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8. Impact of Virtual Exchange on teachers' and student teachers' professional development

Introduction

While the COVID-19 pandemic presented challenges to the teaching profession, it also catalysed a broader awareness of online opportunities for teachers to engage in professional development to support emergency remote teaching and learning. A recent systematic review of online professional development programs (OPD; Bragg et al., 2021) reveals that online opportunities for teacher development are on the rise and that they positively impact teacher self-efficacy and instructional practices in general. Moreover, they conclude that the common ingredient in successful OPD was teachers engaging in peer-to-peer discussion. In a similar manner, a recent meta-analysis by Kennedy (2016) suggests that successful professional development is characterised by focussing on content knowledge aligned to a broader goal and through collective participation where experts and non-experts work to achieve the goal, for example, to evaluate teaching strategies or develop lesson plans together. Peer-to-peer discussion and collaboration around a task are hallmarks of Virtual Exchange (VE) and, in this way, provide a rich environment to support teacher development. For example, O'Dowd and Dooly (2022) found that VE helped foreign language teacher educators evolve their teaching practices through innovative approaches.

The VALIANT VEs described in this book are clear examples where peer-to-peer discussion and collaboration position teachers and student teachers to exchange knowledge and experiences and engage in meaningful tasks to impact their current teaching practice or to prepare for their future profession. Previous chapters have addressed the affordances of VEs on teachers' motivation and feelings of isolation as well as their potential

to build critical competences in digital technology and intercultural communication. However, there are other important aspects of teacher professional development that have yet to be examined. Specifically, this chapter presents the perceived impact of VEs on self-efficacy, transversal skills development, and professional knowledge and attitudes about teaching and online professional networks. Furthermore, we consider student teacher growth compared to that of teachers to determine how these two groups are impacted differently and to what extent.

Review of the Literature

Teacher Self-efficacy

The concept of self-efficacy is a widely studied topic in psychology. According to Bandura (1997), self-efficacy refers to a person's belief in their ability to organise and carry out the necessary actions to achieve specific goals. Bandura (1997) explains that efficacy beliefs influence how individuals perceive opportunities and obstacles, how much effort they put into a task, and how long they persist in the face of challenges. According to Skaalvik and Skaalvik (2010), teacher self-efficacy (TSE) refers to the personal beliefs of individual teachers regarding their capacity to plan, organise, and successfully carry out activities that are necessary to achieve educational goals and can serve as a significant motivational factor that influences a teacher's effectiveness in the classroom. Several authors (e.g., Künsting et al., 2016; Bach, 2022) have pointed out that a teacher who possesses strong self-efficacy beliefs is likely to be resilient, adept at problem-solving, and, most importantly, capable of learning from their experiences.

According to Bandura (1997; 2006), people's beliefs about their capability of succeeding on particular tasks are influenced by four main factors: mastery experiences (own success experiences), vicarious experiences (observing others), verbal persuasion (verbal encouragement), and physiological and affective states (emotional reactions to specific tasks). Table 8.1 summarises these major sources, as defined by Bandura (op.cit.).

Table 8.1. Factors that contribute to self-efficacy

Factor	Description
Mastery experiences	If teachers believe their performance to be successful, efficacy beliefs are raised.
Vicarious experiences	When teachers see someone succeeding at something, their self-efficacy will increase; and where they see people failing, their self-efficacy will decrease.
Verbal persuasions	Encouragement can increase teacher self-efficacy, whereas negative feedback can weaken perceptions of teaching competence.
Emotional indicators	Teachers' perceptions of physiological indicators, such as stress or anxiety can markedly alter their self-efficacy.

Furthermore, it is suggested that fostering teachers' self-efficacy is crucial for cultivating effective, dedicated, and enthusiastic educators and this is especially important in recruiting and retaining teachers long-term. Bandura's self-efficacy theory not only encompasses individual beliefs but also extends to collective beliefs within groups. Collective efficacy refers to a group's shared belief in their collective capabilities to organise and execute actions necessary to achieve desired outcomes. In the teaching profession, collective efficacy plays a significant role as teachers operate collectively within an interactive social system. Bandura and subsequent studies (e.g., Donohoo, 2016; Goddard et al., 2000) have demonstrated that academic achievement is higher when teachers have belief in their collective abilities to influence student outcomes.

