybe someday we'll be able to meet together"*. In the last reflections the most common thing was to find those who wish the exchange to last longer, those who hope to keep in touch with their new friends and even go to visit them and those who consider that they have found good professional contacts for the future.

5.6.2. Importance of different task types or topics for learning outcomes

The analysis of the VEs revealed two patterns for the students' investment into intercultural discussions. When the exchanges dealt with consensual questions, the interactions tended to remain rather superficial. This configuration appeared when students exchanged information on themes regarding material life: accommodation, cost of living, hobbies, school system, studies, transport, or food. Students noticed similarities and differences in these areas, but the stakes were low. If students learnt facts about their partners' lives, or practices, they did not really discover their worldviews nor reflect on their own.

This was the case for a VE where students were asked to compare student life in their countries. This led them to stress mainly common points, and did not allow them to go into a profound

understanding of their partners' perception. Such themes appeared satisfying for some students: *"We talked about our housing. How and where we live, how we like it and how satisfied we are. Most of us live in a flat with friends or alone. We are all happy with that and we like such a life. This topic suited me and was closest to me"*. However, students were often disappointed by the lack of intercultural exchange: *"We didn't get to experience a lot of intercultural competences"*.

On the contrary, when the VEs involved controversial topics, such as racism, religion, gender, or politics, the focus was on how participants saw the world, expressed points of view and interpreted events. The students were thus more likely to try to understand their partners' beliefs and consequently develop their ICC. Students related how they learnt to see the world with their partners' eyes, regarding for instance forbidden books, feminism or political opinions.

Beside the benefits of bringing about controversial subjects in VEs already emphasized by Helm & Guth (2012) and Helm (2013), it is important to look into task types (O'Dowd & Ware, 2009). Some of them were explicitly focused on taking a critical approach to common stereotypes. For instance, participants from Argentina, Sweden and Poland learnt to develop a critical approach to tourist websites. In addition, collaborative tasks helped students to reach agreement and to reflect on collaboration and compromise in the exchanges. Nevertheless, tasks based on collaboration as the one where students had to make decisions for an Erasmus year in Germany in which no high-stakes issues appeared, proved to be too focused for participants: *"Well, actually, I expected to talk about different things, to talk about the life there, to learn more about their person, their culture, their life in Czech Republic, to discuss everything we could. But I didn't expect to be focused on this special, special thing. And I was quite disappointed of it because we were, we had only to focus on this Erasmus year and this year of work and et cetera."* As a result, collaborative tasks associated with controversial topics appear to be key factors for the development of ICC – provided that students get along with their partners.

5.6.3. The different impact of videoconferencing vs. text-based information

A final important contextual issue relates to the different impact of using videoconferencing and text-based communication tools in the exchange (see also section 4.2.2). Many students reported the important role which videoconferences had played in shaping the quality of their intercultural communications. Online communication involving live video reportedly led to friendlier relationships, more fluent communication and less intercultural misunderstandings. One student explained nicely the different experiences they had had when communicating with their partners in videoconferencing and in text-based asynchronous forums:

"So, it's easy to get angry, for example, with words. ...It's hard to get angry in front of someone. It's more easy to express feelings with calm when we see each other and when we are in a synchronous conversation, when we speak at the same time. But when we have a [text-based] forum, it's harder to communicate, to be more understandable I think."

Another student compared their experiences in two different VEs in this way:

"I think, because the second telecollaboration was mostly on WhatsApp and the first one was on Zoom so I learned that it's a huge difference if, when we talk to the Brazilians every week of Zoom. And we saw them in the video call. ...[W]e got closer because we could see each other. And with Palestine, it was only we were writing to them. We were messaging them. But it takes so much longer. And you can't see the emotion. I mean, you can use emojis, but it's not the same as when you see the face."



It has already been well established that text-based interaction carries important benefits for telecollaborative learning. In text-based tools such as discussion fora, students have more time to compose their interaction and to reflect on the messages from their partners (Warschauer, 1996). Video-based communication through tools such as Skype or Zoom may also be problematic due to time zone differences and student access to good quality internet connections. However, the data here highlights that, whenever possible, videoconferencing should be incorporated into VEs in order to support the development of partner relationships and more fluid communication.

5.7. Discussion

In conclusion, the VEs examined in the EVOLVE dataset provide evidence for VE's potential for developing:

1. The set of skills for successful intercultural interaction and collaboration in online settings as well as the ability to manage and resolve conflicts in such contexts;
2. Different aspects of cultural knowledge as well as an adaptability to cultural perspectives and practices which are different to one's own;
3. A critical understanding of cultures, a reflection on one's own perceptions and a distancing from some of one's worldviews.

Although growth in empathy and awareness of worldviews of others were not seen in the quantitative results, there is considerable evidence of this in the qualitative data. The reason for this difference may be due to an initial over-estimation of these skills and attitudes by the informants in the pre-test.

Various contextual factors were seen to be key to the success of intercultural learning in VE. These were related to the quality of interpersonal relationships, the type of tasks students were asked to collaborate on and the combination of videoconferencing and text-based communication tools in the collaborative process. The potential for students to overgeneralise information they received from their partners or to minimise cultural difference were also identified in the data.

6. Development of critical digital literacy

Mirjam Hauck, Linda Plowright-Pepper and Teresa MacKinnon

6.1. Definition

As a convergence of both digital and critical literacies, critical digital literacy (CDL) examines how digital contexts shape ways of thinking, knowledge, identities, and social relations in ways that often privilege some and marginalize others. It equips learners with the tools to examine the linguistic and non-linguistic features of digital media, to identify their embedded biases and assumptions, in order to better inform their activities and judgments (Darvin, 2017). It is informed by critical digital pedagogy which is concerned with methods for establishing presence and voice (Morris, 2017).

6.2. Background

Previous research has pointed to the beneficial effect of VE on participants' digital competence development through VE (e.g. The EVALUATE Group, 2019). It has also highlighted the positive impact of VE on awareness and attitude towards technology use for formal educational purposes. Kurek and Hauck (2014) suggest the "double mediation" effect of computer-mediated communication as a possible explanation, i.e. the fact that in VE, the processes participants are involved in, are at least mediated twice: by the technology used and – in the majority of cases – by the use of a second or additional language, or a lingua franca. However, criticality has been shown to be limited to critical awareness of tool affordances and potential pedagogical use of tools (The EVALUATE Group, 2019). What has been missing in VE-based digital literacy research, is the critical dimension of digital literacy as outlined above. VE designed to help participants become aware of how operating in digital spaces shapes ways of thinking and doing and VE-based investigations into the biases and assumptions inherent in both linguistic and non-linguistic features of digital media are only starting to appear in the literature (e.g. Hauck, 2019). Hauck (2019) suggests that this gap is partly due to common approaches to VE task design, i.e. the lack of tasks that explicitly foster learners' CDL skills development. Yet again though VEs seem to provide the ideal context for such skills development, as they are by default mediated by technology and allow for "on-the-job" training in (critical) digital literacy skills (Helm, 2014).

VE environments - as Helm (2019) reminds us – are not ideologically neutral. They steer learners to normative behaviours and meanings and shape how learners position each other, how they perform identities, and how information is legitimated and distributed. CDL can help us understand how technologies are used in situated and enculturated ways. The EVOLVE VEs that focused on critical digital literacy skills used tasks that engaged learners in reflections to this effect.

The pilot study had provided the following insights:

- Few students identified difficulties in establishing a connection with others in their VE.



- Participants emphasised the value of speedy and accessible information exchanges to establish and maintain communications based on multimodal approaches such as simultaneous use of synchronous and asynchronous communications tools.
- Participants connected with partners by finding shared interests and using humour.
- They were reflexive and empathetic in using a range of social strategies to engage with each other and support each other in establishing their online presence and expressing their voice in the exchanges
- Students were reflexive and empathetic about the impact of partners' choices and use of multimodal communication tools recognising their exchange partners' need for personal space, for example.
- Nonetheless there was a general sense that those who shared personal information and engaged in relaxed contemporary cultural expression and humour appeared more open and committed to exchanges. Participants who were more reserved and formal in their language, slower to respond and/or less fulsome in responses could appear less committed and less open.
- Participants felt they had critically engaged with computer mediated communication through conscious choice of synchronous real time personal exchanges attaching high value to visibility of partners' embodied communications; and through asynchronous communication which offered personal space and – for some – the possibility to hide from public gaze.
- The criticality of participants' engagement with different tools and applications and the level of their reflection upon the tools was deeper among more socially confident (often related to language confidence) exchange partners and those more confident in terms of communication technology.
- Challenges of interacting with others were primarily about poor internet connections but were also connected to individual's levels of confidence when engaging in talks, often emerging from mismatches within partnerships

6.3. Specific research questions

Within this area of competence, there are two overarching research questions we examined:

1. Did the VE facilitate the development of participants' CDL skills?
2. If so, which aspects of CDL were most frequently developed?

We looked at evidence of emerging skills as framed by Darvin (2017) with a particular focus on learners' efforts in establishing their online presence and finding their voice online as well as their efforts in supporting others who are trying to do the same (Morris, 2017).

6.3.1. Pre and post VE survey questions

Survey questions measured change in VE participants' self-assessment of their CDL skills, knowledge and understanding. As indicated in section 2.2.3, participants assessed themselves against the following statements using a five-point Likert scale from strongly disagree (value 1) to strongly agree (value 5):

1. I am able to use digital tools and services such as chat forums/WhatsApp, conferencing applications (e.g. Skype or Zoom, multimedia messaging applications (e.g. Instagram, A2000) to establish and maintain my online presence.

2. I am able to support others in establishing and maintaining their online presence in similar ways (see previous question).
3. I am able to explain how different digital modes of interaction (written, oral, visual) may impact how communication plays out and how we perceive others online.
4. I am able to select and use digital tools and applications that are appropriate for my communication purposes and the communication context. (Examples: using a private chat F4000).
5. I can recognize the potential bias in online information and communication through different media. (Example: choice of images and/or audio and/or text to convey a message).
6. I am able to critically evaluate online resources (e.g. websites, wikis, blogs, vlogs, hashtags, etc.).
7. I am able to curate and create online resources in order to communicate with a wider audience.

6.3.2. Semi-structured student interview questions

Semi-structured student interview questions probed engagement in CDL aspects of participants' experiences using the following questions:

Q5.A Have the tools that you used in your exchange allowed you to interact with others or perhaps prevented you from interacting with others?

Q5.B Could you please give one example from online resources used during your Virtual Exchange, such as websites, set images, sounds, symbols such as emojis and how their use was influenced by assumptions or by different local or cultural practices?

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6.3.3. Qualitative portfolio data

Using the following prompts, students were invited to record their reflections on critical engagement with digital communication and on their critical digital literacy demonstrated in the way VE tasks were carried out:

- Give an example from your virtual exchange that illustrates **how you have established a connection with others** during the exchange and (if it applies) dealt with a challenging situation in your interactions with others.
- Give an example from your virtual exchange that illustrates how you have helped another participant to establish their presence and/or find their voice.
- Give one example that illustrates that you have **critically engaged with computer mediated communication** during the exchange. That is, you have considered:
 - the different ways the channels of communication used during the exchange (audio, text, video conferencing etc.) **allow you to interact with others**
 - the different ways these channels prevent you from interacting with others
 - the impact of this on **how you perceive others**.

These questions provided the framework for reporting findings from students' experiences starting with the statistical analysis of pre and post VE survey items.

6.4. Statistical results

Before engagement, participants generally at least 'agreed' with each of the statements relating to their ability to critically engage with digital tools and services as set out in Table 12 below. Participants felt most able to 'use a range of digital tools and services' (Q1.1) and next most able to 'select and use tools and applications appropriate to the context of the communication' (Q1.4). They felt least able to 'curate and create online resources to communicate with a wider audience' (Q1.7) neither agreeing nor disagreeing with this statement.

The comparison between the pre and post survey demonstrated that participants increased in their abilities in all aspects of critical digital literacy. The largest rise being in their ability to 'curate and create online resources to communicate with a wider audience' which had the lowest self-assessed score at the start of the VE. The item on students' ability to support others in establishing and maintaining their online presence through digital tools and services (CRIT-Q1.2) was statistically inconclusive but remained generally assessed as 'agreed' both before and after the VE.

Table 12: Pre- and post-survey scores Critical Digital Literacy

Item number	Item	Presurvey means	Postsurvey means
CORE-Q.1.10	I am able to select digital technologies to suit my communicative purpose online with consideration of how their use may impact on others.	3.85	4.09*
CRIT-Q1.1	I am able to use digital tools and services such as chat forums/WhatsApp, conferencing applications (e.g. Skype or Zoom), multimedia messaging applications (e.g. Instagram, A2000)	4.37	4.54*
CRIT-Q1.2	I am able to support others in establishing and maintaining their online presence in similar ways (see previous question).	4.01	4.10
CRIT-Q1.3	I am able to explain how different digital modes of interaction (written, oral, visual) may impact how communication plays out and how we perceive others online.	4.04	4.20*
CRIT-Q1.4	I am able to select and use digital tools and applications that are appropriate for my communication purposes and the communication context. Examples: using a private chat F4000	4.14	4.26*
CRIT-Q1.5	I can recognize the potential bias in online information and communication through different media. Example: choice of images and/or audio and/or text to convey a message.	4.07	4.25*
CRIT-Q1.6	I am able to critically evaluate online resources (e.g. websites, wikis, blogs, vlogs, hashtags, etc.).	4.05	4.25*
CRIT-Q1.7	I am able to curate and create online resources in order to communicate with a wider audience.	3.61	4.06*

Note. * Significant at $p < 0.05$

6.5. Explanations based on qualitative results

Themes in data collected from semi-structured interviews and from participants' portfolio entries were explored for potential explanations for the quantitative findings.

The code book developed during the qualitative analysis of the pilot study was applied to this study and continued to be developed as new themes arose from the participants' reflections in their portfolios. The top-level descriptors from the codebook are illustrated in Table 13 below.

Table 13: *Top-level descriptors CDL code book*

1. Establishing a connection with others	<ul style="list-style-type: none"> • Communications channels which encouraged participation • Initiating interactions • Maintaining good interactions with others • Not-positive response to initiating a connection • Positive feelings from interactions
2. Help other establish presence voice	<ul style="list-style-type: none"> • Actions to encourage others to contribute • Correcting and supporting language skills of partners • Giving constructive criticism • Giving others space • Giving praise and encouragement • Mutual sharing of skills and tasks • Pursuing shared understanding • Recognising other's communications preferences • Seeking opinions and participation of others • Supporting others in the group • Understanding the concept of presence in (digital) communication
3. Critical engagement with computer-mediated comms	<ul style="list-style-type: none"> • Allowing interaction • Communicating culture through photographs • Description of computer mediated engagement in communication • Generational or tutor-student differences • Impact of choice of use of communications technology on others • Preventing interaction • Communication which demonstrated or challenged cultural assumptions, preconceived ideas

Findings are presented in three strands comprising critical digital literacy experiences associated with:

- Establishing a connection with others
- Helping others establish presence and a voice
- Critical engagement with computer mediated communication particularly
 - Communication tools which allowed and/or prevented interaction with others
 - The impact on the perception of others.



6.5.1. Establishing a connection with others

As in the pilot study, students generally reported positive experiences in connecting with VE partners, rarely experiencing sustained challenges. Key themes in establishing connections and dealing with challenges comprised:

- Actions taken to establish connection and deal with challenges
- Communication channels which encouraged participation
- Shared humour and positive social exchanges
- Challenges

Actions taken to establish connections and deal with challenges

Virtually all participants were proactive in establishing early connections with their VE partners. High levels of reflexivity were apparent in students' considerations about how to present themselves. Key themes in the data comprised: use (over- use for some) of informal, friendly language and language enhancements (e.g. emojis); sharing photographs, personal information and use of common ground; fast and frequent responses.

How to present selves

Participants were generally anxious to present themselves as friendly and approachable when connecting with their VE group and reflected quite deeply about how they did this. For instance they talked about presenting themselves *'without being fake or too vain'* as a Spanish student from a Tridem VE between universities from Israel, Spain and the US put it. Another identified the challenge of working with people from a distance and realised that there was a need to be *'extra polite and respectful, and maybe overstate our comments in order to maintain a good relationship'*. Information and images including recordings of songs from their personal life were used to engage their partners and to present themselves as friendly and dynamic by consciously demonstrating their enthusiasm and also probing what they might have in common with their partners. A participant from a VE between a Swedish University and a University in Indonesia felt that *'this is a part of establishing oneself by sharing your own story'*.

Most participants from the aforementioned Tridem VE tasked with preparing an introductory video found it a useful way of initiating a connection with their new partners; *'breaking the ice as well as in creating a friendly atmosphere and a good work environment'*. Some found the task hard and were concerned about deciding how they wanted to present themselves and making a good impression on their group especially since the video introduction meant that they would be visible to group members. Participants in the Swedish-Indonesian VE spoke about showing their commitment to the exchange by consciously and actively participating in the tasks.

