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Combining virtual exchange with challenge-based learning: the experience of the "Virtual Environmental Challenge"

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Abstract

This practice report presents the use of Virtual Exchange (VE) (O'Dowd, 2018) and Challenge-Based Learning (CBL) (Gallagher & Savage, 2020) as a means to enhance an Internationalisation at Home (IaH) (Beelen & Jones, 2015) experiment. The present study focuses on the "Virtual Environmental Challenge" (VEC) which brought together 10 different universities from 7 different countries, in the context of an Erasmus+ project. Now in its third iteration, the VE is focusing on the VEC in tandem with Challenge-Based Learning. The CBL approach can be considered as Project-Based Learning (PBL) (Fleming, 2002) with the students in charge of defining their own project. Explaining the conceptual framework of CBL allowed for the transmission and communication of the complex elements of the VEC in an easy to understand format. This article reports back on the experience, feedback and learning experiences of the VEC in order to map out the future perspectives of the project. The contribution of this report is to ground CBL as a pedagogical new approach in the form of experiential learning (Kolb, 2015). This report also aims to inform practitioners about the value of VE, CBL, and IaH focused projects and the rewards these projects can bring.

Keywords: challenge-based learning, transferable skills, virtual exchange, pre-mobility exchange, interdisciplinary approach

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1.   Introduction

Virtual exchange (VE) is a term "used to refer to the engagement of groups of learners in online intercultural interactions and collaboration projects with partners from other cultural contexts or geographical locations as an integrated part of their educational programmes" (O'Dowd, 2018, p. 1). While VEs allow students to interact from a distance and work actively with peers, Challenge-Based Learning (CBL) also encourages students to work together in collaboration, but not necessarily from a distance. CBL involves a multidisciplinary perspective, including groupwork with teachers and stakeholders in society in order to identify complex challenges which are beneficial for sustainable development. Thus, these complex challenges imply formulating relevant questions and action for sustainable development which is the same premise which the "Virtual Environmental Challenge" (VEC) is built upon; although, originally, in a language education framework.

The VEC attempts to bring together CBL and VE to promote peer education across borders, through a cross-curricular perspective, whilst also considering the essential issues around sustainable development. This blending of methods creates ideal circumstances for Internationalisation at Home (IaH) initiatives as we will see later in this report. Additionally, we report on the experience, feedback and learning experiences of the VEC in order to map out the future perspectives of the VE project and its potential both in terms of IaH and CBL. This report should be of interest to all educators involved in the development of students' competencies in a classroom style module. It is also of interest to language teacher trainers and, indeed, language teachers who are interested in enhancing their VE projects with a focused and rich CBL methodology, which, in our own classrooms, has aided students to advance linguistically and also gain critical soft skills at the same time.

With the inclusion of the VEC's educational model in a Key Action 2 (KA2) Erasmus+ European project, our current emphasis is on strengthening the quality of IaH programmes and aligning the module with EU priorities such as diversity and inclusion, sustainability, civic engagement and digital literacy.

2.   Context

The VEC has been taking place since 2020 and involves a challenge, an international VE, students of different levels – high-school students, undergraduates, master's students – and teachers and lecturers from ten different universities and institutions.

Over the last 20 years, VE has integrated pedagogies in higher education, stimulated by various theoretical and philosophical schools of thought, and is gradually changing the landscape (O'Dowd, 2018, 2021). The context of the COVID-19 pandemic acted as an accelerating factor because of lockdown policies, and universities across the world embarked on a journey of rapid digitalization. In the COVID-19 context, in our own experience, some of the existing pedagogies are proving to be inadequate (King, 1993; Özüdoğru, 2021; Stracke et al., 2022), which leads pedagogues and practitioners to experiment with and apply new modes and methods of language education which involve VE and IaH.

IaH is defined as "the purposeful integration of international and intercultural dimensions into the formal and informal curriculum for all students within domestic learning environments" (Beelen & Jones, 2015, p. 69) and is increasingly becoming key in calls for higher education projects in Europe (for example, KA2 projects). Yet, taking their lead from Robson (2017), some universities argue that "if universities are to become truly 'international', they should start 'at home'" (p. 368) and it is with this desire that the VEC was created.