Transversal Skills

Online collaborative learning allows participants to practise interpersonal communication to accomplish a task. This requires skills like teamwork, time management, problem-solving, and negotiation (of ideas). These are some of the many transversal skills, sometimes referred to as "soft skills", that have been found to be critical to both employability and success in the workforce (Mourshed et al., 2014). Furhermore, transversal skills are essential for teaching and learning. In 2020, the *Assessment of Transversal Skills* (ATS) was created and co-funded by the Erasmus+ Programme of the European Union as an innovative policy experimentation to provide

guidance to teachers in assessing transversal skills in learners and, most importantly, to strategically target them in curricula. ATS defines transversal skills as "the ability to think critically, take initiative, use digital tools, solve problems, and work collaboratively" all of which are key ingredients to successful collaboration in the VALIANT VEs.

There are many ways to classify transversal skills and Cinque (2016) offers a helpful taxonomy that has been targeted and evaluated in the European Union (pp. 397–399). Skill development stands out as a primary method for teachers to build confidence in their profession, aligning with both self-efficacy and the broader significance of professional growth. Transversal skills that were analysed in this study were (1) team working, (2) negotiation of skills, (3) time-management, and (4) problem-solving.

Professional knowledge and attitudes about teaching

In addition to self-efficacy and transversal skills, research has also demonstrated the benefits for teachers who gain knowledge about innovative practices and can discuss approaches to dealing with the realities of the profession (Angelini & Muñiz, 2021; O'Dowd & Dooly, 2022). This is the case for continuous teacher development as well as for future teachers. For example, Dietrich (2022) found that VE challenged future teacher's assumptions about the profession while helping them anticipate how they can support students in challenging learning environments. In addition, their study also revealed that participants' perceived linguistic competence improved, suggesting that both teaching practices and content knowledge are outcomes of VE for future teachers. While certainly self-efficacy and transversal skill development are important elements of professional development, we also take an inductive approach to understanding knowledge and attitudes, to provide a comprehensive and thorough analysis for professional development gains in general.

Research Questions

The VALIANT project used both quantitative and qualitative data to analyse the perceived impact of VEs on teachers' and student teachers'

self-efficacy beliefs, transversal skills development, professional knowledge, and attitudes about teaching and online professional networks. The following research questions were considered:

RQ1. How did the engagement in VE contribute to the perceived development of teachers' and student teachers' self-efficacy?
RQ2. What transversal skills do teachers and student teachers perceive they gain as a result of VE?
RQ3. What were other perceived professional development gains in terms of knowledge and attitudes?

Quantitative Analysis

RQ1 included both quantitative (teachers only) and qualitative analysis collected from both teachers and student teachers. The answers to RQ2 were based on a quantitative analysis of both groups. Finally, RQ3 was analysed qualitatively for both groups.

To answer RQ1 and RQ2, the pre- and post-VE survey scores for self-efficacy, team working skills, negotiation skills, time management skills, and problem-solving skills were computed and compared to determine whether there was a perceived gain in self-efficacy and transversal skills following the completion of the VE experience. For a more detailed explanation of the survey and quantitative data analysis, see Chap. 3 of this volume.

Framework for Qualitative Analysis: Codebook

To answer RQ1, the data pertaining to teachers' and student teachers' self-efficacy were analysed qualitatively, and themes were formulated through a combination of deductive and inductive coding techniques (Braun & Clark, 2022). The following open-ended items from pre-, mid- and post-VE surveys were included in this analysis, specifically:

- What have you learnt about the topics that you have worked on? Has discussing them with distant partners influenced your understanding of the topics? If so, how?
- Has your Virtual Exchange project impacted on how you see your current work situation or your career? If so, how? If possible, give a concrete example to illustrate your answer.
- What have you learned from taking part in this Virtual Exchange?
- Did anything happen during this exchange which made a particular impact on you? If so, could you tell us about it?
- Has your experience in the Virtual Exchange influenced how you approach your teaching/teaching career or your continued studies as a student teacher? If possible, give a concrete example to illustrate your answer.
- Do you think the collaboration with teachers helped you to gain a better understanding of your future profession?