Use of informal, friendly language and language enhancements (e.g. emojis, gifs)

With very few exceptions participants used emojis and emoticons, *'exchanged gifs or other short videos'* (Polish-Swedish-Argentinian Tridem VE participant), sourced memes, graffiti and other pictures from the web to establish friendly connections with partners. These together with *'relaxed or comfortable language'* (Swedish-Indonesian VE participant) were the most widely cited way that participants used to connect with others. Drawing on emojis etc. was closely associated with the commitment of positive energy to their VEs. The use of emojis, memes etc. was widely and variously commented on:

- A way of establishing themselves: *'part of the "unwritten" language that establishes feelings'*; a more effective way of showing they were involved in people's ideas than just texting; establishing a sense of solidarity about completing tasks when there were work pressures or seeking reassurance about exchanges of ideas
- Improving effectiveness of communications: making Instagram posts *'read better and more freely'*; *'bringing a clear message'*; ... help simplify the interpretation of the meaning'; *'more dynamic'* and a way of getting messages *'better interpreted'*, *'improving online contact with people'* across an international group and helping reach agreement on the group's VE task; to add emphasis
- A means of establishing and maintaining a positive tone in communications: to lighten the mood of the conversation and *'to set the mood of the text conversation'*; making *'conversations very interesting, sometimes exciting and funny'*; bringing humour to interactions
- A technical communication tool in itself: adding an emoji to *'older messages one had missed when they were actually written, so not to start a new conversation'* and a form of shorthand to communicate efficiently, for example, when someone joined a group meeting late by simply sending a *'thumbs up'*
- A way to maintain positive group relationships: to *'keep peace in our group and to make sure that everyone kept a good feeling towards the project even when I felt irritated'* as one participant from the Polish-Swedish-Argentinian Tridem VE put it; *'to prevent misunderstandings or stress and anxiety'*; *'to keep polite in conversation as well as encouraging and praising the (partners) for their contribution'*; developing group identity: *'one of the partners also changed the 'like icon' to the mountain image (which the group had adopted)'*

One participant from the Israel-Spain-USA VE eloquently summarised the most prevalent use of language and language enhancements:

I learnt how to achieve better collaboration with my online partners through the use of language; that is, by including in my online messages emotive words, the name of the addressee to make it more personal, questions to encourage communication, personal information or emoticons etc.

At the same time, some were *'not a fan of sending emojis'* and found the use of them *'a bit annoying'* or experienced an *'overuse of things as emojis'* and felt *'too much improper emojis are not good for conversation. We should know the appropriate time to use them'*.

In contrast, when reflecting on ways they would connect with others in the future, participants mentioned *using emojis, emoticon, memes etc. even more in future exchanges and sharing more information about themselves.*

Sharing photographs and personal information, use of common ground to build rapport

Partners *'uploaded pictures of themselves'*. They also exchanged experiences of shared contemporary issues through text and pictures (such as the onset of the COVID-19 pandemic) to engage successfully in conversation. One participant in the Swedish-Indonesian VE recalled as *'one of the best discussions'*:

We used music to signify how we interact with the world; an example being showing a bit of your personality by sharing what music you enjoy.



Subjects of common interest and shared understandings bridged ‘*very different levels linguistically*’ across the partnership. A less confident participant in the Newcastle-Turkey VE found: ‘*Seeing similar items such as common interests helped my devise my words that I will be sharing with others involved in the exchange*’. Finding out that participants ‘*shared a lot of things*’ with the others in the VE, ‘*made it easier to work together*’ for some. The sharing of information encouraged others to do likewise leading to a reflection that ‘*you can see a lot more similarities than you think*’ by a participant in the Polish-Swedish-Argentinian exchange.

A few participants were concerned with the authenticity of information on the internet and how this impacted the communication of their own views and experiences: ‘*I presented photos of the city, so everyone could get to know the city not through photos from the Internet, but through my own photos*’ a participant from the same exchange pointed out.

Fast and frequent responses

Routinely ‘check(ing)in with everyone individually’ was seen as a way of developing ‘a deeper connection with group members’. The ‘importance of keeping fluent communication for the proper function of the group’ was identified as a key learning point for a number of groups particularly those working across time zones. Communications tools were selected which:

allowed us to be in constant contact, we could write to each other in every free moment about everything. This was to facilitate the differences in time between Europe and Argentina.

Responsiveness to the group was highly valued, evoked confidence in partners and led to positive relationships. As a participant from the Israel-Spain-USA Tridem VE observed:

It was easy to work with these people because they are very open-minded and always ready to work. If I had some question or doubt, they answered quickly and nice.

In contrast, slow responses gave the impression that partners ‘*were not as participative*’ as they could have been. Speed of communication combined with fluency of conversations was linked to more interactive and democratic exchanges. One group in the Swedish-Indonesian VE concluded that using WhatsApp:

Provided a platform where we could have more personal communication by exchanging fast interaction more similar to a conversation. Thereby, all participants got a voice in the conversation and could participate on more equal terms, and by means, they felt relaxed and comfortable with.

Many of these comments appeared to reveal a degree of anxiety to complete VE tasks and this could have impacted participants’ behaviours.

Communication channels which encouraged participation

Communication tools were chosen for their potential to support the making and maintaining of connections. Technologies were preferred which: ‘*provided a platform where we could have more personal communications by exchanging fast interaction*. Key themes in terms of communication channels encouraging participation comprised: the engaging quality of multi-modal communications and facilitation of shared humour and positive social exchanges.

Choices of tools were also often guided by group VE tasks, for instance creating a group screenshot of all members at work. At other times choices were made to support participants' linguistic skills and confidence. Texting or audio recorded communications using WhatsApp supported and enhanced participation where group members lacked confidence in speaking. In contrast, one participant from the Swedish-Indonesian exchange reflected that they would in the future use more video conferencing *'to have a broader insight of the people that I am working with and allow for them to have the same on me'*.

The ability to swop music and images whilst using Zoom resulted in rich layers of communication illustrated in many participants portfolios and the feeling that *'This integration of different types of technology worked well in our favour'* as another participant from the Swedish-Indonesian VE remarked.

Engaging quality of multimodal communications

Typical combinations of communications tools were online video links (e.g. Skype, Zoom) and text chat software (e.g. Messenger, WhatsApp, Facebook, Canvas) to establish connections as a group; alongside software to simultaneously share and develop group tasks (e.g. Google docs, Trello, Schoology). The simultaneous deployment of a range of different tools made *'communication a lot easier'* for many participants. Some were very clear about the purpose of multimodal communication tools, like this learner from the Polish-Swedish-Argentinian exchange:

we created a messenger group as the main technology for important information such as scheduling meetings. We used Skype for sharing materials, decision making and discussing and reviewing our work. We used google docs/drive for sharing materials and writing

In the same VE the use of simultaneous multimodal channels assisted understanding and communication by reinforcing meaning and providing partners with a range of ways to receive and interpret information:

through multimodality one can get a message across. I will try to incorporate pictures and sound

I would ask others to create these kind of uniting multimodal texts as well. Where we draw from our conversations about things we have in common and unite it in creative ways.

What I think could be good is combine that real-time "fast" channel with the use of a "slower" communication channel too, like comments in a google document

The combination of audio and video was a great way for me to both understand the ideas of partners and express my ideas clearly by using my body language alongside with verbal prompt

'through multimodality one can get a message across. If writing seems to be a hindrance when it comes to planning together, I will try to incorporate pictures and sound'

Impact of video-conferencing and livestreaming

Most participants favoured the use of video conferencing to *'make an image'* of people to *'allow you to connect with the person'* because *'working through computers can be very impersonal'*. Seeing partners enabled *'more natural communication'*; communication *'in a real-time*



conversational manner’ conferencing which was *‘more authentic’*; created *‘a friendly atmosphere and a good work environment’* and a sense of connection with VE partners. Participants mentioned being able to show what they *‘were really like’* using video introductions to their colleagues.

Video/conferencing based on WhatsApp which allowed for simple, fast communication was highly valued by some: *‘WhatsApp was our final choice because discussing through email was hard and very slow’*. WhatsApp was seen to *‘support repeated offers of support’* which made for *‘the perfect working environment’*; to *‘reply and communicate be more timely’* and also to have conversations outside of the task itself.

However, on occasion other participants found text communications more efficient. Pressing deadlines and the challenge of communicating across time zones led one group to revert to a WhatsApp text conversation to complete a VE task and reflected:

We had everything in place, we planned more than in video meeting because there was no chaos in conversations.

Another partnership used video conferencing and livestreaming and found *‘people reacted to livestream but not for videos.’* They could not be sure why but reflected on the possibility that it was *‘because of lack of time’*.

Livestreaming focused upon immediate issues inviting short responses rather than discussion. For instance a piece of video sent to group members to show their contribution to the group task; and the impact of COVID-19 social distancing on local transport which triggered comments from students experiencing different national measures. It may be that under time constraints, participants reverted to simple non-complex communication using asynchronous communication tools which gave them space and time to prepare responses off-line that were clearer and better understood than online discussion. The sense of frustration expressed in some reflections again appear to be related to on time task completion.

Shared humour and positive social exchanges

Communications which facilitated humour led to positive social exchanges and helped groups to bond. It also allowed misunderstandings between group members to be resolved. The use of humour was a good indicator of positive rapport between VE partners as reflected in this comment from the Swedish-Indonesian VE:

The fact that we were able to make jokes without any issues as well, in writing and over the internet, I thought was wonderful

This was also seen in the use of emoji’s and memes in messages but also a feature of video conferencing. One person found it easier to talk to partners on video because *‘we could read the emotions from their faces, but also laugh together. Laughter is always bonding people together’ .. ‘and cooperate’*. As part of their first task, *‘Making a screenshot was a fun part and it always made everyone smile in the group’*.

Laughter appeared to prepare groups to work together to *‘fool around and laugh a little’* before starting to work on their task using video conferencing and *‘without even having meet in person’*. It could be infectious when one *‘dared to act “silly”* others followed, so that humour was shared between group members between serious work. On one occasion this was consolidated in the design of a meme which reflected their humorous exchanges and provided a group identity.

Challenges in establishing connections with others

All groups experienced short-term challenges which were quickly resolved comprising:

Bad internet connection which broke video calls at times, lack of linguistic fluency which caused a loss of meaning or purpose at times, and a need to find a set time that worked for everyone regardless of time zone.

Many participants experienced ongoing poor internet connections and navigated these by using a multimodal approach. For instance, using Messenger alongside video conferencing when members could not connect very well. Groups often experimented with a variety of different communication tools to find combinations which worked for all.

Technical problems could also be about differing levels of familiarity and competence of some partners with specific tools, which led to negotiations until the group agreed on a tool all members were confident in using.

Some groups worked with colleagues who were shy about participating in synchronous video sessions. Language barriers were particularly noticeable during video communications because of the use of translation software which led to pauses in conversation. Written communication could help maintain the conversation flow and the timeliness of exchanges. One participant found: *'we communicated most efficiently when text and speech was not included, music and picture gave the best results'* and having to rely on text and speech led to translation confusions. Use of google translate *'led to a lot of misunderstandings'* and in one group, one member started to help everyone rather than use this software.

Opinion was divided about the overall merits of synchronous video discussion and the use of shared documents and texting. Messenger and Google drive were used to address difficulties in working across time zones but as one participant from the Polish-Swedish-Argentinian VE commented *'it still caused the work to go slower at times'*. Meanwhile another suggested that in spite of the *'interesting experience to get to know the people through social media'* they preferred to meet people face-to-face.

It appeared that the challenges participants identified in establishing connections with others were strongly linked to the completion of VE tasks. Worry about breakdowns in connecting positively with partners were triggered by concerns about being able to complete tasks well and on time. Participants demonstrated high levels of commitment and creativity in confronting challenges in group working relationships e.g. one group member from the Polish-Swedish-Argentinian exchange recalled:

The project was at a halt and we needed to be productive so I sent a meme of something silly and others did the same and it started a chain reaction of positive responses and further conversations.

However, this participant's reflection about future VEs highlights the impact of the task upon establishing and maintaining a relationship with others:

I would talk more with partners and explain to them that we have to share, what we feel about the project and not hide them.

They felt that the task had gained greatest importance in the VE and that they should remember to talk about other aspects of their lives.



6.5.2. Helping others establish presence and a voice

Key themes emerging from qualitative thematic analysis are as follows:

- Enabling others to participate:
 - Reflexive attitude and approach
 - Recognising others' communications preferences
- Helping others establish their presence/find their voice
 - Giving others space, praise and encouragement
 - Directly seeking contributions from partners
 - Pursuing shared understanding

Enabling others to participate

Reflexive attitude and approach

Participants demonstrated a strongly reflexive approach to VEs. Recognising someone was '*really shy because he didn't speak in English a lot*' and '*extremely horrified about interacting*' with the partners one commented:

We could only imagine how he felt. To help him overcome his fear, I wrote him calming messages and I used emojis to make it look a lot nicer and friendly'.

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They also spoke of empathy and respect between group members shown in the care each took to communicate in polite ways. Particular care was taken when using the spoken word, i.e. when communication was more spontaneous and could not be prepared. There was awareness that '*words could be used wrongly. It is important to take care of politeness; conversations on WhatsApp can be misunderstood*'.

Teachers in a group with students reflected that they had tried '*to make sure that the communication didn't suffer from any power dynamics*.' They were conscious of a tendency for the group to follow their ideas: '*it was not clear if they understand what we mean, and if they really agree or if they do not want to go against us*' and wished that partners had been '*more vocal about their opinions*'. They applied the technique of emphasising that they only offered their thoughts as ideas which others could amend. Similarly, others '*had to step back a bit to not take over since all three of my group members were on the quiet side*' or reflected that – in a future VE – they would '*try not to sound forward too much and allow them (partners) to steer the conversation more*'.

An incident where a partner had '*interpret(ed) a phrase as rude*' led this participant in the Polish-Swedish-Argentinian VE to reflect on the way they had formed their negative impression of the partner and on how important it was to '*be self-aware of your own view of politeness and indirectness/directness*' so that '*I would not have build a bad first impression of a person so quickly*'.

A widespread reflexive attitude supported flexible and dynamic approaches to exchanges and resulted in participants adapting to group and partner needs.

Recognising others' communication preferences

Participants frequently recognised that their partners were more confident communicating in one form rather than another leading one to conclude that '*a combination of texting and camera meetings might be the best solution*'. This included reflecting upon and adapting language used to support partners' understanding:

As soon as I recognized and realized it, I was trying to be inviting in (video) conversations, avoid the bigger words etc. And of course, in text communication I used a more advanced vocabulary that would the level they displayed. I kept changing back and forth, adapting to what seemed to fit them best.

Similarly, group members volunteered to lead tasks where they knew how to support the group in the use of communication tools others were unfamiliar with.

Helping others find their voice

Giving others space, praise and encouragement

Generally, group members actively encouraged one another to participate including unconscious methods of supporting people with lower linguistic skills such as using hand gesturing. The frequent use of the word 'we' in conversation gave participants a sense of feeling *'included throughout the entire project'* together with *'the consistent expressions of support and help offered repeatedly for WhatsApp made the perfect working environment'*. Participants also consciously and positively commented on each other's uploaded work *'to further encourage each other'*. This had the effect of helping everybody feel *'more relaxed and comfortable'* and realise that even if shy *'one should always try to give feedback'* to interact with colleagues *'to make things easier'* and contribute to making *'a wonderful working environment'* as one participant in the Israel-Spain-USA Tridem VE put it.

Others were alert to the individual needs of group members. One described reaching out to *'one group member who felt neglected, through a different platform'* and having a private conversation alongside the whole group conversation. They reflected that they would make this a routine approach to ensure all group members work well together. Another recalled encouraging her partner *'to speak up more often in (our) meetings'* and noticing her increased self-confidence over time. Mindful of some participants' technology difficulties, it was important not give up on peers during delays or other difficulties.

Directly seeking contributions from partners

Directly seeking contributions to exchanges encouraged partners to voice their views and involved asking questions, inviting comments and seeking opinions. Participants wanted to ensure partners *'feel like they are valuable members that can contribute to the project To make them feel comfortable.'* Occasionally listening was mentioned as a means of engaging partners: *'whenever someone was talking, I focused on listening to that person and not interrupting'*. Individual contributions to a simple group activity were used *'Sometimes we pasted screenshots when we marked what is good and what is wrong'*.

Pursuing shared understanding

Although one participant commented on the failure of others in the group to adapt their language to be supportive, generally groups actively sought to achieve shared understanding of one another. They helped one another express themselves clearly by correcting and explaining partners' language.



6.5.3. Critical engagement with computer mediated communication

As identified in the pilot study, the concept of critical engagement in computer mediated communications appeared to be challenging for many participants. One student in the Polish-Swedish-Argentinian VE said:

'I feel like this question is very broad and a bit difficult to answer.'

Nonetheless, participants' reflexive approach to VE provided insights when discussing technology which fostered or prevented positive communications.

Reflections on tools which fostered collaborative work

Successful collaborative working was associated with technology which facilitated:

- Collaborative and efficient approaches to VE tasks
- Strong connectivity across the VE partnership
- Development of positive affective states between members

Sub-themes in the data echoed the factors which supported partners to establish mutual connections comprising: the engaging quality of multi-modal communication i.e. positive impact of video-conferencing and live streaming; facilitation of shared humour for positive social exchanges (see 'Communications channels which encouraged participation'). Here priority will be given to issues which have not already been identified in participants' reflections on communication tools used.