When creating the VEC, the ambition was to offer IaH in the context of a university experience during the COVID-19 lockdowns. It was also to set up an initiative which would allow students to learn about the campuses and courses of partner universities – thus, fostering pre-mobility and the desire to go abroad.

CBL is a methodology which comes under the umbrella of a structured, constructionist pedagogy which aids learners to learn through participating in a project. This educational approach is more widely understood as a project-based learning approach; however, CBL differs as students are free to choose their own problem or question to address.

CBL learning environments can show that "students perceive that they have developed deep skills in problem formulation and sustainable development, as well as working across disciplines and with different stakeholders" (Kohn Rådberg et al., 2018, p. 22).

> [CBL] follows a workflow that mirrors the 21st century workplace. Students are given enough space to be creative and self-directed and at the same time are provided with support, boundaries, and checkpoints to avoid frustration. (Nichols & Cator, 2008, p. 3)

Over the years, the VEC's participating students have developed sustainable ideas for their home campuses related to sustainable communities, while also improving their second language skills.

As previously mentioned, the main aim of this environmental challenge is to encourage the development of transferable skills, peer education in an international context – mainly in language teaching and learning and challenge-based projects – as well as addressing issues of sustainability.

The very theme of the VEC – in focusing on producing presentations promoting environmental projects – situates the VEC in the field of CBL. Indeed, CBL is a pedagogical approach that actively engages students in a situation that is real, relevant and related to their environment (Caratozzolo & Membrillo-Hernández, 2021). While not required in the VEC, many participating teams developed their project beyond the presentation phase: some students, for example, developed an indoor herb garden on their campus while others cleaned up local canals in their city.

The VEC allows CBL to take place through the identification, analysis and design of a solution to a sociotechnical problem that the participants choose for their teams. Also, the learning experience is typically multidisciplinary, in that it involves different stakeholder perspectives and aims to find a collaboratively developed solution, which is environmentally, socially and economically sustainable (Kohn Rådberg et al., 2018).

3.   Objective

The objective of the VEC was to develop an educational model to professionalise pre-service language teachers through gaining experience in working with language learners; at the same time, the VEC was a method for participant students to find new innovative ways to promote, connect and improve the sustainability of their home campus environments (Moore & Evain, 2023). With this in mind, the VEC challenge aims at cross-campus exploration of environmentally-friendly projects and the exchange of best practices through peer presentations in an international virtual class format. The project also promotes international peer tutoring using a virtual classroom platform. While the VEC contributes to the development of students' second language skills, digital literacy and inter-disciplinary project management skills, the combined benefits of the challenge are the opportunity to experience IaH through virtual exchanges, therefore, bringing the dimensions of an international, intercultural Erasmus experience to the home campus.

4. Project design

The VEC challenge is generally organised on a yearly basis. Having initially begun with an English language focus, in the second year of the challenge French was added. As part of the KA2 project, this challenge now offers English, French, German, Spanish, Slovak and additional versions of the VEC have offered French Sign Language and Greek. More languages have been attempted, such as a Mandarin language VEC. Working in teams of two to six or even eight participants, they are asked to develop a question related to a topic and form ideas relevant to their campuses. Across one semester, the participant teams create a team logo, produce a short three-minute video about their project and ideas, and they present their ideas in debates against opposing teams and a judging panel composed of teachers, lecturers, PhD students and Master's level students.

The participant teams' teachers, guides, and VEC hosts are students from a Master of Language Education programme, who initially take on the role of student "coaches" and "super-coaches". While the term "coach" was used in the first two years of the VEC project, the terms "teamcher" and "mentor" have now been adopted, as they better reflect the roles given to the teacher-in-training. Teamcher is a term that is currently being used in CBL (Gunnarsson & Swartz, 2021). Teamcher has been defined "as an individual that, either on their own or as a part of a team, arranges, leads and supports CBL activities" (Eldebo et al., 2022, p. 805).