In the process of analysis, a total of eleven sub-codes were established (see codebook presented in Table 8.2. Six of these sub-codes (codes 1 to 6) were directly derived from the VALIANT survey items on self-efficacy. Furthermore, five sub-codes (codes 7 to 11) were generated from the collected data. These sub-codes were subsequently examined and categorised into two overarching themes: (a) enhanced confidence in the ability to teach effectively and (b) being able to take a broader, international or intercultural perspective in the teaching and learning context. All 11 self-efficacy sub-codes are presented below:

Where self-efficacy measurement tools are well established, other criteria related to VE teacher professional development and attitudes about teaching and online professional networks are not. As a result, an inductive approach was used to code qualitative data specific to RQ3. The same open-ended questions analysed for self-efficacy (referenced above) were considered for RQ3. Three main categories emerged such as professional knowledge, skills, and attitudes, and each had several sub-categories that were coded. Table 8.3 below presents the codebook that was used for analysis responding to RQ3, specifically.

Table 8.2. Codebook for self-efficacy qualitative analysis

CODE	SUB-CODE	Definition	EXAMPLE	FREQUENCY
Teacher self-efficacy	1. Developing more self-confidence in teaching	This code includes all statements in which participants reported that they developed more self-confidence in their capacity to teach	"I feel more confident now. I feel that my teaching methods are useful and the students can benefit from them." (In-service teacher)	Student teacher: 193 Teacher: 71
	2. Implementing alternative strategies in the classroom	This code includes all statements in which participants reported that they believe they can now implement alternative teaching strategies in their classrooms	"I learnt that every country is different, has its own education system, parents' expectations, values etc. I learnt that I would take part again because it was a lot of fun and very enriching. I learnt that I can also be a good teacher one day and that I don't always have to be too strict or assess everything the students say. I learnt that you sometimes have to make a move towards your students, so you can develop a better understanding for their struggles and needs." (Student-teacher)	Student teacher: 351 Teacher: 226
	3. Developing strategies to get students to work together	This code includes all statements in which participants reported that they believe they have acquired new strategies to get their students to work together	"I have learned different negotiation strategies, effective team-building and collaborative working strategies. I have also learned how to build and sustain the group dynamics and effective monitoring skills. I have realized how important it is to facilitate my group as a teacher educator in different ways" (In-service teacher)	Student teacher: 18 Teacher: 11

Table 8.2.   Continued

CODE	SUB-CODE	Definition	EXAMPLE	FREQUENCY
	4. Developing strategies to motivate students [who show low interest in their studies]	This code includes all statements in which participants reported that they believe they have acquired new strategies to motivate students [who show low interest in their studies]	"Yes, this virtual exchange influenced a lot my point of view regarding teaching. I realized that is very important to use some innovative strategies and technological tools in order to motivate the students with the subject." (Student teacher)	Student teacher: 47 Teacher:22
	5. Developing strategies to get community groups and any types of organizations involved in working with schools / institutions	This code includes all statements in which participants reported that they believe they have developed new strategies to get community groups and any types of organizations involved in working with schools	"Yes, especially in what regards developing our professional network. It is really good to meet lots of people that like us want to work in projects. Is not only good for us, but also for our students who benefit from these exchanges" (In-service teacher	Student teacher: 57 In-service teacher: 44
	6. Helping colleagues/course mates with developing their teaching skills	This code includes all statements in which participants reported that they have acquired skills to help colleagues/course mates with developing their teaching skills	"[…] Our virtual partners have helped us to understand some concepts which we had no clue about, and vice versa […]." (Student-teacher)	Student teacher: 38 In-service teacher:31
	7. Confidence in analysing teaching and learning processes from different perspectives	This code includes all statements in which participants reported that they feel more confident in analysing teaching and learning processes from different perspectives	"Yes, especially when it came to designing the lesson plan, because listening to the ideas of my colleagues I saw how things could be done in different ways" (In-service teacher)	Student teacher: 272 In-service teacher: 163