Perceptions of tools which facilitated collaborative and efficient approaches to VE tasks

There was a strong focus on completing VE tasks and this set the context for selecting communication tools. Attention was given to tools which helped maintain effective social relationships and facilitated efficient and effective group work for task execution and completion. Many participants cited time pressures as a key consideration in getting tasks completed on time compounded by the fact that groups worked across time zones.

Ability to see others during interactions

There was widespread agreement about the value of being able to see each other and at least initially meet visually e.g. using Zoom or Teams.

As a result participants also felt closer to partners: 'You communicate easier because you see the other'. Video communications encouraged social interaction 'because when we are doing the meeting we are not just tell about the assignment, but we are also tell about ourselves ... what will do in the weekend'. Interestingly the positive impact of a visual connection with partners was emphasised by the use of recorded video meetings to overcome the 'difference in time and finding a space that works for everyone'. This group also used Adobe Spark to introduce themselves and described it as an 'eye-catching' way of carrying out introductions as opposed to using email which was perceived as being 'more serious and more boring'. One participant spoke of an initiative to 'create a Facebook group or at least a conversation on Facebook to communicate in a more present way' like in a WhatsApp conversation. However, they were discouraged because they would have had to use their private accounts. Thus suggests that they saw a demarcation between their social selves and their VE-self.

Working simultaneously on tasks was found to be easier when free discussions took place via video conferencing. Some felt encouraged after the initial getting to know each other phase. *'When we actually get to know ourselves better, it was easier'* to use the videoconferencing as one student from A Polish-German VE observed. A few partnerships relied completely on video conferencing finding this the most efficient way of completing tasks, working *'in real time ... was really helpful ... we could work really fast'*.

Facilitating both group and individual contributions to VE tasks

Benefits were also seen for a combined approach using a *"fast"* channel' video communication with *"slower"* communication channels too, like comments in a google document to support different individual patterns of participation and working styles. This combination of tools provided a means of maintaining the momentum of work and group dynamic. Having created social contact visually online, written documents could be shared, edited and developed asynchronously.

Asynchronous communications supported group work across time zones allowing for tasks to be shared by individuals who could engage independently at times that suited them whilst maintaining a coordinated and collaborative approach. One group decided *'to write our thoughts'* so that *'individually, we did different parts of the project'*. Working across time zones one partner commented: *'These tools allowed us to be in constant contact, we could write to each other in every free moment about everything'* and this in turn helped to maintain positive relationships among students. Group members were able to demonstrate commitment to tasks *'to work on project without any retardation'* emphasising the importance of *'a fluent communication for the proper functioning of the group'* as well as maintaining the quality of conversation.

Similar efficiencies in completing VE tasks were found during the preparation of group presentations. WhatsApp provided a useful facility to share ideas in real time across the group. Some favourably compared the ease and efficiency of WhatsApp for instance using group chat against Google Drive to advance shared VE tasks:

But once we did (in) the group of WhatsApp what we could take a day to do in 5 minutes was already divided the task and if there was any doubt or any misunderstanding could be explained at the time.

Similarly, another partnership started using Gmail for the completion of a task but found it inadequate: *'a very linear communication, not direct, not instantaneous'* and problematic in organising a group response. *'You can't debate, and you lose a lot of the answers ... you forget something that someone has put two emails ago'*.

Establishing strong connectivity

Connectivity was about building confidence in each other's commitment to the group, particularly in relation to VE task completion, and was reflected in frequent and almost immediate communications. Participants' confidence in and knowledge of chosen communication tools and how well tools functioned for them, played an important role.

Using communication tools which were accessible and familiar to all partners was a key factor in all VEs. Occasionally participants mentioned difficulties in collaborating because they used *'different platforms to text and phone call'*. In such cases students adjusted their initial choices to achieve connectivity which could involve familiarising with new tools.



Personal connectivity was strongly associated with timely responses between partners. WhatsApp provided participants with the sense of being continuously in touch with each other and allowing for instantaneous coordination of the group. Others found Zoom helpful for scheduling work in real time together to make progress with tasks. Other groups used group texting tools, often WhatsApp but also Moodle and Messenger to pursue the common goal of completing VE tasks.

Development of positive affective states between members

Participants frequently alluded directly or indirectly to the importance of maintaining positive attitudes and feelings towards their partners in order to keep the VE going. For one the use of Zoom made him/her feel closer to partners because they strayed outside their VE task to talk about themselves and their social activities. For another the use of Adobe Spark to introduce themselves to each other was a less serious way of presenting themselves. Use of emojis in text-based communications and even the sharing of humour around technical difficulties, all played a part in establishing and maintaining positive affective relationships.

The outcome of successful exchanges could result in a strong sense of connection:

Deep down it was like talking to friends, considering you don't know them.

Perceptions of tools which facilitated collaborative and efficient approaches to VE tasks

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Some tools appeared to prevent collaborative working due to their potential to disrupt social relationships within the group. See, for example, this comment from a participant in a VE between France and Brazil on use of WhatsApp as a text-based communication tool:

It was difficult to see what they felt, what they wanted to say. They used, sometimes they used emojis, sometimes they didn't. So, it's a bit ... you have to interpret the others' messages, which is a bit hard because you don't know what they want to say, if they're friendly, if they are just annoyed. I don't know.

Another also referred to the greater potential for misunderstanding and getting angry with each other when only communicating by texting and it being:

hard to get angry in front of someone. It's more easy to express feelings with calm when we see each other and when we are in a synchronous conversation'. It was 'a bit weird' only having written communication; 'I have trouble to picture the person behind the words. And it's just at the end when I finally saw and heard the students that I could understand, the whole person'.

One partnership reported their difficulties in completing a task asking for the exchange information about where they lived using an '*E-formation platform to communicate with students during the tasks*'. They described confusion about why their partners were not responding to their questions about the way they were responding to the task:

If it were too hard to answer the questions or if it was too boring or we couldn't figure it out' ... Just we couldn't create a real contact with the students.

Use of online resources influenced by assumptions or by different local or cultural practices.

Participants did not engage strongly in considering cultural aspects of technologies. As reflected in the pilot study and portfolio data, a number of interviewees were unsure about cultural assumptions impacting chosen online resources. They were unable to recall any examples or did not understand the concept of cultural influence on the selection of digital communication technologies: *'I don't think I understand the question'*.

Participants rarely referred directly to the impact of the choice of digital communication tools on their perception of others. However, their choices and critiquing of tools suggested that without at least initial visual contact they generally found it more difficult to form a connection with their partners which some appeared to perceive as a weakness of their VE. However, others, particularly those who appeared more focused on task completion, appeared less concerned about visual contact and creating stronger connections with exchange partners which, in turn, reduced the potential for reflection on the impact of cultural differences in the use of online resources.

Participants identified online resources used. Simultaneously, participants engaged in discussion about cultural differences. The two sets of reflections were not however explicitly connected except in quite mechanistic ways. For instance, cultural differences were found from sharing humour: *'they gave us an article that mentioned some jokes in French, ... for us to realize that the humour in France is different from the humour in Cyprus...'*. Differences in protocols for quoting sources used from the internet led two students to believe their partners had a culturally based different attitude towards citing sources.

Participants often defaulted to describing examples of exchanges about their respective countries, traditions and cultures. For instance, one group established a web space where they daily visited their partner country online: *'we shared cultural activities like sky because in Grenoble there is little snow and yes. A lot of activities in Grenoble. And monuments'*.

The exchange of photographs appeared to impact some partners quite profoundly, for instance:

They sent me the cold ... I mean the cold, cold winter ... that's nice ... I cannot see that in Indonesia because Indonesia doesn't have winter.

Notwithstanding, culturally different uses of emojis and emoticons were identified as part of establishing and maintaining positive communications. Others expressed concerns about using emojis and emoticons *'because you always have the doubt of how they will be interpreted in another culture. So, we tried not to use them just in case'*. Some commented on partners sending confusing impressions being *'normal, very objective'* in conversation and then over friendly overusing emojis in messaging.

In a rare reflection about cultural differences, one participant commented on a partner's use of emojis as a way of 'fixing' having said something bad:

I think that in Spain we are more direct and maybe in her culture, she is more used to that ... On the surface always seeming to be in good mood even if you are saying something bad.

Some thought *'there wasn't any differences in usage of emojis'* and photographs exchanged were *'more or less related to the culture of all of us'*. This similarity of use was attributed to partners each being *'millennials and we are born in new technologies, we, if not we have there's no cultural, a local aspect'*. Others however felt: *'The emoji has a different meaning in every country'*.



6.6. Discussion

Quantitative self-assessment of participants' confidence in the knowledge and use of a range of digital communication tools and services was reasonably high and increased after their VE experience. This included participants' ability to support others with their online presence; knowledge of the impact, method of selecting and potential bias of different digital modes of interaction such that they could critically evaluate online resources.

Participants' lived experiences of VE highlighted themes which contradicted stated levels of confidence in the quantitative results. In particular this was demonstrated in comparatively low levels of engagement in considering the potential impact of digital communication choices and potential cultural impact of those choices. Participants did however demonstrate high levels of reflexivity and empathy in their engagement in exchanges. These behaviours could be considered forerunners to critical digital literacy as participants gain experience of digital communications. For instance, at a functional level partners were responsive to partners' preferences in terms of communication channels, demonstrated creativity and flexibility in supporting effective exchanges using combinations of digital communication tools. This was demonstrated by a high value placed on establishing and maintaining positive personal and social relationships using technologies which enabled the use of humour and sharing of personal information.

Having specific tasks to engage newcomers to a VE was highly successful and enjoyed by the vast majority. It gave an instant focus to participants' exchange; a clear reason to collaborate and communicate. However, a number of participants had time constraints and found the completion of tasks challenging. For some on time task completion to a high standard appeared to become the focus of the VE. For those participants, completing the task was prioritised almost to the exclusion of a focus on the exchange experience itself. This may have impacted their behaviours, communication choices and perceptions of partners. Working across time zones with partners and dealing with technology challenges added further pressures. The context of a series of tasks may have emphasised digital communication choices which enabled swift progress on tasks rather than sharing the richness of cultural diversity that the VE offered.

Still, the majority of participant portfolios highlighted the layered and dynamic nature of group interactions. Participants described their VE experiences in portfolios in a logical linear narrative, but analysis of group experiences revealed:

- Complex interweaving of different group members' changing energies for the VE dependent upon other demands upon their time
- Spontaneous actions which on some occasions stimulated insightful rich communication and exchanges which touched upon cultural exchanges and shared understanding.

VE tasks could both encourage engagement; provide stimulating targeted collaborative working but also elicited mechanistic engagement which seemed to demonstrate stressed responses perhaps due to the lack of time to respond and spiralling negative reactions.

Future studies might consider:

- Investigating the impact of introducing multiple tools and technologies and their critical assessment on VE participants' increase in critical digital literacy.
- The value of emphasising the benefits of a reflexive approach in terms of choice, implementation and assessment of communication methods used in a VE.
- Potentially assisting participants to practice reflexivity in real time alongside tasks

- Focusing participants more specifically on the cultural dimension of an exchange and leaving group members to negotiate their own tasks.



7. Development of language skills

Shannon Sauro and Catherine Felce

7.1. Definition

The definition of language skills and competences draws upon the Common European Framework of Reference for Languages (Council of Europe, 2001) and the recent companion volume (Council of Europe, 2018) and reflects the skills and knowledge that language learners need to develop in order to use a foreign or second language effectively for communication during four types of oral and written language activities (reception, production, interaction, and mediation) in different domains (public, personal, occupational, educational) to perform different tasks.

7.2. Background

Virtual exchange and the related practice of telecollaboration has a long rich history (more than 20 years) as a pedagogical practice and subject of research in foreign language education (O'Dowd, 2016). It represents a common use of computer-mediated communication (CMC) to support social interaction, collaboration, and intercultural exchange, all valued practices in language education (Dooly, 2017).

Accordingly, this present investigation builds upon this rich history of research on VE for language learning, including small scale studies of single partnerships (see recent reviews by Çiftçi & Savaş, 2018 and Lewis & O'Dowd, 2016) as well as a large-scale multi-site investigation of VEs that examined language learning in VEs carried out between university classes of teacher students (The EVALUATE Group, 2019). Findings from this body of prior research has found evidence that VE supports the development of language competence in a wide range of areas including the following: (1) pragmatic competence, (2) grammatical range and control, (3) the ability to interact with other speakers of the target language, (4) understanding/reception of the target language, (5) overall language skills, (6) oral language skills, and (7) vocabulary knowledge.

In addition, the present investigation expands the study of the development of language competence in VEs by exploring learning that arises among different populations of students. This includes not only second language learners studying the language of the VE, but also native and near-native speakers of the language of the VE for whom language learning is not an explicit goal of the VE.

7.3. Specific research questions

Within this area of competence, we examined two research questions:

1. Did the VE facilitate the development of participants' language skills and knowledge?
2. If so, what specific language skills and knowledge were most frequently developed?

Both research questions were broad overarching questions intended to identify wider trends across VEs both with and without a specific language learning emphasis. This was intended to

account for the linguistic and digital variation that could arise in different VEs with a focus on language competence. For instance, such variation could include different target languages, variation in the proficiency of the students, variation in the specific language skills being focused upon in the course, and variation in the technological tools of participating VEs. In particular, because VEs that emphasize language development entail communicating in the language(s) being learned, the availability of digital tools and resources (e.g. video-conferencing vs. email) inherently mediate the specific language skills and knowledge that students will be called upon to use and therefore develop during the VE. In addition, these broad questions were also intended to capture language skills and knowledge developed by students who did not identify as language learners but who may have found that interacting in a lingua franca with partners from different language backgrounds and proficiencies influenced their awareness and use of the language of the VE.

7.4. Statistical results

The statistical results were drawn from 10 total items: one question from the core portion of the survey which asked participants to evaluate their communication ability in the language of the VE, and nine items designed to capture a range of language skills and knowledge that had been observed to emerge in prior studies of VE and language learning (e.g. Akiyama, 2017; Belz & Vyatkina, 2008; Sauro, 2013; Vinagre & Muñoz, 2011; Ware, 2013) and were also developed based on qualitative findings from the preliminary study carried out the prior semester. Included in these items was one that drew additionally upon the work of Dörnyei and Ryan (2015) referred to as confidence to capture the attitude L2 learners adopt during communication in the target language. This was also an item that was based upon findings from the preliminary study conducted within the EVOLVE project.

Altogether, these ten items capture the following subcompetences:

- Communication ability
- Confidence
- Vocabulary range
- Vocabulary control
- Adapting / mediating
- Interaction
- Propositional precision and thematic development
- Goal-oriented collaboration
- Spoken fluency
- Grammatical range and control

As shown in Table 14, T-tests conducted on these ten items revealed a significant difference from pre-test to post-test on all eight items. Overall results showed that following the VE, participants reported statistically significant higher levels for communication ability in the language of the VE, confidence, vocabulary control, interaction, propositional precision and thematic development, goal-oriented collaboration, spoken fluency, and grammatical range and control. The two subcompetences which were not significantly higher on the post-test than the pre-test were vocabulary range and adapting / mediating.

Qualitative findings regarding why these two subcompetences stood out as an exception are explored in section 5.3.5 below.

Table 14: Comparison of pre- and post-survey items on language skills

Item number	Item	Presurvey means	Postsurvey means
CORE-Q1.12	I am able to communicate adequately in the language of the Virtual Exchange.	3.90	4.15*
LANG-Q1.1	My language ability allows me to communicate in most contexts and I don't feel restricted in what I want to say or to understand what people are saying or writing	3.84	4.07*
LANG-Q1.2	I have a good command of vocabulary and can easily formulate my ideas or understand my partners.	3.80	3.92
LANG-Q1.3	I can use the precise words needed to communicate specific meaning or to express the exact meaning of what I want to say.	3.59	3.79*
LANG-Q1.4	I feel comfortable in plurilingual communicative situations. I can adapt my language accordingly or help to facilitate communication in a group.	3.85	3.92
LANG-Q1.5	I can participate actively in conversations or discussions and interact easily with other people.	3.83	4.03*
LANG-Q1.6	I can write about complex ideas, presenting my arguments in a structured way and giving examples.	3.81	4.04*
LANG-Q1.7	I can actively participate in a collaborative work with partners and decide with them upon the organisation of the task.	3.97	4.16*
LANG-Q1.8	When I talk, I can express myself fluently and with spontaneity and I am usually comfortable talking with people.	3.64	3.80*
LANG-Q1.9	I am able to formulate correct sentences, to use grammatical features or to identify errors made by my partners or peers.	3.79	3.95*

Note. * Significant at $p < 0.05$

7.5. Explanations based on qualitative results

Qualitative content analysis (Zhang & Wildemuth, 2009) was carried out on the participants' responses to the open language questions in the survey as well as responses to the language component of portfolio and the focal student interviews. Preliminary coding categories included the ten subcompetences used in the quantitative items in the survey, which were expanded upon through multiple rounds of coding by two raters. This included subdividing the subcompetences further to reflect students' responses (e.g. adapting and mediating were coded as separate items), identifying additional subcompetences found in the CEFR companion volume (Council of Europe, 2018) which emerged in the qualitative data but were not investigated in the quantitative data (e.g. phonological control), and identifying common themes relevant to language learning (e.g. no improvement; opportunity for practice) that were salient in the students' response to the open-ended survey questions. Altogether, this resulted in 19 overall productive categories listed in the table below in order of frequency.