For CBL to work, the teamcher is required to take on three main roles which are:

- Role 1: academic teacher
- Role 2: facilitator or coach
- Role 3: organiser.

Typically, those studying in master's programmes acted as teamchers, in that they combined the three above roles:

- They were in regular contact with the different teams for tutoring (role 1): As part of the "teaching" role 1, they delivered chapters from an Ecolinguistics MOOC[4] for the English language competition

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4.   https://www.storiesweliveby.org.uk/

and used a French language environment and sustainability YouTube channel[5] for the French language competition.

- They were involved in helping the participants to organise their VEC investigations and presentations (role 2): Indeed, the teamchers guided their teams with tasks from coming up with an idea, creating productions (logos, video trailers), to facing-off with competitor universities in a debate style elimination – both the interactions with the teamchers and competition steps were in either English or French.
- Finally, the teamchers took on additional tasks such as overall organisation of the competition, booking meeting slots and creating a system of groups of teamchers. They also provided feedback to the teacher coordinators from participating institutions and helped plan the competition organisation itself; they additionally hosted the semi-final and final competitions (role 3).

Mentors act as an educational support for the teamchers as they encounter the VEC for the first time. The mentors also act as a "go-between", between lecturers, teachers and the participant students, and they can also help as project assistants in the overall organisation of the VEC.

The interdisciplinary subjects the teams focused on related to different domains, one being Ecolinguistics, which was mainly for our language teachers-in-training – due to the influence of linguistics in the field – and the other included language related to the environment in order to understand and discuss global matters related to the UN's 2030 Agenda.[6] The students' progress in the subjects they chose to focus on will be presented in the next section.

5.   Evaluation and discussion

The presentation below provides insights into the students' development regarding the acquisition of transferable skills, competences, sustained motivation and group dynamics. Additionally, we aim to explore the ongoing interplay between the concepts of CBL, VE and IaH, building upon the established connections outlined at the beginning of this paper.

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5.   https://www.youtube.com/c/UVEDfr_UNT

6.   https://sdgs.un.org/2030agenda

5.1. VEC participants and teamchers

With each iteration of the VEC, we collected various types of data including recordings of sessions between teamchers and participant groups, and at the end of each VEC a questionnaire was sent out to all students. The questionnaires focused on aspects such as hours spent working on the project, group work and transferable skills, and in 2023 we added a section on professionalisation. This section provided more depth to the scope of the research where previously positive responses to gaining competencies could be linked to professionalisation, but with this round of the project the students were asked directly if they professionalised through the VEC. We previously reported on a sample, including nine teamchers and 22 participants (Moore & Evain, 2023) and we elaborate on this below in the appendices to include, in total, 34 teamchers (and six questions related to their professionalising experience), and 30 participants (with one question related to their experience). The data found that overall, 100% of the participants felt that it was a professionalising experience through developing language, digital skills, group work and presentation skills along with "brainstorming", the first step of the VEC-CBL cycle. 93.8% of the teamchers felt they had professionalised, the 6.2% "No" related to a student who did not agree with the "fun aspect of learning". The teamchers commented on a range of professionalising factors including teaching in another language, discovering teaching and distance teaching, project management, use of educational information and communication technology (which the teamcher notes are "transferable skills"), and teaching students with B1 and B2 language levels. 84.4% of the teamchers thought that they professionalised in other ways such as adapting, collaborating with peers, organisation, content creation and "project-related technical skills".

Table 5[7] examines the mentoring aspects within the project, involving teachers, researchers, and M2 students. The subsequent inquiry in Table 6 is directly tied to the data showcased in Table 5, addressing whether the mentoring experience has accelerated professionalisation compared to other university classes, with 59.4% responding affirmatively. Written responses elaborate on the application of newly acquired theoretical knowledge, assistance in project management, and comprehension of project objectives.

Of the 34 teachers surveyed, all but three assigned a 3-5 rating when assessing their team's confidence in their second language development through the challenge (refer to Figure 1). The concluding question in Table 7 presents responses regarding the impact of methodologies like Project-Based

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7. For this and subsequent tables and figures, see Appendix.