8. Reaching a better understanding of specific pedagogical concepts	This code includes all statements in which participants reported that the VE helped them to reach a better understanding of specific pedagogical concepts	"I have learned about a very useful approach, task-based learning, which I have always consider very effective. It has helped me to understand it much better and to learn about some steps to take in order to make it effective and profitable. Our virtual partners have helped us to understand some concepts which we had no clue about, and vice versa. I would say that it has been reciprocal and that we have learned many things from each other. They have shared with us their experience about real situations, how they implement certain techniques at school, things that do actually work, and others that do not, how students feel about them, etc. So, it is being a great opportunity to get some advice." (Student-teacher)	Student teacher: 77 In-service teacher: 49
9. Developing more self-confidence for collaborating with their course mates/ colleagues	This code includes all statements in which participants reported that they developed more self-confidence for collaborating with course mates/colleagues	"It did have an impact. For example, when I have a video call with my partners, I am more willing to express my thoughts than before" (In-service teacher)	Student teacher: 206 In-service teacher: 104

Table 8.2. Continued

CODE	SUB-CODE	Definition	EXAMPLE	FREQUENCY
	10. Enhanced confidence in (future) teaching due to awareness of common challenges	This code includes all statements in which participants reported that through the VE they realized that other course mates/colleagues face the same/similar problems/challenges in the classroom	"[…] The exchange is giving me the feeling that I too can be a good teacher one day because we notice that everyone has their struggles, and we are all humans, and I don't have to be perfect in order to be a good teacher." (Student-teacher)	Student teacher: 73 In-service teacher: 110
	11. Having resources and networks for further learning	This code includes all statements in which participants reported that they gained resources and networks for further learning	"The exchange is definitely helping me to feel less isolated professionally and to develop my professional network. We exchange our views in our school, in our country, but it's always nice to have a wider perspective. I think institutions in our country (such as Ministry for education) aren't very responsive." (In-service teacher)	Student teacher:125 In-service teacher: 97

Table 8.3. Codebook for professional development qualitative analysis (attitudes, skills, knowledge)

CODE	SUB-CODE	Definition	EXAMPLE	FREQUENCY
Attitudes	Sense of a global teaching community	Statements that specifically refer to the value of a global/international network of teachers	"I learned that in different countries we have the same problems and the same concerns with students the way we teach"	105
	Value of online collaboration	Statements that show the role of/attitudes towards building and maintaining networks	"Discussing the provided material by others from different backgrounds has helped me understand it a lot better as different aspects were pointed out"	62
Skills Development	Collaborating effectively in online networks	When participants mention how professional collaborative networks can be used as a source for one's own professional development	"I definitely feel that the exchange is helping me to build key competencies and abilities to build a network that I can reach out to for support during my training to become a teacher and as a future teacher. For instance, the relationship we are building with our fellow student teachers helps us develop our critical thinking, intercultural communication and creativity skills. In addition, in the future it will be useful to collaborate on innovative projects or research."	132
	Digital skills	Statements that show students' and teachers' awareness of their own digital skills and the importance of such for using technology in FLT	"This virtual exchange has made me realise how important it is to improve my digital skills in order to know how to apply technology in class in a proper way since technology can be a really powerful tool to motivate students and help them in their learning process."	18

Table 8.3.   Continued

CODE	SUB-CODE	Definition	EXAMPLE	FREQUENCY
	Personal Communication Skills	Statements that show that participants improved their communication skills / FL skills	My first impressions so far about the interactions are very nice, actually. I was excited to take part in this exchange, because I consider it the greatest opportunity to use effectively the language we have been learning and to improve our communicative skills. Also, it allows us to share different ideas and learn from our partners.	35
Professional knowledge	Realities of teaching	Statements that show how the VE led to a more realistic understanding of the profession and foreign language teaching at secondary schools	"It was great to get to know the insight of two teachers who have been of course already working a lot of years and have a lot of experience. They have countered some myths and explained how things really work in a school setting (the real world)."	55
	Characteristics of students- e.g., digital natives	When students and teachers mention that now they are more aware of their (future) students' digital skills (& the lack of such)	"We must be aware of the fact that we cannot take the students' knowledge of using digital devices and tools for granted. Students need guidance and training in order to learn how to use technology beneficially in class."	12
	Teaching methodologies / Classroom Practices	Statements that reference the value of learning several different teaching methodologies or a specific one like TBL	"I have learned many different ways of teaching and new methodologies."	66
	Digital tools	Statements that refer to tools, digital tools, apps, websites, etc.	"I've learnt so many things about online tools in such a short period of time and I'm looking forward to learning new tools like the eBook."	48