Table 15: Main language subcompetences and other language related themes and frequency of coding

Language Competence	Description	Frequency
Production	The participant's own performance in producing the target language in speech or writing.	85
Vocabulary range	The breadth and variety of words and expressions a participant knows in the target language.	51
No improvement	Lack of change, learning or improvement in language competence explicitly identified by the participant.	43
Adapting	Changes in formulation in production or shifts in reception, including changes in style or register, use of synonyms, similes, simplification or paraphrasing.	40
Reception	The manner in which the participant processes input in order to understand the communicative intent of their interlocutors	32

Language Competence	Description	Frequency
Interaction	Successful involvement in interactional sequences in discussion and conversation.	32
Spoken or written fluency	The ability to speak or write spontaneously, rapidly or without having to prepare or plan what to say or write.	26
Confidence	Emotions or attitudes toward the target language or its use evoked in the participant which result in enjoyment or successful achievement.	22
Grammatical control	The ability to use specific grammatical forms accurately.	21
Propositional precision	The ability to formulate what one wishes to express.	20
Vocab control	The ability to choose an appropriate or accurate expression.	15
Goal-oriented cooperation	The ability to actively contribute to collaborative, task-focused work or its organization in the target language.	15
Opportunity for Practice	Awareness that the VE provided a unique space or opportunity to practice the target language with other speakers.	14
Metalinguistic Awareness and Control	The ability of a more proficiency speaker to provide help or scaffolding to a less proficient interlocutor.	13
Sociolinguistic Awareness	Awareness of linguistic markers indexing social relations or other social dimensions of language such as politeness conventions, dialect, and accent.	12
General	Encompasses reference to general development of the target language without reference to any specific competence.	12
Building on plurilingual repertoire	The ability to draw upon all available linguistic resources in order to communicate effectively in a multilingual context.	6
Phonological control	Awareness of how to better or differently articulate phonological features in the target language in order to produce more comprehensible output.	5
Mediation	The ability to intermediate or make communication possible between other participants who are unable to communicate with each other directly.	1

7.5.1. Improvement of production and reception

As can be seen in the table, the following six themes were most frequently mentioned: production, vocabulary range, no improvement, adapting, reception and interaction. Of these six, two were broad subcompetences not captured in the 10 quantitative items: production and reception. That is to say, in their own words, participants reflected upon and provided numerous examples of how Virtual Exchange supported their overall spoken or written production and reception competence in the language of the virtual exchange.

In some cases, participants pointed to general examples of the production or reception skill that they believed improved during the VE: *“Better writing skills”* or *“mi habla”* (my speaking). More frequently, however, participants provided nuanced reflection of why precisely they felt that their production or reception improved as a result of the VE. This included, for instance, the fact that the VE necessitated use of a communication modality that they were less comfortable with: *“I definitely developed my writing skill. I’m more used to listen and to talk in english but rarely I’m in the need of writing in english. This time, I had to do it in a formal and informal way and I think I’ve improved that skill”*. In a related vein, the development of a particular modality of production was tied to the specific digital platform that participants used frequently in their particular VE: *“It helped me devolpe my writing competence, thanks to the whatsapp group, which I don’t practice that much.”*



With respect to reception, another trend emerged. This was the opportunity for participants to develop receptive competence when using the language of the VE with speakers from different language backgrounds than they were accustomed to, in particular other second language speakers of the language of the VE who were from other contexts: *“Making an effort to understand English despite people’s accents was a skill I believe I developed by working with other non native speakers.”* This included understanding partners from countries or populations whose accents in the target language were entirely new to them: *“I may have improved my comprehension skills since I’ve never heard the Brazilian accent in English so I guess I’m more used to it now.”*

However, an unfamiliar accent was not the only factor which pushed participants to develop their reception skills. Another issue identified was the need to develop reception skills in order to understand their partners’ intended meaning despite incorrect grammar or word choice: *“I could understand what my partners’ intention even though there were some errors in the sentences”*. Of note, these examples also relate to the subcompetence adapting, explored in more detail in a later subsection.

7.5.2. When no language improvement was reported

The third most-frequently identified language learning related theme to emerge from the qualitative analysis was no improvement. A closer look at the responses provided by students who specified that no language learning occurred during the VE identified several commonalities. The most commonly referenced factor was that language learning was not applicable to this particular VE due to the fact that the language of the VE was the native language of the participant: *“This VE was performed in my native language and was not an intentional focus of mine or the instructor’s”*. Such an outcome is not surprising in a multi-site, multi-class study that incorporates VEs which use a lingua franca to partner classes that have a common disciplinary focus.

A second factor identified was the language level required for interaction being not challenging enough to support the language development of the participant: *“We communicated in Japanese, and most of what was used were very basic terminology as we did not need anything beyond that.”* Or similarly, acknowledgment that the proficiency and role of the participant meant they did not expect to develop their language skills: *“As I had the role of guide or proofreader, I didn’t think I developed language skills in French”*.

Finally, in a few cases, participants’ responses indicated problems in the VE or problems stemming from the relationship between participants being responsible for lack of language development: *“I have no comment. My group never did a single activity. I have no experience in what I am being asked because I did not get anything from my exchange partners”*.

7.5.3. VE tasks fostering language use and development

Nevertheless, the qualitative analyses of the open-ended questions indicate a positive impact of the VE tasks on language competence. Improvement in different skills and concrete, authentic language use are under the most quoted expectations students expressed in the presurvey (PRE-INTR-Q6) and the perceived outcomes out of the postsurvey (POST-INTR-Q6) confirm that the VE contributes to enhance language skills. Students’ quotes vary in this respect from very general statements (*“I improved my language skills”*) to more specific reports on improvement associated with the skills investigated in this language section, such as spoken fluency, speaking or writing skills, pronunciation, or grammatical features. Moreover, VE provides an opportunity to get used to using a foreign language and overcome the fear of speaking, being misunderstood or to

misunderstand what is being said, by getting the opportunity to practice with peers who are learning the same language or with native speakers. Therefore, the construct of confidence has been added to the set of competences investigated in this section. Drawing on the work of Dörnyei and Ryan (2015), it refers to the attitude adopted by L2 speakers during communication in the target language. On the one hand, the construct of confidence has to do with anxiety as an emotion linked to the very specific context of foreign language practice. Foreign Language Anxiety as posed by Horwitz (2010) and further by Dörnyei and Ryan (2015) affects the performance in the L2 by hindering sufficient access to knowledge or by affecting the processing of the target language. On the other hand, confidence also includes enjoyment when students realize that they managed to overcome their initial fear or lack of confidence. As pointed out by Dewaele and MacIntyre (2014), anxiety and enjoyment can interact productively and work as a fostering element in the learning process (Dörnyei and Ryan 2015: 176-179). *“I have increased my confidence while talking in a plurilingual context, as I have realized it is not as difficult as I thought it was.”* Gain in confidence can be explained by the specific communicative situations provided during VE (interactions with peers or with other L2 learners) and identified by the participants as benevolent and hence non-frightening settings.

“In our first online meeting I was very nervous because I didn't trust in my self and my use of english. I told this issue to the group, but they told me that I had nothing to worry about because no one knew how to speak perfectly english and non of us would get angry because of our way to communicate.”

The help provided by the peers is underlined many times and seems to support engagement with the L2 positively, as it makes the learners notice that communication can unfold despite a lack of accuracy.

“I think that through this Virtual Exchange I broke my language barrier. I'm aware that my spoken English still isn't very well, but I'm certain that online meetings made me to think “now”, immediately without any hesitates, so I learnt to be more spontaneous and courage to tell what I think. Sometimes it's better to tell anything, maybe with some mistakes, but it gives a chance to be understood in spite of being shy and not be heard.”

VE-tasks could in that sense have a triggering function by creating circumstances that push learners to go beyond their limitations.

“This virtual exchange enhances my communication skill. When we have a discussion about our project, I need to push my English communication skill to have a great discussion with my partners.”

Engagement with the partners in collaborative work constrains learners to make use of all the means they can rely on to ensure communication and mutual understanding. For less proficient students that means use of body language, gestures or expressive tonalities in speech to convey meaning. But also at more advanced stages, students were pushed to extend the skills they already mastered.

“For the second Online-Meeting I was a little bit more prepared, I've prepared some questions in advance and thanks to the previous experience, it was easier to talk and find those words to continue our conversation and in the end, I was pretty amazed how fast you can learn something if there is no other way how to do it. Kind of forced to understand it. But thanks to that, I was getting better so fast!”



These findings confirm the potential of the VE to get learners out of their comfort zone (The EVALUATE Report 2019, p. 107) and to engage productively with the learned language.

7.5.4. The contradictory cases of vocabulary range and adapting

Two of the language subcompetences most frequently identified by participants through qualitative means, vocabulary range and adapting, appear to contradict the quantitative findings. These two subcompetences the only two quantitative items on the survey to show no statistically significant improvement from pre- to posttest. A closer look at several factors may reveal potential causes underlying these apparent contradictions in findings that suggest that VE is indeed facilitative of both vocabulary range and adapting.

First, the quantitative item for vocabulary range asked participants whether they felt they had a good command of vocabulary. For students with high levels of proficiency in the language of the VE or who interacted with participants of much lower levels of proficiency, the development of vocabulary range was not likely to happen, resulting in non-significant improvement in this subcompetence.

However, for students whose proficiency in the language of the VE was not as high, the development of vocabulary range may have been particularly salient and easy to recall, leading to many of the examples provided in the qualitative data. This included reference to the development of slang, informal language, or other language that is appropriate to certain types of computer-mediated interactions and which may not have been entirely correct *“Regarding my language skills, I learned to develop a type of vocabulary in video calls, not so correct.”* For others, the VE provided the chance to learn words not commonly found in their formal educational contexts: *“Able to learn new words, beyond the scope of the Arabic curriculum in my institution”*.

For still other students, however, the new vocabulary they developed was tied to the topic or tasks of the VE *“Since we were working about our argumentative skill, I got to learn new expressions and ways to defend and argument, for example, talking about forbidden books or explaining an idea.”* This also included the development of more technical vocabulary in the language of the VE that was specific to their field of study: *“I liked the idea of using English to work on a project of my field. Thanks to this, I could become more familiar with technical vocabulary”*.

Regarding the second subcompetence, adapting, two additional factors stand out which may have led to differences between the quantitative and qualitative results. First, the quantitative item for adapting also asked participants to reflect on their comfort with plurilingual contexts and their ability to mediate in groups. In other words, this item conflated potentially three separate constructs: comfort with plurilingual contexts, adapting and mediating. Thus, participants who were only confident that their ability to adapt their language had improved as a result of the VE but did not otherwise believe their ability to mediate or their comfort with plurilingual contexts had sufficiently changed may not have indicated much if any improvement on the quantitative items. Indeed, the very limited reference to improvement in building on plurilingual repertoire (n=6) and mediation (n=1) in the qualitative data suggests that the development of these skills through VE was neither frequent nor highly salient for participants and that the conflation of these constructs on a single quantitative item may have led to the discrepancy between quantitative and qualitative findings.

One unique aspect of the subcompetence adapting was that most references to it came from participants who were highly proficient in the language of the VE and who became aware of

different techniques for adapting their language in order to be comprehensible to all interlocutors: *"I was able to alter my way of communication in English to be more intelligible to my peers. For example, I noticed how I got more response for my group members when I spoke slower, clearer and asked,"*. Some students articulated adapting strategies that were specific to the language background of all participants they were communicating with: *"I learnt how to make my english more "romance" as we were all native speakers of romance language so that everybody even with lower levels of English could understand more easily."*

In other cases, adapting was not always at the level of language but instead at a conceptual level. For instance, one participant in an exchange involving Japanese and US students explained how adapting involved presenting information in a manner that would be understood by members of both cultures: *"Adaptation - because it was required of me to communicate with one American student and one Japanese student, I had to develop a way to frame my ideas in a way that could be understood by both cultures."*

Different linguistic shifts are reported being made in order to achieve mutual understanding or efficient work within the group, such as using the multimodality videoconferencing allows, reusing intentionally words or expressions spotted in the productions of the partners, or rephrasing in advance stretches of language to make sure communication will not be hindered. This empathetic attitude leads to an adaptive controlled linguistic behaviour the students considered crucial for their collaborative work. *"During the course of this project I had to explain varying concepts and ideas to my partner but I had to explain them in a way that was easy to understand. As a result I had to rethink and rephrase some of my ideas in a way that I would normally not even consider doing"*. In that sense, students develop transferable skills (context-sensitivity and flexibility) initiated from language issues. They learned to adapt themselves and the language form(s) they used according to competence and inferred or noticed needs of the others. Consequently, the benefits of the participation in the VE concern not only predetermined language skills or knowledge, but also apply to soft or transferable abilities, which are key features for communication and collaboration in plurilingual settings.

7.6. Discussion

In this section, we return to the research questions guiding this study which asked (1) whether VE facilitated the development of participants' language skills and knowledge, and (2) what specific language skills and knowledge were most frequently developed through the VE.

Findings from this study correspond with many of the findings of prior studies on language learning outcomes resulting from VEs partnering foreign language classes. This includes development of the following subcompetences: (1) understanding/reception of the target language, and (2) vocabulary knowledge (i.e. vocabulary range and vocabulary control), (3) the ability to interact with other speakers in the target language (i.e. interaction).

Beyond this, quantitative results pointed to the development of the following additional subcompetences: (4) communication ability, (5) confidence, (6) propositional precision and thematic development, (7) goal-oriented collaboration, (8) spoken fluency, and (9) grammatical range and control. Finally, qualitative results indicated the development of both (10) production in the target language, and (11) adapting, particularly among higher proficiency participants and native speakers of the language of the VE.



Key takeaway points from this analysis are the following:

- Findings correspond with those of prior studies on language learning regarding the development of understanding/reception, vocabulary knowledge, and interaction.
- Quantitative results indicated the development of communication ability, confidence, propositional precision and thematic development, goal-oriented collaboration, spoken fluency, and grammatical range and control.
- Qualitative results indicated the development of production and adapting, particularly among high proficiency and native speaker participants.
- Most noteworthy, because of the inclusion of highly proficient or even native speakers of the language of the VE, there was also evidence that VE can support language development, specifically adapting, among high proficiency users of the language of the VE.
- Future research on this data-set should also investigate the specific language subcompetences developed by participants of different levels of proficiency in the language of the VE.
- Another important future area of investigation for this and other large scale VE studies is the relationship between size and configuration of the VE and the type of language development these foster. For instance, is there a difference in language skills and knowledge developed in dyadic versus triadic or multi-partner VEs?

8. Development of disciplinary skills and knowledge

Sake Jager, Juan Albá Duran and Gerdientje Oggel

8.1. Definition

This section focuses on how VE may contribute to developing disciplinary learning, i.e. the skills and knowledge associated with specific academic disciplines or subject areas.

An academic discipline is a branch of knowledge in higher education, characterized by many or most of the following: (1) a specific object of research, (2) a specific and often unique body of knowledge, (3) theories and concepts used to organize this knowledge, (4) the use of specific technical language, (5) research methods that are specific to their object of research and research questions, and (6) institutional representation in the form of university departments and courses, academic journals and conferences, and professional associations (Krishnan, 2009, p. 9).

Disciplinary skills and knowledge therefore encompass the specific skills and knowledge taught and assessed in university courses, which are considered relevant for the academic discipline in which the course is based. However, as will become evident from the results presented below, these tend to be associated by students quite closely with the transversal or ‘soft’ skills discussed in the previous sections.

To be able to classify, group and analyse disciplines and fields of disciplines, the EVOLVE project uses the International Standard Classification of Education (ISCED) framework (version 2013) (UNESCO Institute for Statistics, 2014, p. 18-20).

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8.2. Background

VE is frequently associated with teaching and learning in the humanities and social sciences. The sets of competences reported on in the previous chapters (intercultural communicative competence, critical digital literacy and language skills) reside particularly well with student learning outcomes targeted in language and culture studies, social sciences and teacher education. The EVOLVE baseline study into the awareness and use of VE in Higher Education institutions revealed that these are also the disciplines in which VE is most widely applied (Jager et al., 2019). However, such competences are of supreme importance to education more generally to prepare students for living and working in an increasingly globalised society. They relate to universities’ broader Internationalisation-at-Home ambitions (Beelen and Jones, 2015) which seek to embed global competences across the curriculum by offering all students international learning experiences, of which VE can be potentially one.

This shift of VE from a relatively small set of disciplines to wider application across disciplines has been observed in the literature (e.g. O’Dowd, 2018), but not much is known yet on how VE contributes to learning outcomes which are specific for these disciplines. This is why it was decided to complement the research on the learning outcomes reported on in the other chapters in this study with a closer examination of specific disciplinary skills and knowledge facilitated through VE.