Learning and Challenge-Based Learning on personal learning experiences and those of participant teams/students, with 87.5% of teachers expressing agreement.

Reports underscore the positive aspects of these methodologies, such as facilitating authentic language learning, enriching teaching experiences, instilling confidence, and providing opportunities to connect language learning with societal concerns. Some reports stress the importance of collective commitment for reaping these benefits, citing instances of enhanced learning experiences through collaboration with fellow teachers. However, challenges in team communication were noted as hindrances to the learning experience for some participants. In other words, respondents acknowledged that such learning approaches actively involve them in the learning process, enabling the practical application of acquired knowledge and skills in real-world scenarios. These approaches were found to foster collaboration, critical thinking, and increase motivation and engagement (see Figure 1).

Participant students not only developed intercultural competences, but also enhanced their academic skills through challenge-based projects, particularly in specific disciplinary areas. The reported progress encompassed language acquisition, environmental awareness, proficiency in using digital tools for presentations and communication, remote and group work, building peer and teacher networks, proficiency in debate and public speaking in a foreign language, project management, stress management, adaptability, research, data collection, intercultural awareness and the production of deliverables. Master's students, specifically focusing on language teaching skills and competencies, achieved their goals and benefited from investigating various project aspects, including roles, workload, experience and additional learning environment needs (see Table 4). The VEC fosters a learning environment for transferable skills on two levels: for Language Education students and university students beyond the master's level (see Tables 5 and 6). The VEC serves as a platform for diverse student profiles to collaborate on common objectives, enabling each group to contribute their competences to language class projects. For instance, a team composed of spatial science students applied their expertise to create a "green roof" initiative, conducting research and sharing ideas within the larger international group.

5.2. The international level

For the high school and university partners involved in the initial iterations of the VEC, the VEC served a dual purpose during the COVID-19 lockdown of offering continued teaching and training to the students involved in the challenge and also of adhering to requirements the home university had set itself in relation to IaH policies. As the questionnaire indicates, the use of digital technologies resulted in an increase in digital competences. Our institution initially encouraged accrediting VEC

participants with 3 ECTS; in the KA2 the 3 ECTS is a priority for the consortium. The results of the questionnaire indicate that several students, from partner universities, expressed the desire to embark on a mobility program following the initial pilot. For the first time, students from the previously indicated institution and country were integrated into our master's teacher training program. These were not students who had previously participated in the VEC, but students who had heard of our university through the VEC.

While the primary objective of the VEC was to achieve specific objectives in terms of IaH, VE and student mobility, the VEC project in retrospect echoed the criteria of the CBL approach (Gallagher & Savage, 2020; Leijon et al., 2021) itself, which was a further dimension and finding of this approach. The attributes of CBL include:

1. Learning is student-centred;
2. Learning takes place in smaller groups (versus traditional classrooms);
3. Teamchers are coaches and facilitators;
4. Challenges provide the organisational focus and stimulus for learning;
5. Challenges ensure development of both subject and generic competences.

The VEC revolves around the following principles with VEC teamchers at the heart of the system. Figure 1 illustrates how the three phases of CBL are carried out in an IaH context.

6.   Conclusion and implications

The VEC was primarily launched as an answer to continued language teaching and learning in the university environment through the COVID-19 lockdowns, and we found the VEC project to be a valuable contribution to the intersecting field of CBL, VE, IaH, language education and in the acquiring of transferable skills.

The study shows how the VEC created conditions for learning for the different categories of student participants. Indeed, the ecological competition acted as the ideal environment for interdisciplinary learning, including intercultural skills. It also provided for the master's level teachers-in-training to capitalise, through acting as teamchers during the sessions with the student-competitors, by facilitating the participant teams and through the delivery of chapters of the Ecolinguistics MOOC in English and the French sustainable development videos on YouTube. Mentors also had the opportunity to upskill by working in educational and project support roles.