Main Quantitative Findings

RQ1: Perceived Gain in Self-efficacy

Overall, there was a significant moderate perceived improvement in self-efficacy among teachers ($Md^{[1]}_{\text{pre-VE survey}}$ = 65.4, $Md_{\text{post-VE survey}}$ = 72.9, z = -5.685, $p < 0.001$, $r = -0.44$). This improvement was consistent across all three rounds of exchanges indicating strong replicability of these results. Overall improvement in self-efficacy is demonstrated in Figure 8.1 below.
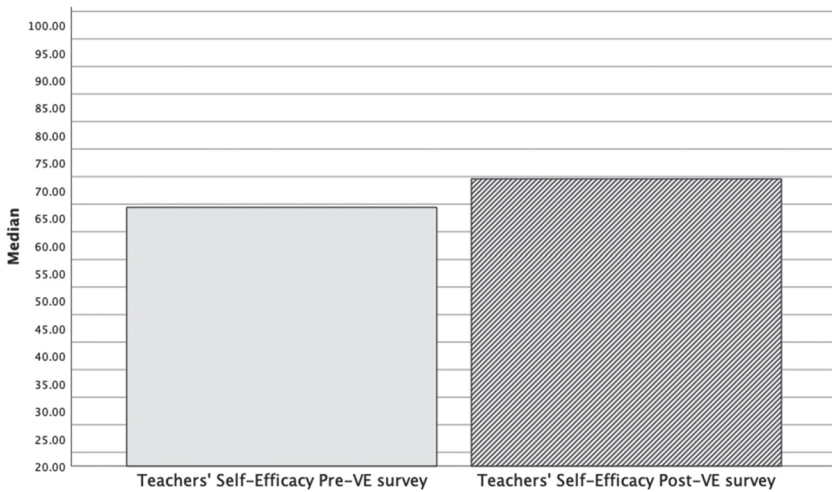

Figure 8.1: Overall perceived improvement in self-efficacy between pre- and post-VE surveys

Looking at the responses separately for each question, we noticed that perceived improvement in self-efficacy is related to collaborative engagement with outside organisations (other schools and universities) and motivating students who are low on engagement.

With regard to the type of VE (mixed teachers with student teachers or teachers only), teachers who collaborated with student teachers showed large significant improvement in their levels of self-efficacy ($Md_{\text{pre-VE survey}}$ = 64.5, $Md_{\text{post-VE survey}}$ = 72.1, z = -4.988, $p < 0.001$, $r = -0.52$). Teachers who collaborated with other teachers showed moderate significant improvement

in their self-efficacy (Md$_{\text{pre-VE survey}}$ = 69, Md$_{\text{post-VE survey}}$ = 74.2, z = -2.396, $p < 0.05$, r = -0.3). The results are summarised in Figure 8.2 below. It is important to note that self-efficacy was only mentioned for the teachers' sample. It was not possible to compare the results with the control group as it comprised student teachers only.
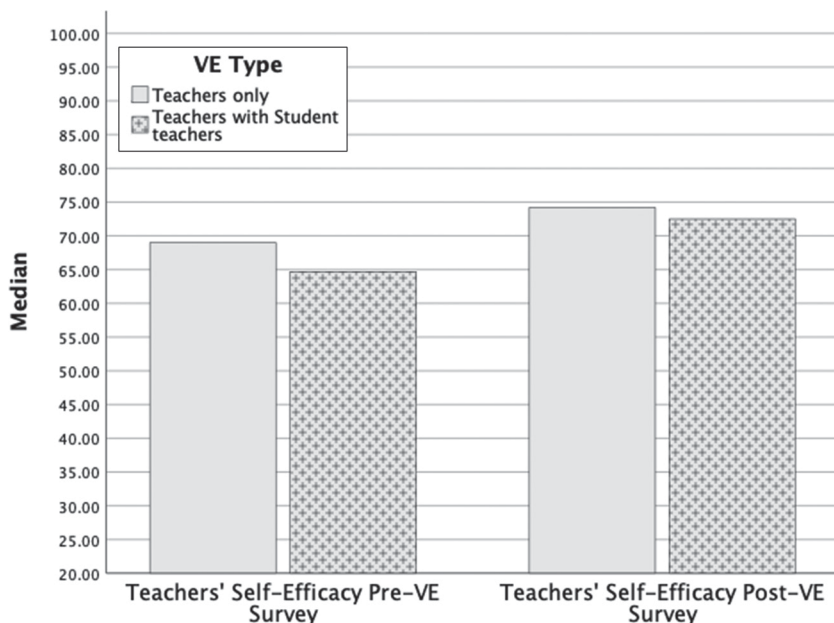