The relatively small number of studies that do exist from other disciplines suggest that VE may contribute to a better understanding of discipline-specific knowledge (concepts and content) on the one hand, and to acquiring relevant professional competencies and skills on the other.

In economics, business and management, online international collaboration is often associated with global virtual teams. Studies from this field report how global virtual teams provide experiential learning on the subject matter, which supports the integration of 21st century skills (Abruquah, 2019; Popescu & Warmenhoven, 2020), prepares them for collaborating online in future organisational settings (Magnier-Watanabe et al., 2017) and advances intercultural awareness and transversal skills more generally (e.g. Fondo & Withanachchi, 2019).

In medical sciences and nursing, implementing VE helps to offer students insights into other health care education and prepares them for globally diverse health care environments, while sensitising them to intercultural differences at the same time (De Castro et al., 2019; Wu et al., 2020). In addition, VE contributes to foregrounding local perspectives on problems of global scale, such as addiction, which may constitute a powerful example of internationalising the curriculum (Lee & Cai, 2019).

In geography and related disciplines, international online collaboration has been shown to be effective in improving students' understanding of geographic concepts, making them aware of different international perspectives and promoting intercultural awareness (Bolderman et al., 2020; Klein & Solem, 2008; Ray & Solem, 2009).

In fluid mechanical engineering, VE has been shown to contribute to improved experimental design and better essays, as students explain discipline-specific concepts to non-experts in VE peer groups, fostering intercultural competence and teamwork at the same time (Raga et al. 2020). Similar gains in intercultural competence are reported in undergraduate programs in civil engineering, agronomy engineering, and information systems (Bassani & Buchem, 2019).

These studies suggest that, by including VEs in courses across disciplines, students deepen their knowledge of the subject matter, gain new international perspectives on the subject studied and practice a wide range of transversal skills and knowledge (e. g. communication, intercultural) during the online international collaboration.

The EVOLVE project intended to diffuse the use of VE across disciplines by providing training and mentoring to educators from any discipline, so that further research on disciplinary-specific gains could be initiated to increase our understanding of how VE contributes to developing learning outcomes specific to certain disciplines.

8.3. Specific research questions

The main questions guiding our research were as follows:

1. Which disciplinary skills and knowledge do students develop when participating in VEs implemented as part of their courses?
2. How are these competences and knowledge related to the course objectives defined by the teachers?

Course learning outcomes are commonly expressed using Dublin Core descriptors making reference to Bloom's taxonomy of learning (Bloom, 1956; Anderson & Krathwohl, 2001).

However, the data collected during the piloting round of our study had shown that without recourse to actual student artefacts (written work, recorded and transcribed conversations and discussions, video recordings, etc.) relating students' disciplinary learning to Bloom's taxonomy is not well possible. Collecting these data was beyond the scope of our cross-disciplinary study. However, teachers had provided descriptions of course objectives and learning outcomes in VE information gathering sheets, which we used, together with the student survey and interview data to identify patterns and trends which may help to increase our understanding of the impact of VE on disciplinary learning. The teachers and students in the current exchanges did not use portfolios for documenting disciplinary learning.

Students were asked to report on disciplinary learning in the post-survey on the basis of the following question (POST-CORE-Q2):

How has the project helped you to gain knowledge and/or develop skills which are essential within your discipline? Please give examples.

In addition, the semi-structured interview contained a similar question (Q7):

In your Virtual Exchange, did you learn more about the specific subject area your university course focuses on? And if so, could you please specify?

Together with a question intended to measure progress quantitatively through paired t-test analysis (see below), these questions were the point of departure for studying which kinds of disciplinary learning are facilitated through VE.

8.4. Statistical results

Similar to the other competences reported on in this study, the pre and post-test comparison for the question "I am competent in the knowledge and skills identified by the course objectives" showed a significant difference.

Table 16: Comparison of pre- and post-survey items on disciplinary knowledge and skills

Item number	Item	Presurvey means	Postsurvey means
CORE-Q1.11	I am competent in the knowledge and skills identified by the course objectives.	3.77	4.04*

Note. * Significant at $p < 0.05$

It is to be expected that by the end of a course students will report higher knowledge and skills for that course. But how is that related to the use of VE within that course? To better understand to which knowledge and skills the reported growth refers and how VE contributes to this, we examined the responses to the open questions described in section 8.3 more in-depth in relation to stated objectives and learning outcomes through qualitative analyses following the methodology outlined in chapter 2. These results are presented in the next section.

8.5. Explanations based on qualitative results

As described in chapter 3, the data was collected from 16 exchanges. Unfortunately for our purposes, the range of disciplines in which the exchanges were implemented was limited. 17 courses were in teacher training (mainly with subject specialisation and 1 in training for preschool teachers), 9 were in second language learning, including English for Specific Purposes



(English for Tourism, English for Medicine and for Chemical Engineering), and 6 were in linguistics, literature and (inter)cultural studies. The other courses were not specified.

8.5.1. VE objectives and learning outcomes

We had asked the participating educators to describe in VE information gathering sheets which learning outcomes and objectives they had set for their students. The descriptions in Table 17 are representative of objectives and learning goals in the courses of our study.

Table 17: *Examples of VE objectives and learning outcomes*

Teacher education

Objectives	Introduce teacher students to new teaching methods and techniques (task-based learning, experiential learning, intercultural learning). Make students experience and reflect on the processes of task design, collaboration, peer-evaluation, none of which are used in our educational system. make the students experience first -hand use of technology for learning and teaching purposes. Expose the students to culturally different interpretations of communication, work organization, the role of feedback, collaborative work.
Learning outcomes	Students will be able to utilize their knowledge of second language processes and theory to design a lesson plan with fellow teacher candidates

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Second language learning

Objectives	<ul style="list-style-type: none"> • foster the interactional competence of the students (by using the language in a more spontaneous way and less controlled as they are used to in the classroom context) • allow the students to identify their needs (or strengths) during their experience in order to set own learning objectives – it means improve their learning awareness and develop some self regulations skills • intercultural exchange about their studying contexts and student life in both countries • exchange information, negotiate and collaborate actively with the partners in the target language by using specific linguistic means but also developing strategies for understanding / maintain the interaction / express ideas or share opinions
Learning outcomes	<p>Students...</p> <ul style="list-style-type: none"> • can exchange informations about a topic, give opinions, ask questions, make decisions and propositions in an oral interaction or in short written posts (forum) • can make / write a summary with collected informations • can work collaboratively with pairs and develop intercultural awareness • can speak more fluently without focusing exclusively on accuracy [German as Foreign Language (B1 level) - for students most French-speaking & Czech-speaking and coming from different study programs (sciences, engineering, law, languages, etc.).]

English for Tourism

Objectives	Provide an authentic setting for international and intercultural collaboration, increase students' awareness of challenges related with international and intercultural team work, foster intrinsic motivation for language learning, build students' awareness of promotional discourse in tourism, raise students' awareness of sustainable city development.
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Learning outcomes	By the end of the project, the students will be able to: <ul style="list-style-type: none">• formulate critical views of municipality website discourse,• identify and discuss some of the cultural, social, political or environmental problems of the tree cities: Buenos Aires, Malmo, Poznań, and design a creative multimodal text on the chosen theme,• reflect on the experience of intercultural online collaboration,• select in an informed way the preferred group communication and collaboration tools (Zoom, Messenger, What's app, MS Teams, Google docs, etc) and experiment with its affordancies,• use a new digital tool (e.g. a video editing app, Instagram, MadMagz, Wordpress Blog or Genial.ly) for the creation of the collaborative City Text.
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Overall, these objectives and desired learning outcomes reflect the commonly targeted competences for VE - language, culture and digital literacy - but the descriptions contain discipline-specific and VE-specific objectives reflecting the richness and versatility of VE as an educational tool.

For teacher education, it is explicitly stated that VE makes it possible to open up student perspectives to teaching methods and techniques not used in the regular education system. VE is a means for applying theory in practice and it provides hands-on, experiential learning of technology and intercultural communication. Collaborating effectively and being able to give peer feedback are additional goals. Also being able to plan and organise are mentioned as important objectives of the exchange.

Similar learning outcomes and objectives are mentioned for second language learning courses, which in addition put specific emphasis on VEs as an authentic setting for spontaneous communication, fluency development and confidence building.

The English for Tourism example, finally, has similar objectives, and it adds how this authentic setting may be used to enhance motivation, subject-specific language use, and very interestingly how it provides a space for discussing cultural, social, political or environmental problems.

8.5.2. Disciplinary learning reported by the students

The coding of student responses to the questions in the post-survey and interview was conducted as a cyclical process in which we made no a priori assumptions about the disciplinary learning reported. Initial word frequency analyses revealed that 'communication', 'difference', 'culture', 'work', 'language', 'people' and 'countries' featured prominently in student input, suggesting strong links with language and culture learning. But also 'time' was frequently mentioned.

We explored the data further through in vivo coding of the responses in a first cycle, followed by discussions about emerging categories, which were defined and used on samples of the data by the researchers independently. After an intercoder reliability of 80% or higher had been achieved, the codes were finalised and data was shared out between the researchers and all the data were coded in the second cycle (Saldaña, 2013, p. 64).

By and large the categories that emerged could be divided in two main groups: Teacher education and transversal skills.

Teacher education

The prominence of education in our sample is brought out clearly by students reporting skills and knowledge which, as they explicitly state, emerged in the context of their development in becoming teachers. The knowledge and skills reported by students in teacher education were categorised into the following subareas:

Table 18: *Teacher education competencies identified and frequency of coding*

Disciplinary competency	Description	Frequency
	The participant reports learning concerning:	
Developing Activities	developing (online) activities for students.	23
Discovering Digital Tools	digital tools for teaching/learning purposes (this includes the use of tools, knowledge of tools or attitudes towards the use of digital tools for teaching).	22
Improving teaching methods	the knowledge or application of teaching methods or approaches. Includes explicit reflection on the methodology used for instructional design (i. e. the student reflects explicitly about the methodology behind the task design). Different ways in which language can be taught.	14
Intercultural Teaching	the intercultural dimension of teaching. How to internationalize their own teaching, connect students with other students from different cultures.	10
Adapting to student's needs	adapting teaching practices to students' needs (includes being aware of specificities of the target public or expectations of students).	8
Supervising students	online supervision of students (responding to students' requests, being strict/flexible with students' deadlines, managing his/her online teacher presence, etc.).	3
Assessing students' work	assessing students' work. Includes giving feedback to students' work.	1

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Improving teaching methods and developing activities

Teacher trainees report that the VE contributed to their teaching methodology (14 refs) and more concretely to their ability in developing activities for students (23 refs).

Concerning their gains in improving their teaching methods, students learned how to apply theoretical insights into their teaching practice (e. g. socio constructivist theories, online active learning and project-based learning principles):

"I definitely did, because the university course is about the application of theory, and that really came out in the final task when we were talking about educational norms. For instance, we were talking about the research of Gibbons and O'Dowd from 2015 and also talking about Vygotsky and his idea of the zone of proximal development, and just how we need to teach specifically, you know, to the strengths of, teach to the zone of proximal development of the students (...)."

Some of the reported learning in the area of task creation includes (1) promoting interaction and group work through instructional design, (2) following given criteria for designing successful online activities, (3) learning how to structure task sequences in steps and (4) how to provide clear instructions: *"So, in the first semester we learned to structure a good telecollaboration and to use good instructions to be clear and to give learners a good way, a good structure, (...) what they have to do in what order"*.

Some of these gains are more closely related to second language teaching methodology: *“From this project, I learned that the involved people should not only focus on form during the working phases. It is better to focus on meaning first to deal with form issues afterwards. This way, the communications won't get interrupted that quickly”*.

After implementing the designed tasks with actual students, some teacher trainees report learning from their mistakes, which helped them set new learning goals for next iterations. In this case a student reflects on the importance of formulating clear instructions:

And then we tried creating a task and then applying it in the second telecollaboration where we saw still problems like this thing where they didn't know how to, where to post it on the Moodle forum. So, we saw there still, we can still improve. We can still do better instructions.

Many students highlight that by participating in the VE they feel more prepared for performing as teachers in online settings and, more specifically, for planning and developing activities for a VE themselves: *“For me as a future teacher I have gained knowledge of how to work with a virtual exchange project in the classroom”*. A number of students notice that the experiential nature of the exchange (i.e. explicit modelling) contributed to their learning *“Most important was that we actually worked in a real telecollaborative setting, so we had the chance to experience both sides (designing tasks in the teacher perspective, working on tasks in the student perspective)”*.

Discovering digital tools

Teachers in training mention that the VE project has helped them to discover and use digital tools (22 references), both by broadening their repertoire of digital technologies and by (re)discovering tool affordances from a pedagogical perspective: *“Even though I can work with ICT tools, the exchange has hel[p]ed me to use them in an education context. In addition, I got to know many online apps and tools that I would not have known about had it not be because of this activity”*.

Students also learned how to critically reflect on the tools' affordances and limitations for specific communication and collaboration purposes: *“I have understood that different tasks have different communicative demands, and as such, I have gained experience of using different digital tools that meets these requirements. This is certainly something that I will bring with me into my on teaching”*. More specifically, some students reflect on the contextual implications of technology: *“We talked about the use of technologies as it was in each country and what limitations we could have”*. Many students mention how the digital knowledge and skills developed through the VE made them be better prepared for their work as teachers.

Integrating intercultural learning

Participating in the VE project also contributed to integrating the intercultural dimension in their teaching (10 refs). As one student puts it: *“I have gained insights into the importance of reflecting on your self and who you are before you engaging in an intercultural exchange. This I have understood can cleverly be incorporated into task structure, which I will be sure to implement in my own teaching”*.

Adapting to student needs, supervision and assessment

Finally, several topics emerged relating to teacher engagement with students. These included adapting to their needs (8 refs), supervising them (3 refs) and assessing their work (1 ref).



Important in student-centred teaching approaches, some teacher trainees report adapting to students' specificities: *"I think the project was very important because helped to think about how I could prepare a class. Like for example, I had never prepared a class before, and the most important thing was [to] think about the students and their specific purposes"*. More specifically, a student learned *"how to invite "quieter" students into a conversation, taking initiatives and making compromises"*.

Some students mention how the VE helped them practise how to supervise students in online teaching: *"It helped me to become more strict, while asking for homework for example. At first I would let students give me their work later than expected, but after a while I did not let them anymore"*.

One student reports learning in assessing students' work: *"Correcting also taught me how to grade effectively and clearly"*.

As can be seen from these responses, they are closely aligned with the learning outcomes and objectives set for the language teaching courses.

Transversal skills

The second group of codes which emerged is less typically associated with specific disciplines, which is why we have assigned the label 'transversal skills' to this group. This label is compatible with the European Skills/Competences, qualifications and Occupations (ESCO) framework which provides the following definition:

Transversal knowledge, skills and competences are relevant to a broad range of occupations and economic sectors. They are often referred to as core skills, basic skills or soft skills and are the cornerstone for the personal development of a person. (European Commission, 2019, p. 21)

The following subareas of transversal skills emerged from our data:

Table 19: *Transversal skills identified and frequency of coding*

Transversal skill	Description The participant reports learning concerning ...	Frequency
Communicative Competence	his/her communicative competence (in L2) in general terms or concerning specific communicative sub-competencies or skills (vocabulary, grammar, pragmatics, fluency, accuracy, reading, writing, speaking and so on). There is no explicit mention of their disciplinary field of expertise (activities, topics, etc.), then it is reported as transversal skill.	84
Intercultural Competence	his/her intercultural competence (whether it is about knowledge about the other culture, intercultural skills or attitudes toward the own or other cultures). There is no explicit mention of their disciplinary field of expertise, then it is reported as transversal skill.	64
Group work	his/her ability to collaborate in groups (e. g. leadership skills, distributing work, facilitating an online meeting, etc.).	37
Self-management	his/her abilities to manage time (deadlines), workload, feelings. Includes being aware of the personality traits, etc.	37
Digital Competence	his/her digital capability (whether it is about new tools or the use of these tools). There is no explicit mention of their disciplinary field of expertise, then it is reported as transversal skill.	27

Communicative competence

Communicative competence emerged as the most frequently reported area of transversal learning (84 refs) when asking participants about learning that is relevant within their discipline. Benefits for practising language in an authentic setting and overcoming linguistic and personal obstacles were mentioned for all exchanges: *“The project helped me break the language barrier. My communication in English is much better, I’m more confident. This is very important, because in my future profession English is very important, e.g. when you are traveling abroad”*.

As in the previous quote, some students explicitly connect their ability to communicate in a second language with their discipline of expertise, like this student of translation and interpretation: *“[we] communicated both through online messaging and verbal communication in both English and Japanese, providing Japanese when necessary to help our Japanese partner better understand. This was a good experience for me in translation/interpretation”*. Other students relate their gains in second language communication to their future career perspectives: *“I have been able to practice my Arabic linguistic skills with a native Arab speaker, which will be useful for any future visits to the Arab region”*.