Beyond the VE and IaH objective, our study shows that the VEC project can be adjusted to different disciplinary objectives. At our institution, the VEC is applied to professionalising teachers-in-training through the students acting as teamchers and mentors; at partner universities, the VEC is part of second and specialist language learning modules and is also used to enhance science subject knowledge and experience (such as the spatial science team).

As far as the data collection for this project is concerned, much remains to be done and new methods of analysis need to be explored. However, the skills and experience that were recorded in our questionnaire showed that the VEC students learned and improved their intercultural skills and digital skills through the challenge and the teachers reported back on non-native language acquisition.

In terms of future perspectives, the VEC aims for more inclusivity, as well as a growing number of teams, themes, languages and partners. The VEC paves the way for the next version of the project, called the Intercultural Virtual Societal Challenge (IVSC), which includes mixed groups of participants from three or more different countries.

In closing, the VEC provides a model that is currently being applied to additional thematic and language scenarios, thus opening up new perspectives for CBL in a VE and/or IaH context, which could further lead to community engagement and service-learning (Felten and Clayton, 2011).

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Appendix

Table 1 displays an overview of the questions posed to participant students and teamchers in relation to professionalisation. There is only one relevant question for participants and six for teamchers.

Table 1

Participants	
	- Participants were asked whether they believed the VEC/DEV project had contributed to their professionalization, encompassing the acquisition of experience, transferable skills, and other assets applicable in the workplace.
Teamchers	Teachers were asked if they believed that the VEC/DEV project had contributed to their professional development as language teachers, encompassing the acquisition of experience, transferable skills, and more. They were queried on whether the project had professionalized them in alternative ways. Furthermore, insights were sought regarding their mentoring experiences within the project, which involved guidance from fellow teachers, researchers, and M2 students. Participants were prompted to elaborate on whether this mentoring had accelerated their professional development compared to a traditional university class.
	The teamchers were also probed on the extent to which students in their participant teams had bolstered confidence in their second language through the challenge, with a scale ranging from "Not at all" to "Very much so" and an explanation requested for their chosen rating. Lastly, teachers were asked for their opinions on whether the utilization of methodologies such as Project-based learning and Challenge-based learning had enriched both their own learning experiences and those of their participant teams and students.

Table 2 shows participant responses in relation to the question: "Do you think that the VEC/DEV project has helped you to professionalise i.e. gained experience, transferable skills, etc. that you can use in the workplace?"

Table 2

No. of Participants	Yes	No	Textual responses (excerpts)
30	100%	0%	
			- The eco-responsible manoeuvres during the completion of this project allowed me to organise and implement skills that will be useful to me in the future. - Yes, it helped improve my English and my computer skills. - I acquired new knowledge in English and we faced deadlines and therefore responsibilities and we also had to work in groups and pay attention to others etc. - The most precious thing for me as someone (French) who never travelled to an English-speaking country, only Spanish and German-speaking ones, was actually speaking and discussing using only English. - Of course, I got to practise my oral skills in English and I enjoyed working in a team. - The spirit of collaboration and I also learned to work under pressure. - It helped me a lot, I discovered a lot of things. THANKS! - Logo creation, brainstorming, even trailing.

Table 3 shows teamcher responses in relation to the question: "Do you think that the VEC/DEV project has helped you to professionalise as a language teacher i.e. you gained experience, transferable skills, etc?"

Table 3

No. of Teamchers	Yes	No	Textual responses (excerpts)
34	93.8%	6.3%	
			- It was the first time that I worked with apprentices whose repertoire was completely different from mine. So, I also learned how to teach French in French instead of in my mother tongue. - Yes, this project allowed me to develop several skills in distance learning, project management and the use of innovative educational tools such as H5P, Canva, LearningApps and Kahoot. These skills are transferable and can be applied to different professional contexts. - I learned to use digital tools, collaborate with colleagues, teach learners at level B1 and B2.

Table 4 shows teamcher responses in relation to the question: "Has the project professionalised you in other ways?"