Figure 8.2: Improvement in perceived self-efficacy for two types of VE

RQ2: Perceived Gain in Transversal Skills

There was a small to moderate significant perceived improvement across all transversal skills (e.g., teamworking, problem-solving, time manage-ment and negotiation) in the VE groups. The results are summarised in Figure 8.3.
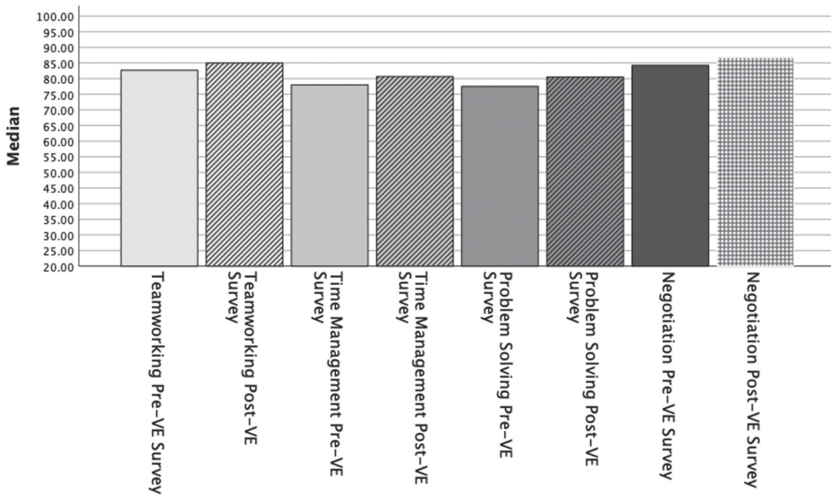
Figure 8.3: Graphical representation of the difference in pre- and post-VE transversal skills[1]

These results were consistent across three rounds of VEs supporting the replicability of the results. In addition, it is important to note that there was no improvement in any of the transversal skills in the control group. Therefore, all the perceived gain in the measured skills can be attributed to the effectiveness of the VE.

When comparing the effectiveness of the VE for the transversal skills development for student teachers and teachers separately, student teachers showed small and significant perceived improvement across all transversal skills whereas teachers showed significant improvements in three out of four skills (no improvement in teamworking skills). The largest improvement was in problem-solving skills: (student teachers: $Md_{pre\text{-}VE\ survey}$ = 75, $Md_{post\text{-}VE\ survey}$ = 79, z = -4.791, $p < 0.001$, r = -0.3; teachers: $Md_{pre\text{-}VE\ survey}$ = 80.5, $Md_{post\text{-}VE\ survey}$ = 85, z = -4.337, $p < 0.001$, r = -0.32), followed by perceived improvement in time management skills: (student teachers: $Md_{pre\text{-}VE\ survey}$ = 73.3, $Md_{post\text{-}VE\ survey}$ = 84.5, z = -3.605, $p < 0.001$,

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1   *Note:* Team working skills (z = -3.837, $p < 0.001$, r = -0.18), time management (z = -4.748, $p > 0.001$, r = -0.23), problem-solving (z = -6.434, $p < 0.001$, r = -0.31), and negotiation (z = -3.716, $p < 0.001$, r = -0.18).

$r = -0.23$; teachers: $Md_{\text{pre-VE survey}} = 83$, $Md_{\text{post-VE survey}} = 84.7$, $z = -2.99$, $p < 0.01$, $r = -0.22$).