Intercultural competence

The second most coded-for category within in the transversal skills is intercultural competence (64 refs). Some of the examples relate to factual information and learning about their partners’ culture, which corresponds to the dimension of *cultural knowledge and understanding* discussed in section 5.1 of this report:

“Yes. So, the subject was the student’s life in Germany in general. And so, we had to compare our, the student’s life in Germany. This means life in Czech Republic and in France. So, we learn that, for example, renting a flat is much more, it’s well, it’s cheaper in Czech Republic than in France. [...] For example, about how students eat in their university. What are their schedules? Do they have the same hours than us?”

Other responses point to more transformative aspects of intercultural engagement, including empathy, preparedness to help each other, gaining knowledge from multiple perspectives and respecting others’ opinions: *“I learned to be unbiased when expressing or teaching anything (for example I can talk about religious beliefs without sharing my own practices)”*; *“Friends from Malmo are constructive when we in Jakarta need help; they are happy to help us, and so are we from Jakarta”*; *“I saw other ways of thinking and I talked a lot with my partner. I saw how open-minded they are”*. These correspond with answers in section 5.1 of *critical understanding of cultures and critical reflection on one’s own culture*.

Group work and self-management

Two closely related categories emerged, group work and self-management, which had 37 references each.

Group work relates to practical aspects of the VE such as collaboratively planning, sharing out work or assuming different roles for the well-functioning of the team, as reflected by this student: *“It also helped me to be conscious of the importance of communicate [sic] and to be a leader in a passive group”*. Some students also mention how the VE provided opportunities to solve disagreements and reach consensus:



“This week learnt me how to cooperate with people from other countries. I learnt how to think as a team, not like individual person. Sometimes we have lot of ideas, but our partners too so it is important to find a common solutions and maybe resign for the sake of the final work”.

On the other hand, self-management relates to the development of a set of personal attributes and skills for carrying out work and functioning in a team, such as leadership skills, overcoming shyness and gaining self-confidence:

“For instance, I managed to learn some leadership abilities. It was often me who talked within the whatsapp group to get the job done. Some of my partners hardly dared to say something, and I was myself quite shy to put deadlines and give orders, but I tried to overcome this shyness although probably not as effectively as I should have.”

Furthermore, self-managing also relates to time keeping and being organised, as shown in this testimonial: “Yes, I learned to abide by the calendar and respect due dates. Our activity had to be online by a due date for the learners. This required organization”. Or, as another student reports: “The project urged me to utilize my time more efficiently just to make more time on this project which I enjoy a lot.”

It should be noted that group work and self-management are closely associated with working in culturally diverse teams. However, this appears not to be the only factor playing a role in the set up of these exchanges. Also the fact that exchanges are normally situated outside class, calling upon students’ abilities to work autonomously in a group, appears to play a role (Fuchs et al., 2012).

Digital competence

Lastly, when asked about learning that is relevant to their specific discipline, the students reported that the VE contributed to developing their digital competencies (27 refs):

“Since the starting of the project, we were using the media tools in all of our meetings. Those media tools were not very familiar for us at the start but at the time, by using them frequently, I learned many properties of the media tools that we were using.”

Even though most student responses do not explicitly mention how these gains on digital competence relate to their own disciplines, several students do make reference to how these are related to their future career: “I want to be an online counselor, so it was a good experience to communicate with another person via online programs”.

8.6. Discussion

Our quantitative and qualitative data provide evidence that students clearly perceive that VE contributes to becoming better students in the disciplines. On the basis of the patterns emerging from our data, we made a distinction between disciplinary skills for teacher education on the one hand, and more generic transversal skills on the other.

Within our sample, our first research question (“Which disciplinary skills and knowledge do students develop when participating in VE’s implemented as part of their courses?”) clearly elicited skills and knowledge which are specific to teacher education and which are useful for the students’ careers as future teachers. The data show that teachers-in-training are empowered by VE, which opens their eyes to technologies they can use to develop innovative activities and tasks

for their learners. They learn new teaching methodologies and how to apply them in practice, integrating intercultural learning in the tasks for their students. The experience has also prepared them to adapt better to students' needs and to interact with students differently in supervision and assessment. These findings confirm previous research results in the field of VE for teacher education (Albá Duran et al., 2020; Dooly & Sadler, 2013; The EVALUATE Group, 2019; O'Dowd & Dooly, 2018).

In relation to our second research question ("How are these competences and knowledge related to the course objectives defined by the teachers?"), we found that for teacher education the skills and knowledge reported by the students coincide largely with the learning outcomes and course objectives intended by the teachers. Each of the competency areas which emerged from the student data was referenced in the descriptions in the VE information gathering sheets compiled by the teachers. Our study, however, was not fine-grained enough to investigate these similarities at the level of individual courses.

Paradoxically, the large majority of gains in disciplinary skills and knowledge reported by the students was found to be in the area of transversal learning, which we defined as competences and skills *not specific to particular disciplines*.

The categories which emerged - communicative competence, intercultural competence, group work, self-management, digital competence - are all well-attested in the literature, with the possible exception of self-management, which relates to aspects suggesting an impact of VE on individual growth and personal development.

These reported gains in competencies and skills corresponded with course objectives and learning outcomes in general, although it appeared that the benefits of VE for working in a group and personal development were not always stated explicitly in the course objectives and learning outcomes of courses where students reported them. However, as mentioned above, we did not examine these relationships at individual course level systematically.

The important fact remains that in all the VEs (33) students reported mainly what seem to be transversal skills rather than disciplinary skills as a primary learning outcome of participating in VE.

For teacher education programmes, this suggests that VE is not only an expedient way of learning about the disciplinary subject at focus, but also, possibly more so, to put into practice a wide range of transversal skills which are potentially transferable to other disciplines and types of employment as a cornerstone of students' personal and professional development.

For the other courses, VE provides a way of connecting discipline-specific content with language and culture learning. The primary focus was on L2 learning as part of (1) more general L2 courses or (2) LSP courses for students from specific disciplines (e. g. English for Medical Science students, or English for Tourism). These courses include topics for discussion related to the discipline of students and their career interests. VE in these cases is an excellent tool for students to develop their skills in the L2 while at the same time discussing topics that fall within their discipline. This is exemplified in statements such as "*When we talked about how our countries tackled the COVID-19 outbreak, we exchanged our perspectives and all got new thoughts after the exchange.*" These findings point to the critical role that VE may play in establishing cross-cultural, cross-disciplinary perspectives and promoting critical thinking and deep learning on global problems and challenges, such as those connected with the UN Sustainable Development Goals (United Nations, n.d.).



Unfortunately, due to the inclusion of only a small group of disciplines in our sample, this dimension of VE could not be researched in-depth in the current study. Also the fact that none of the participating teachers opted for having the students use a portfolio to document disciplinary learning (as for the other learning outcomes described in this report) have limited the scope of our findings somewhat. However, we believe that our data show that disciplinary learning and transversal learning are inextricably interconnected in VE. The student responses point to VE as a holistic, immersive experience in which multiple competences are drawn upon simultaneously. Learning by doing or experiential learning emerges as a powerful aspect of VE.

Several of our findings reverberate aspects researched and reported on more in-depth elsewhere in this report. But, in our view, the fact that students report them as disciplinary learning also demonstrates that they perceive these as being learnt as part of learning in the discipline, not as something separate from it.

Follow-up studies are invited across a larger number of disciplines to learn more about how VE supports specific aspects of disciplinary learning and to which extent the transversal skills reported here are representative of all disciplines. And at the individual learner level, it will also be interesting to start case studies looking into data (including artefacts) of selected learners to zoom in on VE in relation to personal learning and development, particularly how it supports deep learning and critical thinking.

9. General discussion and conclusion

Elke Nissen and Sake Jager

Close inspection of VEs implemented across a range of disciplines by 34 partners around the world confirms that VE is a valuable and powerful tool for development of highly relevant student competences in Higher Education. Our study comprised student data from 248 students in 16 exchanges and analysed these through quantitative and qualitative measures using a standard set of instruments, specifically designed for this study. We investigated students' general perceptions and appreciation of VE and overall learning outcomes and complemented this with studies looking into the development of intercultural competence, critical digital literacy, language skills, and disciplinary knowledge and skills respectively. Our study across this range of disciplines and settings, from these multiple research perspectives, corroborates findings of many previous studies, often conducted at the level of individual exchanges in language and teacher education. It is also in line with larger-scale studies set in more specific disciplinary contexts (e.g. The EVALUATE Group, 2019) or looking at the impact of different forms of VE across much larger populations, such as the concurrent Erasmus+ Virtual Exchange project (Helm & Van der Velden, 2019; Helm & Van der Velden, 2020). Our study therefore provides important additional evidence, with a strong focus on qualitative analyses of learning reported by students themselves, of VE as a valuable tool for competence development in HEIs.

The analysis of intercultural competence, based on the Council of Europe's model of Competences for Democratic Culture (Council of Europe, 2016), demonstrated that students successfully developed competences for intercultural interaction and online collaboration and the ability to manage and resolve conflicts in these settings. They acquired intercultural knowledge, learned to adapt to different cultural perspectives and practices, and demonstrated reflection on and distancing from their own worldviews. As a potential risk, the researchers identified a tendency to overgeneralise and minimise difference.

Our critical digital literacy analysis, guided by critical digital pedagogy frameworks (Darvin, 2017; Morris, 2017), revealed that students show significant progress in most of the items measured. These include use and appropriate choice of text, audio and video communication tools, with regard to the communicative purpose and context, and awareness of the respective impact of these tools on interaction, on the perception of others, and potential bias. The qualitative results provided strong evidence that students managed to establish a connection with others, and that they helped others establish presence and a voice and that they engaged critically with computer-mediated communication. The students had a preference for tools which helped maintain effective social relationships and group work. This included the selective use of video and emojis and other expressive devices. Participants demonstrated high levels of reflexivity and empathy which are required for CDL. They were responsive to their peers' preferences of communication channels and showed creativity and flexibility in supporting effective exchanges by combinations of digital communication tools. They placed high value on establishing and maintaining positive personal and social relationships using tools which facilitated humour and sharing of personal information. The use of tasks fostering CDL was generally regarded as positive, but it also increased pressure about completing these tasks successfully within the time frames imposed. Future work in this field may want to reinforce the intercultural dimension of CDL and allow group members more freedom in deciding on their own tasks.



The study of language skills, based on the CEFR (Council of Europe 2001; Council of Europe 2018), confirms on a large scale many findings of former studies on language development through VE. The comparison of students' self-declared competence before and after their VE experience shows significant improvement in many aspects, which include communication ability, building confidence, vocabulary control, interaction, propositional precision and thematic development, goal-oriented collaboration, spoken fluency, and grammatical range and control. Development of vocabulary range and adapting / mediating could not be validated statistically, but this may have been the result of various factors, including the fact that some speakers were already highly proficient, or even native speakers. The lack of significant results for these items for our respondents overall was counter-evidenced by the clear examples of gains in vocabulary by less proficient learners and highly competent users of the language, including native speakers, showed a great capacity for adaptation when responding to less advanced learners' needs.

The analysis of the development of disciplinary skills and knowledge revealed that the competences targeted in teacher education and second language learning, which were the most represented disciplines in our sample, are generally obtained by the students participating in the VEs. An interesting outcome was that students, when asked about the development of specific disciplinary skills and knowledge, overwhelmingly report on competences which we regard as transversal rather than specific to any particular discipline. This concerns skills and knowledge relevant to a broad range of occupations and economic sectors, which are the cornerstone for personal development (European Commission, 2019). The skills and knowledge reported on by our students include teamworking, organisational, communicative, intercultural, and digital competence, which are largely overlapping with the competences discussed above and also borne out by the evidence from our study on general student perspectives and learning outcomes. From the fact that students report this learning as disciplinary learning, we conclude that they perceive it as being learnt as part of learning in the discipline, not as something separate from it. This is highly relevant for the integration of such skills into the disciplines.

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Our complementary analyses of the same data through the lenses of different theoretical frameworks and approaches, then, provide substantial additional evidence of the efficacy of VE for developing socially and economically relevant, partially overlapping and mutually reinforcing, competences through VE. The authenticity of the learning experience, the opportunity for bonding and building personal relationships, learning-by-doing, and giving students responsibility as individuals and as groups to establish common goals and outcomes all contribute to the observed development of prerequisite skills and knowledge.

Of crucial importance for the effectiveness of VE, as evidenced by our study into general appreciation and learning outcomes, is the fact that students are positive, by a large majority, of the experience of participating in VEs. They would like to participate in more online exchanges if possible and many regard VE as a way to gain international experience without travelling and as an alternative to physical mobility, which is a highly relevant outcome not only in view of the current limitations on travel due to the COVID-19 crisis, but also in view of universities' ambitions of situating online learning in the context of their "Internationalisation-at-Home" strategies. In this respect, the two exchanges in our study impacted by the COVID-19 pandemic demonstrated the robustness and adequacy of VE as an educational tool when the courses in which it was implemented were pivoted fully online. The global crisis necessitated last-minute changes to the courses, but the courses could be continued fully online and the online exchanges turned out to be an opportunity for bringing in cross-cultural, cross-disciplinary and personal perspectives on

this crisis which affected the personal lives of students and teachers in different corners of the world.

Our findings overall should not close our eyes to the fact that competence development is not an automatic outcome of VE. Several aspects of VE were rated negatively by students. VE is based on socio-constructivist principles where learning outcomes are achieved through learning from one another and through collective knowledge and competence development. In such a setting, student engagement and well-functioning group interaction and collaboration are the basis for a successful VE experience and effective learning. We found that students need to perceive VE as an opportunity for learning to reap the benefits.

Our research showed strong correlations between adequate organisation and task design on the one hand and students' appreciation, participation and engagement on the other. The same held true for the relationship between these aspects and the use of technology (ease-of-use, appropriateness and proper functioning). This foregrounds the role of the partner teachers as co-designers of the exchanges. This requires not only the appropriate skills and competences (for which VE is an excellent tool, as evidenced by the results for the teachers-in-training in our sample), but also a readiness to provide the support needed and an awareness of the critical dimensions of time (allowing enough time, setting clear deadlines, negotiation time differences) in developing VE as a tool for learning. Other factors of importance are finding a balance between task-orientation and informal interaction and between students' own and their partners' participation; purposeful integration of VE within the course; and promoting student engagement and building interpersonal relationships (when others are considered as "people who matter" (Belz, 2002) as a basis for fruitful teamwork.

Task selection and tool choice have also been shown to be highly important for facilitating the desired learning outcomes. In this respect, the use of video came out from each of the substudies as highly impactful for creating personal relationship building, avoiding misunderstanding, and allowing for fluid communication. These are preconditions for social and cognitive engagement. At the same time, however, synchronous videoconferencing emerged as the most vulnerable tool in terms of connectivity. So the recommendation was made to combine synchronous and asynchronous video and use it in combination with text-based media for maximum efficacy and appreciation.

The limitations of our study were acknowledged from the start. The VEs studied were situated in the context of intact courses at the participating institutions. Although this greatly enhanced the ecological validity of the study, it limited the options for an experimental design by using control groups as in the EVALUATE project (The EVALUATE Group, 2019). In addition, the disciplines brought together in our sample cannot be regarded as fully representative of Higher Education subjects and courses. This was a consequence of the open recruitment procedures and the sometimes inflexible academic programme structures in which we sought to embed the VEs. Finally, there are obvious limitations to using students' self-reported perceptions as an instrument in our study.

Nevertheless, we believe that our research points to interesting directions for developing our work in the future. Comparison of the quantitative versus the qualitative outcomes in some of the competence areas which we have studied has suggested a degree of variability between the exchanges and inside the exchanges (e.g. with regard to the language levels of the respective partners) which the present study has only partly addressed. Within the constraints of the current study, we have not been able to unravel the differences and correspondences between individual



exchanges or between participants in the exchanges which are suggested by our data and which are fully understandable given the variability in duration, teacher experience and other potentially determinant factors in our VEs. These could be studied further through follow-up statistical analyses or detailed case studies looking at the qualitative data from the perspective of individual exchanges or students.

We also believe that the findings obtained in our study could be validated against research on future exchanges, facilitated by the instruments which we have developed for the EVOLVE project. To this end, we have shared our research instruments through the EVOLVE website so that other researchers may use them, in a new range of settings and disciplines. We are also looking into making the research data obtained for the current study available as open data for the VE research community at large. We hope that these efforts will help us mainstream VE as educational practice in Higher Education as intended by the EVOLVE project's objectives.