Table 4

No. of Teamchers	Yes	No	Textual responses (excerpts)
34	84.4%	15.6%	
			- Allowed me to get organiszed. - Team work. - In collaboration with peers. - Adaptation. - The project helped me develop my communication and organiszation skills. - I think this project taught me how to deal with the unexpected of online classes and to do things differently in case it was to happen. - For me, I also gained knowledge about the environment and environmental protection. - The project allowed me to professionalize myself from the point of view of group pedagogy and the creation of educational content in groups. - Yes, this project allowed me to work in a team more effectively and develop my communication skills, as I had to collaborate with other team members to achieve our common goals.

Table 5 shows teamcher responses in relation to the question (N.B. this question relates to the

following question on professionalisation): "You received mentoring as part of this project from

teachers, researchers, and M2 students; can you tell us about your mentoring experience?"

Table 5

No. of Teamchers	Textual responses (excerpts)
34	
	- No. - I didn't really have a mentor, we rather worked in a group with the other teamchers. The teachers were those who supported and guided us the most. - The liar regularly sent us the copy and paste of the objectives of the sessions that we already had on Google share. - We had access to hotlines, which was very appreciable. However, we did not benefit from significant support from our M2 mentor. - In fact, our mentor was not very present to help us. - Alright. Thank you so much! - I learned a lot of new experiences such as organizing team works, communication with the team members and leading the team.

Table 6 shows teamcher responses in relation to the question: "Has the mentoring experience

helped you to professionalise at a greater rate than you would have in another kind of university

class?"

Table 6

No. of Teamchers	Yes	No	Textual responses (excerpts)
34	59.4%	40.6%	
			- Yes, this mentoring experience helped me manage this project. It is a very enriching professional experience. - Yes, the mentoring experience allowed me to acquire practical skills and a better understanding of the challenges of the profession, which helped me to professionalise more quickly than if I had only followed theoretical courses at the university.

Figure 1 shows a histogram of teamcher responses in relation to the question: "To what extent do you think the students in your participant team have gained confidence in their second language through the experience of the challenge? 1. Not all / 5. Very much so."
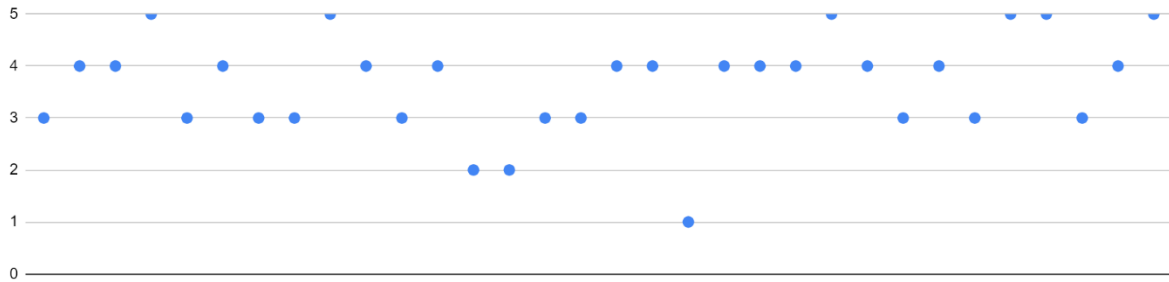
Figure 1

Table 7 shows teamcher responses in relation to the question: "In your opinion, did working with methodologies such as Project-based learning and Challenge-based learning enhance your own learning experience and the learning experience of your participant teams/students?"

Table 7

No. of Teamchers	Yes	No	Textual responses (excerpts)
34	87.5%	12.5%	
			- This is the first time that I have carried out a project of this type so I obviously learned during these several weeks of work about supervising students so that they carry out the project they wish to carry out, and for us to create supports. - I think it's very interesting and enriching! This is a good opportunity to enrich vocabulary and link language learning to social concerns. Learning a language means not only learning linguistic knowledge, but also learning how to express yourself and argue in this language when faced with current issues. - It seems to me that working with methodologies such as project-based learning and challenge-based learning can be beneficial if everyone buys into the project. In my experience, working and preparing for sessions with other teamchers improved my learning experience. As for our team, it seems to me that this did little to improve their learning experience due to the difficulty we had in communicating.