The VE type (mixed teachers with student teachers, student teachers only, and teachers only) also showed to have an effect on transversal skills development. Small significant perceived gain across all transversal skills was noted for teachers who collaborated with student teachers. Student teachers who have collaborated with other student teachers only reported small significant perceived gain in time management and problem-solving skills. Finally, teachers who have collaborated with other teachers, reported small significant improvement in all but teamworking skills. Thus, the most stable and largest perceived gain was seen in problem-solving closely followed by time management skills. The results are summarised in Table 8.4 below.

Table 8.4. Wilcoxon signed rank test results for the three types of the VEs

VE type	Statistics	TW	TM	N	PS
Student teachers with teachers	$Md_{\text{Pre-VE survey}}$	83.3	78.3	85.0	80.0
	$Md_{\text{Post-VE survey}}$	86.7	82.2	87.5	81.8
	z	-3.29	-3.402	-2.977	-4.222
	p	<0.001	<0.001	<0.01	<0.001
Student teachers only	$Md_{\text{Pre-VE survey}}$	76.2	70.8	81.8	73.3
	$Md_{\text{Post-VE survey}}$	76.0	76.3	81.0	78.5
	z	-1.623	-2.63	-0.558	-3.187
	p	>0.05	<0.01	>0.05	<0.001
Teachers only	$Md_{\text{Pre-VE survey}}$	87.3	81.0	82.5	77.5
	$Md_{\text{Post-VE survey}}$	86.3	84.0	89.0	82.0
	z	-1.034	-1.975	-2.787	-3.952
	p	>0.05	<0.05	<0.01	<0.001

Note: Md – Median, TW – teamworking, TM – time management, N – negotiation, PS – problem-solving

Regarding the evaluation of the impact of the VEs on the transversal skills development it is important to note that all participants scored quite high on their initial perceived levels of transversal skills and the length of the VEs was quite short.

Conclusively, in relation to RQ1, investigating the impact of the VEs on teachers' self-efficacy, the results showed that VE has a moderate significant impact on the development of self-efficacy and in particular the impact is stronger if teachers get to collaborate with student teachers. In relation to RQ2, investigating the impact of VE on teachers' and student teachers' transversal skills development, the most perceived gain was seen in time management and problem-solving skills. These skills developed the most for both student teachers and teachers and the most effective exchanges for that were VEs where teachers collaborated with student teachers.

To better understand the impact of the VE on teachers and student teacher's self-efficacy (RQ1) and transversal skills (RQ2), as well as perceived gains in professional knowledge and attitudes about teaching and online professional networks (RQ3), it is important to consider these quantitative results in light of the qualitative findings.

Main Qualitative Findings and Discussion

RQ1: Most Valued Gain in Self-efficacy

In general, the qualitative findings also demonstrate the positive impact of VALIANT VEs on the perceived self-efficacy of teachers and student teachers.

Two main themes were generated in response to RQ1. Theme 1 underscored the significant improvement in teachers' confidence and belief in their own ability to teach effectively. This included student teachers displaying confidence in their potential to become skilled educators and teachers experiencing an overall positive impact on their professional self-confidence. Theme 2 pertained to the augmented awareness among student teachers and teachers of available international support networks and digital resources, which positively impacted their beliefs regarding their capacity to overcome challenges and find effective solutions.

Themes 1 and 2 are elaborated in further detail below and substantiated by selected data quotes from the participants.

Theme 1: Enhanced confidence in the ability to teach effectively

The qualitative findings indicate that VE facilitated a collaborative environment where student teachers had the opportunity to learn from experienced professionals (i.e., teachers). More specifically, these interactions provided mentorship, guidance, and practical knowledge, which in turn boosted the student teacher's motivation and self-assurance. The following quotes illustrate the student teachers' perceptions regarding the impact of the VEs on their self-efficacy when responding to questions regarding the added value of the VE for their professional development:

> *Interacting with more experienced teachers helped me to increase my motivation and **self confidence** in my area. (student teacher)*
> *I think that the exchange and cooperation with other teachers around the world is a great added value for us students. On the one hand, because it gives us insights into the school system and, on the other hand, because we have to **put into practice** what we have studied up to that point (student teacher)*

In these quotes, the student teachers emphasised the positive impact of VE interactions and collaboration on their motivation and self-confidence. By engaging with more experienced teachers, the student teachers gained valuable insights and support, resulting in an increase in their motivation and belief in their own abilities within their specific field.