References

- Abruquah, E. (2019). Global virtual teams (GVT) for business students. *TAMK conference 2019, Tampere University of Applied Sciences*, pp 54-60. <http://urn.fi/URN:NBN:fi-fe202003047171>
- Akiyama, Y. (2017). Vicious vs. virtuous cycles of turn negotiation in American-Japanese telecollaboration: is silence a virtue?. *Language and Intercultural Communication*, 17(2), 190-209. <http://dx.doi.org/10.1080/14708477.2016.1277231>
- Albá Duran, J.; Oggel, G.; Espejel Nonell, O. & Pujolà Font, J. T. (2020). *Success factors of a Telecollaboration project in the context of Second Language Teaching and Learning*. *Culture Crossroads*, 15, 31-60. [http://www.culturecrossroads.lv/\[...\]26-53.pdf?1602878632](http://www.culturecrossroads.lv/[...]26-53.pdf?1602878632)
- Anderson, L. & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Bassani, P. & Buchem, I. (2019). Virtual exchanges in higher education: developing intercultural skills of students across borders through online collaboration. *RIITE. Revista Interuniversitaria de Investigación en Tecnología Educativa*, 6, 22-36. <http://dx.doi.org/10.6018/riite.377771>
- Beelen, J. & Jones, E. (2015). Redefining Internationalization at Home. In: Curaj, A.; Matei, L.; Pricopie, R.; Salmi, J. & Scott, P. (Eds.). *The European Higher Education Area*. Springer. https://doi.org/10.1007/978-3-319-20877-0_5
- Belz, J. A., & Kinginger, C. (2003). Discourse Options and the Development of Pragmatic Competence by Classroom Learners of German: The Case of Address Forms: Language Learning. *Language Learning*, 53(4), 591-647. <https://doi.org/10.1046/j.1467-9922.2003.00238.x>
- Belz, J., & Kinginger, C. (2006). The Cross-linguistic Development of Address Form Use in Telecollaborative Language Learning: Two Case Studies. *Canadian Modern Language Review*. <https://doi.org/10.3138/cmlr.59.2.189>
- Belz, J. A. & Vyatkina, N. (2008). The pedagogical mediation of a developmental learner corpus for classroom-based language instruction. *Language Learning & Technology*, 12(3), 33-52. <http://dx.doi.org/10125/44154>
- Bloom, B. (Ed.). (1956). *Taxonomy of educational objectives, The classification of educational goals, Handbook 1: Cognitive domain*. David McKay.
- Bolderman, L.; Groote, P. D.; Hague, E.; Boode, H.; Timmer, J. & Jager, S. (2020). Implementing a cross-course design for online international exchange in geography courses. *Journal of Virtual Exchange*, 3, 59-72.
- Brown, J.D., & Coombe, C. (2015, eds). *Research in Language Teaching and Learning*. Cambridge University Press.
- Byram, M. (1997). Teaching and assessing intercultural communicative competence. *Multilingual Matters*.
- Catroux, M. (2018). *Méthodologie de la recherche en didactique des langues: les étapes clés d'un travail de recherche, avec extraits de mémoires de master*. Ellipses.



- Çiftçi, E. Y., & Savaş, P. (2018). The role of telecollaboration in language and intercultural learning : A synthesis of studies published between 2010 and 2015. *ReCALL : The Journal of EUROCALL*, 30(3), 278-298. <https://doi.org/10.1017/S0958344017000313>
- Council of Europe. (2001). *Common European framework of reference for languages: learning, teaching*. <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680459f97>
- Council of Europe (2016). *Competences for democratic culture – Living together as equals in culturally diverse democratic societies*. <https://rm.coe.int/16806ccc07>
- Council of Europe. (2018). *Common European framework of reference for languages: learning, teaching, assessment companion volume with new descriptors*. <https://rm.coe.int/cefr-companion-volume-with-new-descriptors-2018/1680787989>
- Darvin, R. (2017). Language, Ideology, and Critical Digital Literacy. In S. Thorne, & S. May (Eds.), *Language, Education and Technology. Encyclopaedia of Language and Education* (3rd ed.). Springer.
- De Wit, H. (2016): Internationalisation and the role of online intercultural exchange. In: R. O'Dowd & T. Lewis (Eds.): *Online intercultural exchange: Policy, pedagogy, practice*. Routledge, 192-208.
- Deardorff, D. K. (2004). The identification and assessment of intercultural competence as a student outcome of internationalization at institutions of higher education in the United States. Unpublished doctoral dissertation, North Carolina State University.
- Dewaele, J.-M., & MacIntyre, P. D. (2014). The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Studies in Second Language Learning and Teaching*, 4(2), 237–274.
- Dooly, M. (2016). Please Remove Your Avatar From My Personal Space. In R. O'Dowd & T. Lewis (Éds.), *Online intercultural exchange : Policy, pedagogy, practice*. Routledge, 192-208.
- Dooly, M. (2017). Telecollaboration. In *The Handbook of Technology and Second Language Teaching and Learning* (p. 169-183). John Wiley & Sons, Ltd.
- Dörnyei, Z., & Ryan, S. (2015). *The Psychology of the Language Learner Revisited*. Routledge, Taylor & Francis Group.
- European Commission. (2019). ESCO handbook. European Classification of Skills/Competences, Qualifications and Occupations. <https://ec.europa.eu/esco/portal/document/en/0a89839c-098d-4e34-846c-54cbd5684d24>
- European Union. (2006). *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning* (2006/962/EC). <http://keyconet.eun.org/eu-policy>
- Fondo, M. & Withanachchi, S. (2019). Crossing Borders in Business and Economics Classrooms: Implementing Telecollaboration to Advance Diversity and 21st Century Skills. *Proceedings of*

- the International Association for Business and Society*, vol. 30, 2019, pp. 110-119.
<https://doi.org/10.5840/iabsproc20193013>
- Fuchs, C., Hauck, M., & Müller-Hartmann, A. (2012). Promoting learner autonomy through multiliteracy skills development in cross-institutional exchanges. *Language Learning & Technology*, 16(3), 82–102. <http://dx.doi.org/10125/44301>
- Hauck, M. (2019). Virtual Exchange for (critical) digital literacies skills development. *European Journal of Language Policy*, 11(2), 187-210.
- Helm, F. (2013). A Dialogic Model for Telecollaboration. *Bellaterra Journal of Teaching & Learning Language & Literature*. 6. 28-48.
- Helm, F. (2014). Developing digital literacies through virtual exchange. *Elearning Papers*, 38. 1–10.
- Helm, F. (2015). The practices and challenges of telecollaboration in Higher Education in Europe, *Language Learning & Technology* (19)2, pp. 197–217.
<http://ilt.msu.edu/issues/june2015/helm.pdf>
- Helm, F. (2019). Languages and international virtual exchange. *EJLP* 11(2), 139-142.
- Helm, F. & Guth, S. (2012). Open Intercultural Dialogue: educator perspectives. *Journal of E-Learning and Knowledge Society*, 8. 129-139.
- Helm, F. & Van der Velden, B. (2019). *Erasmus+ Virtual Exchange Impact Report 2018*. Publications Office of the EU. <https://op.europa.eu/s/ovdj>
- Helm, F. & Van der Velden, B. (2020). *Erasmus+ Virtual Exchange Impact Report 2019*. Publications Office of the EU. <https://op.europa.eu/s/ovdk>
- Horwitz, E. K. (2010). Foreign and second language anxiety. *Language Teaching*, 43, 154–167.
- Jackson, J. (2019). *Online Intercultural Education and Study Abroad*. Routledge.
- Jager, S., Nissen, E., Helm, F., Baroni, A., & Rousset, I. (2019). *Virtual Exchange as Innovative Practice across Europe: Awareness and Use in Higher Education. EVOLVE Project Baseline Study*.
<http://hdl.handle.net/11370/de9b9f72-b11b-4f28-9a17-eea6b76c62c4>
- Klein, P. & Solem, M. (2008) Evaluating the Impact of International Collaboration on Geography Learning, *Journal of Geography in Higher Education*, 32:2, 245-267,
<https://www.tandfonline.com/doi/abs/10.1080/03098260701728500>
- Kramersch, C. (2009). *The multilingual subject*. Oxford University Press.
- Krishnan, A. (2009). What Are Academic Disciplines? Some Observations on the Disciplinarity vs. Interdisciplinarity Debate. NCRM Working Paper. National Centre for Research Methods.
<http://eprints.ncrm.ac.uk/783/>
- Lewis, T., & O'Dowd, R. (2016). Online intercultural exchange and foreign language learning: A systematic review. In R. O'Dowd and T. Lewis (Eds.), *Online intercultural exchange: Policy, pedagogy, practice* (pp. 21-66). Routledge.
- Kurek, M., & Hauck, M. (2014). Closing the “digital divide” - a framework for multiliteracy training. In G. Pettes Guikema & L. Williams (Eds.), *Digital Literacies in Foreign and Second Language Education: Research, perspectives, and best practice* (pp. 119–140). CALICO.
- Kurek, M., & Müller-Hartmann, A. (2019). The formative role of teaching presence in blended Virtual Exchange. *Language Learning & Technology*, 23(3), 52–73.
<http://hdl.handle.net/10125/44696>



- Magnier-Watanabe, R., Watanabe, Y., Aba, O. & Herrig, H. (2017). Global virtual teams' education: experiential learning in the classroom, *On the Horizon*, Vol. 25 No. 4, pp. 267-285. <https://doi.org/10.1108/OTH-02-2017-0007>
- Mircioiu, C., & Atkinson, J. (2017). A Comparison of Parametric and Non-Parametric Methods Applied to a Likert Scale, *Pharmacy*, 5(2). <https://doi.org/10.3390/pharmacy5020026>
- Moore, M. G. (1993). Theory of transactional distance: the evolution of theory of distance education, in Keegan, D. (ed.), *Theoretical Principles of Distance Education*. Routledge, pp. 22-38.
- Morris, J.M. (2017). Critical Pedagogy and Design. Retrieved from: <https://www.seanmichaelmorris.com/critical-digital-pedagogy-and-design>
- Muller, C. (2015). Des échanges interculturels à distance : oui, mais quelle vision de l'interculturel ?. In A. Potolia & D. Lemay (eds.) *Enseignement/apprentissage des langues et pratiques numériques émergentes*, Paris: Éditions des archives contemporaines, 113-125.
- Muller, C. (2013). Culturalisation des apprenants par les tuteurs dans des échanges interculturels en ligne. In F. Dervin (ed.) *Le concept de culture - Comprendre et maîtriser ses détournements et manipulations*. L'Harmattan, 95-119.
- O'Dowd, R. (2018). From telecollaboration to virtual exchange: state-of-the-art and the role of UNICollaboration in moving forward. *Journal of Virtual Exchange*, 1, 1-23, <https://doi.org/10.14705/rpnet.2018.jve.1>
- 110 O'Dowd, R. (2016). Emerging trends and new directions in telecollaborative learning. *CALICO Journal*, 33(3), 291-310. <https://doi.org/10.1558/cj.v33i3.30747>
- O'Dowd, R. & Ritter, M. (2006). Understanding and working with 'failed communication' in telecollaborative exchanges, *CALICO Journal*, 23 (3), 623-642.
- O'Dowd, R., Sauro, S., & Spector-Cohen, E. (2020). The Role of Pedagogical Mentoring in Virtual Exchange. *TESOL Quarterly*, 54(1), 146-172.
- O'Dowd, R. & Ware, P. (2009). Critical issues in telecollaborative task design. *Computer Assisted Language Learning*, 22(2), 173-188.
- Popescu, F. & Warmenhoven, R. (2020). Global Virtual Teams Course at Arnhem Business School. In: Ahram, T. (eds) *Advances in Human Factors in Wearable Technologies and Game Design. AHFE 2019. Advances in Intelligent Systems and Computing*, vol 973. Springer. https://doi.org/10.1007/978-3-030-20476-1_34
- Ray, W. & Solem, M. (2009). Gauging Disciplinary Engagement with Internationalization: A Survey of Geographers in the United States, *Journal of Geography in Higher Education*, 33:1, 103-121, <https://doi.org/10.1080/03098260802276425>
- Saldana, J. (2013). *The coding manual for qualitative researchers* (2nd edition). Sage Publications.
- Sauro, S. (2013). The cyber language exchange: Cross-national computer-mediated interaction. In A. Mackey & K. McDonough (Eds.). *New perspectives in classroom interaction in second language research*, (pp. 129-146). John Benjamins.
- Spencer-Oatey, H. & Stadler, S. (2009). *The global people competency framework: Competencies for effective intercultural interaction*. Warwick occasional papers in Applied Linguistics #3. Warwick: The Centre for Applied Linguistics, University of Warwick. www.globalpeople.org.uk

- Stevens Initiative (2019). *Virtual Exchange Impact and Learning Report*. <https://www.stevensinitiative.org/resource/virtual-exchange-impact-and-learning-report/>.
- Suárez García, J. & Crapotta, J. 2007. Models of telecollaboration (2) : Cultura. In O'Dowd, R. (ed.). *Online Intercultural Exchange. An Introduction for Foreign Language Teachers*. Multilingual Matters, 62-84.
- The EVALUATE Group. (2019). *Evaluating the impact of virtual exchange on initial teacher education: a European policy experiment*. Research-publishing.net. <https://doi.org/10.14705/rpnet.2019.29.9782490057337>
- UNESCO Institute for Statistics (UIS). (2014) ISCED Fields of Education and Training 2013 (ISCED-F 2013). <https://eqe.ge/res/docs/228085e.pdf>
- UNESCO International Bureau of Education (IBE). (2013). IBE Glossary of Curriculum Terminology. <https://unevoc.unesco.org/home/TVETipedia+Glossary/filt=all/id=577>
- United Nations. (n.d.). *Take Action for the Sustainable Development Goals*. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- Vinagre, M. & Muñoz, B. (2011). Computer-mediated corrective feedback and language accuracy in telecollaborative exchanges. *Language Learning & Technology*, (15)1, 72–103. <http://dx.doi.org/10125/44238>
- Ware, P. (2013). Teaching comments: Intercultural communication skills in the digital age. *Intercultural Education*, 24, 315– 326. <https://doi.org/10.1080/14675986.2013.809249>
- Ware, P. & Kramsch, C. (2005). Toward an intercultural stance: Teaching German and English through telecollaboration. *Modern Language Journal*, 89, 190–205.
- Wu, A., Noël, G. P. J. C., Wingate, R., Kielstein, H., Sakurai, T., Viranta-Kovanen, S., ... Bernd, P. (2020). An International Partnership of 12 Anatomy Departments – Improving Global Health through Internationalization of Medical Education. *Annals of Global Health*, 86(1), 27. <http://doi.org/10.5334/aogh.2665>
- Zhang, Y., & Wildemuth, B. M. (2009). Qualitative analysis of content. In B. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 308–319). Libraries Unlimited.



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Appendix A: List of research Instruments

The following instruments were used to obtain the quantitative and qualitative results of our study:

- Student Presurvey
- Student Postsurvey
- Student Portfolio
- Semi-structured student interview questions
- VE Information Gathering sheets

Copies of these instruments are available from the EVOLVE Project website: <https://evolve-erasmus.eu/research-resources/>

Appendix B: Items and results for statistical analysis

Survey item variables and descriptions

Table 20: List of variables and descriptions used in pre- and post-surveys

Variable	Description
PRE-INTR-Q2	User ID
PRE-INTR-Q3	Please select your nationality. You can select a second nationality by holding down the CTRL key and click on the second item of your choice.
PRE-INTR-Q4	Please select your mother tongue. You can select a second language by holding down the CTRL key and click on the second item of your choice.
PRE-INTR-Q5	Please select your gender:
PRE-INTR-Q6	Personal learning objectives What do you hope to get out of or learn from this Virtual Exchange?
PRE-CORE-Q1_1	1. I am able to work in teams and solve problems collaboratively.
POST-CORE-Q1_1	
PRE-CORE-Q1_2	2. I am able to take initiatives when working with others.
POST-CORE-Q1_2	
PRE-CORE-Q1_3	3. I am able to reflect critically on my or others' work.
POST-CORE-Q1_3	
PRE-CORE-Q1_4	4. I am able to communicate effectively through online tools.
POST-CORE-Q1_4	
PRE-CORE-Q1_5	5. I find it is easy to talk with people from different cultures.
POST-CORE-Q1_5	
PRE-CORE-Q1_6	6. I am able to express my ideas clearly when interacting with people from different cultures.
POST-CORE-Q1_6	
PRE-CORE-Q1_7	7. I have the confidence to communicate or work in a culturally diverse setting.
POST-CORE-Q1_7	
PRE-CORE-Q1_8	8. I am able to understand the perspectives and world views of others.
POST-CORE-Q1_8	
PRE-CORE-Q1_9	9. I am able to engage in open, appropriate and effective interactions with people from different cultures
POST-CORE-Q1_9	
PRE-CORE-Q1_10	10. I am able to select digital technologies to suit my communicative purpose online with consideration of how their use may impact on others.
POST-CORE-Q1_10	
PRE-CORE-Q1_11	11. I am competent in the knowledge and skills identified by the course objectives.
POST-CORE-Q1_11	
PRE-CORE-Q1_12	12. I am able to communicate adequately in the language of the Virtual Exchange.
POST-CORE-Q1_12	
POST-CORE-Q2	How has the project helped you to gain knowledge and/or develop skills which are essential within your discipline? Please give examples.
POST-CORE-Q3_1	1. I participated actively in the Virtual Exchange (eg. by regularly posting messages)

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Variable	Description
POST-CORE-Q3_2	2. I was actively engaged in the Virtual Exchange (eg. by regularly reading the others' contributions, by feeling concerned/ involved, etc.)
POST-CORE-Q3_3	3. My partners participated actively in the Virtual Exchange
POST-CORE-Q3_4	4. I felt comfortable interacting with my partners (my opinion was taken into account, it was possible to express disagreement while still having a sense of trust)
POST-CORE-Q3_5	5. I built positive/meaningful relationships with one or several partners by participating in this Virtual Exchange
POST-CORE-Q4	How many times a week approximately did you communicate with your international partners? (please enter a numerical value)
POST-CORE-Q5	How many hours in total, approximately, did you spend interacting with your international partners?(please enter a numerical value)
POST-CORE-Q6	You may use the space below to comment on your and your partners' participation in the Virtual Exchange:
POST-CORE-Q7_1	1. The Virtual Exchange tasks met the learning objectives of my course
POST-CORE-Q7_2	2. The Virtual Exchange tasks met my personal learning objectives
POST-CORE-Q7_3	3. The tasks and Virtual Exchange instructions were clear and easy to understand
POST-CORE-Q7_4	4. The due dates and time frames for Virtual Exchange activities were indicated clearly
POST-CORE-Q7_5	5. The Virtual Exchange offered a learning experience that would not have been possible otherwise
POST-CORE-Q7_6	6. The level of difficulty of the tasks was appropriate for the course
POST-CORE-Q7_7	7. The Virtual Exchange was well integrated into the course (e.g. through guiding activities, time dedicated to discussing the Virtual Exchange)
POST-CORE-Q7_8	8. My teacher / the moderator provided appropriate support when necessary
POST-CORE-Q7_9	9. Overall, the Virtual Exchange was well organised
POST-CORE-Q8	You may use the space below to comment on the design and organisation of the VE:
POST-CORE-Q9_1	1. Did you use video-conferencing tools for the Virtual Exchange (e.g. Skype, Zoom)?
POST-CORE-Q9_2	2. Did you use quasi-synchronous group discussion tools (e.g. Messenger, Whatsapp) for the Virtual Exchange?
POST-CORE-Q10_1	1. The technology I used for the Virtual Exchange worked well
POST-CORE-Q10_2	2. The tools were easy to use
POST-CORE-Q10_3	3. In my eyes, these tools were appropriate for the Virtual Exchange tasks
POST-CORE-Q11	You may use the space below to comment on the technology of the VE:
POST-CORE-Q12	Overall, I appreciated participating in this Virtual Exchange
POST-CORE-Q13	Please explain:
POST-CORE-Q14_1	1. The Virtual Exchange should be continued in the future in this course
POST-CORE-Q14_2	2. I am interested in having further opportunities to engage in dialogue through Virtual Exchange
POST-CORE-Q14_3	3. Participating in this Virtual Exchange increased my interest in physical mobility
POST-CORE-Q15	What did you like best in this Virtual Exchange?
POST-CORE-Q16	What did you like the least in this Virtual Exchange?
POST-CORE-Q17	Please write any other comments or suggestions you have regarding the Virtual Exchange.
PRE-INTER-Q1_1	1. I am interested in learning about people's beliefs, values, traditions and world views
POST-INTER-Q1_1	
PRE-INTER-Q1_2	2. When interacting with people from other cultures, I can notice how speakers of other languages express politeness in different ways.



Variable	Description
POST-INTER-Q1_2	
PRE-INTER-Q1_3	3. I can understand how my own beliefs, world views and practices influence the way I communicate.
POST-INTER-Q1_3	
PRE-INTER-Q1_4	4. I can function in intercultural exchanges by translating, interpreting or explaining.
POST-INTER-Q1_4	
PRE-INTER-Q1_5	5. When a disagreement appears in the communication, I try to understand my conversation partner.
POST-INTER-Q1_5	
PRE-INTER-Q1_6	6. When interacting with people from other cultures, I can understand other people's feelings and concerns.
POST-INTER-Q1_6	
POST-INTER-Q2	1. Intercultural Competence Experience One
POST-INTER-Q3	2. Intercultural Competence Experience Two
PRE-CRIT-Q1_1	1. I am able to use digital tools and services such as chat forums/WhatsApp, conferencing applications (e.g. Skype or Zoom), multimedia messaging applications (e.g. Instagram, A2000)
POST-CRIT-Q1_1	
PRE-CRIT-Q1_2	2. I am able to support others in establishing and maintaining their online presence in similar ways (see previous question).
POST-CRIT-Q1_3	
PRE-CRIT-Q1_3	3. I am able to explain how different digital modes of interaction (written, oral, visual) may impact how communication plays out and how we perceive others online.
POST-CRIT-Q1_4	
PRE-CRIT-Q1_4	4. I am able to select and use digital tools and applications that are appropriate for my communication purposes and the communication context. Examples: using a private chat F4000
POST-CRIT-Q1_5	
PRE-CRIT-Q1_5	5. I can recognize the potential bias in online information and communication through different media. Example: choice of images and/or audio and/or text to convey a message.
POST-CRIT-Q1_6	
PRE-CRIT-Q1_6	6. I am able to critically evaluate online resources (e.g. websites, wikis, blogs, vlogs, hashtags, etc.).
POST-CRIT-Q1_7	
PRE-CRIT-Q1_7	7. I am able to curate and create online resources in order to communicate with a wider audience.
POST-CRIT-Q1_8	
PRE-LANG-Q1_1	1. My language ability allows me to communicate in most contexts and I don't feel restricted in what I want to say or to understand what people are saying or writing
POST-LANG-Q1_1	
PRE-LANG-Q1_2	2. I have a good command of vocabulary and can easily formulate my ideas or understand my partners.
POST-LANG-Q1_2	
PRE-LANG-Q1_3	3. I can use the precise words needed to communicate specific meaning or to express the exact meaning of what I want to say.
POST-LANG-Q1_3	
PRE-LANG-Q1_4	4. I feel comfortable in plurilingual communicative situations. I can adapt my language accordingly or help to facilitate communication in a group.
POST-LANG-Q1_4	
PRE-LANG-Q1_5	5. I can participate actively in conversations or discussions and interact easily with other people.
POST-LANG-Q1_5	
PRE-LANG-Q1_6	6. I can write about complex ideas, presenting my arguments in a structured way and giving examples.
POST-LANG-Q1_6	
PRE-LANG-Q1_7	7. I can actively participate in a collaborative work with partners and decide with them upon the organisation of the task.
POST-LANG-Q1_7	

Variable	Description
PRE-LANG-Q1_8	8. When I talk, I can express myself fluently and with spontaneity and I am usually comfortable talking with people.
POST-LANG-Q1_8	
PRE-LANG-Q1_9	9. I am able to formulate correct sentences, to use grammatical features or to identify errors made by my partners or peers.
POST-LANG-Q1_9	
POST-LANG-Q2	1. Language Competence Experience One
POST-LANG-Q3	2. Language Competence Experience Two

Descriptive statistics pre- and post-test items

Table 21: Descriptive statistics pre- and post-survey items used in paired t-tests

Pair	Variables	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE-CORE-Q1_1	4.30	245	.652	.042
	POST-CORE-Q1_1	4.31	245	.642	.041
Pair 2	PRE-CORE-Q1_2	4.11	245	.716	.046
	POST-CORE-Q1_2	4.27	245	.732	.047
Pair 3	PRE-CORE-Q1_3	4.13	245	.627	.040
	POST-CORE-Q1_3	4.21	245	.679	.043
Pair 4	PRE-CORE-Q1_4	3.97	245	.746	.048
	POST-CORE-Q1_4	4.15	245	.728	.047
Pair 5	PRE-CORE-Q1_5	3.75	245	.972	.062
	POST-CORE-Q1_5	3.96	245	.936	.060
Pair 6	PRE-CORE-Q1_6	3.67	245	.794	.051
	POST-CORE-Q1_6	3.93	245	.771	.049
Pair 7	PRE-CORE-Q1_7	3.86	245	.890	.057
	POST-CORE-Q1_7	4.03	245	.863	.055
Pair 8	PRE-CORE-Q1_8	4.24	245	.657	.042
	POST-CORE-Q1_8	4.25	245	.683	.044
Pair 9	PRE-CORE-Q1_9	4.13	245	.716	.046
	POST-CORE-Q1_9	4.26	245	.668	.043
Pair 10	PRE-CORE-Q1_10	3.85	245	.786	.050
	POST-CORE-Q1_10	4.09	245	.747	.048
Pair 11	PRE-CORE-Q1_11	3.77	245	.695	.044
	POST-CORE-Q1_11	4.04	245	.715	.046
Pair 12	PRE-CORE-Q1_12	3.90	245	.821	.052
	POST-CORE-Q1_12	4.15	245	.827	.053
Pair 13	PRE-INTER-Q1_1	4.65	229	.683	.045
	POST-INTER-Q1_1	4.56	229	.773	.051
Pair 14	PRE-INTER-Q1_2	4.29	224	.735	.049
	POST-INTER-Q1_2	4.35	224	.772	.052
Pair 15	PRE-INTER-Q1_3	4.29	222	.754	.051
	POST-INTER-Q1_3	4.40	222	.728	.049



Pair	Variables	Mean	N	Std. Deviation	Std. Error Mean
Pair 16	PRE-INTER-Q1_4	4.08	223	.840	.056
	POST-INTER-Q1_4	4.28	223	.802	.054
Pair 17	PRE-INTER-Q1_5	4.31	229	.699	.046
	POST-INTER-Q1_5	4.41	229	.686	.045
Pair 18	PRE-INTER-Q1_6	4.18	211	.786	.054
	POST-INTER-Q1_6	4.20	211	.780	.054
Pair 19	PRE-CRIT-Q1_1	4.35	233	.758	.050
	POST-CRIT-Q1_1	4.55	233	.662	.043
Pair 20	PRE-CRIT-Q1_2	4.01	218	.803	.054
	POST-CRIT-Q1_3	4.11	218	.712	.048
Pair 21	PRE-CRIT-Q1_3	4.04	212	.756	.052
	POST-CRIT-Q1_4	4.23	212	.701	.048
Pair 22	PRE-CRIT-Q1_4	4.15	221	.763	.051
	POST-CRIT-Q1_5	4.28	221	.728	.049
Pair 23	PRE-CRIT-Q1_5	4.07	216	.737	.050
	POST-CRIT-Q1_6	4.27	216	.717	.049
Pair 24	PRE-CRIT-Q1_6	4.04	226	.796	.053
	POST-CRIT-Q1_7	4.26	226	.690	.046
Pair 25	PRE-CRIT-Q1_7	3.61	206	.919	.064
	POST-CRIT-Q1_8	4.10	206	.735	.051
Pair 26	PRE-LANG-Q1_1	3.84	228	.973	.064
	POST-LANG-Q1_1	4.08	228	.879	.058
Pair 27	PRE-LANG-Q1_2	3.80	231	.916	.060
	POST-LANG-Q1_2	3.92	231	.912	.060
Pair 28	PRE-LANG-Q1_3	3.60	226	.910	.061
	POST-LANG-Q1_3	3.79	226	.966	.064
Pair 29	PRE-LANG-Q1_4	3.86	224	.880	.059
	POST-LANG-Q1_4	3.92	224	.941	.063
Pair 30	PRE-LANG-Q1_5	3.83	231	.926	.061
	POST-LANG-Q1_5	4.03	231	.899	.059
Pair 31	PRE-LANG-Q1_6	3.84	232	.903	.059
	POST-LANG-Q1_6	4.04	232	.852	.056
Pair 32	PRE-LANG-Q1_7	3.96	235	.802	.052
	POST-LANG-Q1_7	4.15	235	.735	.048
Pair 33	PRE-LANG-Q1_8	3.63	232	.980	.064
	POST-LANG-Q1_8	3.80	232	1.031	.068
Pair 34	PRE-LANG-Q1_9	3.79	229	.892	.059
	POST-LANG-Q1_9	3.96	229	.907	.060

T-Test results














Table 22: Paired Samples T-Test Results

Paired Samples T-Test									
Pair	Variables	Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	PRE-CORE-Q1_1 - POST-CORE-Q1_1	-.008	.768	.049	-.105	.089	-.166	244	.868
Pair 2	PRE-CORE-Q1_2 - POST-CORE-Q1_2	-.167	.741	.047	-.261	-.074	-3.533	244	.000
Pair 3	PRE-CORE-Q1_3 - POST-CORE-Q1_3	-.078	.798	.051	-.178	.023	-1.520	244	.130
Pair 4	PRE-CORE-Q1_4 - POST-CORE-Q1_4	-.184	.822	.052	-.287	-.080	-3.499	244	.001
Pair 5	PRE-CORE-Q1_5 - POST-CORE-Q1_5	-.212	.947	.061	-.331	-.093	-3.507	244	.001
Pair 6	PRE-CORE-Q1_6 - POST-CORE-Q1_6	-.261	.862	.055	-.370	-.153	-4.744	244	.000
Pair 7	PRE-CORE-Q1_7 - POST-CORE-Q1_7	-.171	.866	.055	-.280	-.063	-3.100	244	.002
Pair 8	PRE-CORE-Q1_8 - POST-CORE-Q1_8	-.004	.766	.049	-.100	.092	-.083	244	.934
Pair 9	PRE-CORE-Q1_9 - POST-CORE-Q1_9	-.131	.819	.052	-.234	-.027	-2.495	244	.013
Pair 10	PRE-CORE-Q1_10 - POST-CORE-Q1_10	-.237	.821	.052	-.340	-.133	-4.516	244	.000
Pair 11	PRE-CORE-Q1_11 - POST-CORE-Q1_11	-.269	.835	.053	-.374	-.164	-5.048	244	.000
Pair 12	PRE-CORE-Q1_12 - POST-CORE-Q1_12	-.249	.819	.052	-.352	-.146	-4.756	244	.000
Pair 13	PRE-INTER-Q1_1 - POST-INTER-Q1_1	.083	.872	.058	-.031	.197	1.440	228	.151
Pair 14	PRE-INTER-Q1_2 - POST-INTER-Q1_2	-.054	.992	.066	-.184	.077	-.808	223	.420
Pair 15	PRE-INTER-Q1_3 - POST-INTER-Q1_3	-.108	.945	.063	-.233	.017	-1.704	221	.090
Pair 16	PRE-INTER-Q1_4 - POST-INTER-Q1_4	-.197	.962	.064	-.324	-.070	-3.064	222	.002
Pair 17	PRE-INTER-Q1_5 - POST-INTER-Q1_5	-.096	.898	.059	-.213	.021	-1.619	228	.107
Pair 18	PRE-INTER-Q1_6 - POST-INTER-Q1_6	-.014	.973	.067	-.146	.118	-.212	210	.832
Pair 19	PRE-CRIT-Q1_1 - POST-CRIT-Q1_1	-.193	.847	.055	-.302	-.084	-3.482	232	.001
Pair 20	PRE-CRIT-Q1_2 - POST-CRIT-Q1_3	-.106	.971	.066	-.235	.024	-1.604	217	.110
Pair 21	PRE-CRIT-Q1_3 - POST-CRIT-Q1_4	-.189	.935	.064	-.315	-.062	-2.938	211	.004
Pair 22	PRE-CRIT-Q1_4 - POST-CRIT-Q1_5	-.131	.861	.058	-.245	-.017	-2.265	220	.024
Pair 23	PRE-CRIT-Q1_5 - POST-CRIT-Q1_6	-.194	.862	.059	-.310	-.079	-3.314	215	.001
Pair 24	PRE-CRIT-Q1_6 - POST-CRIT-Q1_7	-.217	.875	.058	-.332	-.102	-3.724	225	.000
Pair 25	PRE-CRIT-Q1_7 - POST-CRIT-Q1_8	-.495	.909	.063	-.620	-.370	-7.816	205	.000
Pair 26	PRE-LANG-Q1_1 - POST-LANG-Q1_1	-.246	.915	.061	-.365	-.126	-4.051	227	.000
Pair 27	PRE-LANG-Q1_2 - POST-LANG-Q1_2	-.117	.923	.061	-.237	.003	-1.925	230	.055
Pair 28	PRE-LANG-Q1_3 - POST-LANG-Q1_3	-.186	.929	.062	-.308	-.064	-3.007	225	.003
Pair 29	PRE-LANG-Q1_4 - POST-LANG-Q1_4	-.054	.887	.059	-.170	.063	-.904	223	.367
Pair 30	PRE-LANG-Q1_5 - POST-LANG-Q1_5	-.199	.862	.057	-.311	-.087	-3.512	230	.001



Paired Samples T-Test									
Pair	Variables	Paired Differences			t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
		Mean	Std. Deviation	Std. Error Mean				Lower	Upper
Pair 31	PRE-LANG-Q1_6 - POST-LANG-Q1_6	-.198	.860	.056	-.310	-.087	-3.511	231	.001
Pair 32	PRE-LANG-Q1_7 - POST-LANG-Q1_7	-.191	.868	.057	-.303	-.080	-3.381	234	.001
Pair 33	PRE-LANG-Q1_8 - POST-LANG-Q1_8	-.164	1.044	.069	-.299	-.029	-2.390	231	.018
Pair 34	PRE-LANG-Q1_9 - POST-LANG-Q1_9	-.162	1.024	.068	-.295	-.028	-2.388	228	.018

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