Furthermore, the student teachers' recognition of the significance of constructive feedback and advice in relation to their self-efficacy aligns with Bandura's theory that external validation and support are crucial for maintaining and enhancing one's confidence in their abilities. The following quote illustrates their perspective:

> *We gain experience, we develop our teaching strategies, materials, methods, and approaches. Getting advice from experienced teachers **broadened my horizon** for sure. (student teacher)*

Another important source of self-efficacy were the *vicarious experiences* that the student teachers underwent within the VEs. The findings suggest that the observation of role models allowed the student teachers to learn and gain confidence through observing others' behaviours and actions (e.g., when their lesson plans were implemented by the teachers). As can be seen in the following quote:

> *Yes. As a student, it was a very rewarding experience to plan a lesson with continuous feedback from experienced teachers and then see the lesson outcomes. (student teacher)*

The findings also show that participation in the VEs resulted in an enhancement of the teachers' self-confidence in their professional abilities. The results suggest that teachers experienced not only an increased sense of confidence in their teaching abilities but also a reaffirmation of their career choice. The elements contributing to the enhanced self-assurance of teachers appear to be multifaceted. These include the validation of their current knowledge and instructional approaches, the acknowledgment that fellow teachers encounter similar classroom challenges, the realisation that their students benefit from the teaching methods recommended and employed during the VE, and the gratification derived from mentoring and empowering future educators. The following quotes exemplify the diverse perspectives they expressed.

> *Perhaps I feel **more confident** as the suggestions I heard to approach situations in my context, weren't completely new for me. (teacher)*
> *I **feel more confident** about the way I teach. While talking to other teachers from different countries and sharing our examples of good practice I found out that we all struggle with similar problems and use similar strategies to solve them. (teacher)*
> *I learned a lot about CLIL methodology and how to plan a unit for my classes. The student teachers were amazing in their work and took me back 20 something years to when I was in college myself. **It helped me realize how far I have come and how much my teaching has evolved**. Also, a reminder to never stop learning! (teacher)*

Theme 2: being able to take a broader, international or intercultural perspective in the teaching and learning context

Our findings indicate that the VE experiences have expanded both the student teachers' and the teachers' awareness of the resources and support available beyond their immediate national contexts. Many student teachers realised the potential benefits of tapping into an international network for help and guidance. The following quotes illustrate this perspective:

> *Before this exchange I'd try to find solutions to my answers within a national network but now I realise that there is an international network that might be able to help me. (student teacher)*
> *It's helpful to have a network in order to reduce your own mental load. (student teacher)*

As illustrated in the quotes above, the findings indicate that the VE experiences played a role in enhancing the student teachers' self-efficacy by broadening their understanding of support networks and their own capacity to access and utilise them. Similar insights were identified among the teachers:

> *The exchange showed me that we CLIL teachers are all in the same boat and that everyone feels the same. I hope that we can start more projects, network and exchange more, to benefit from the experience and work of other teachers around the world and to learn new perspectives. (teacher)*

In terms of self-efficacy, such realisations can have a positive impact on the teachers' beliefs about their ability to find effective solutions to overcome challenges. By recognising the potential support from an international network, the teachers' collective self-efficacy was bolstered, since they developed a greater sense of confidence in their capacity to address difficulties. They could access a wider pool of knowledge, experiences, and expertise. For example, both student teachers and teachers noted an increased awareness of digital materials and online resources for lesson planning.

There was also ample evidence that VE participants wanted to continue dialogue with one another, ranging from informal WhatsApp groups to intentional collaborations to share course materials. As discussed earlier, student academic achievement is significantly higher when teachers believe in their collective abilities to influence learning outcomes. The following quotes illustrate these perspectives:

> *Yes. Exchange project is a great way of networking. I couldn't be more thankful that I am a part of this project. In my future career, I'd be looking forward to collaborations with the people I met in this programme and carry our exchange project into something much bigger in the field of ELT. As we are from different cultures and countries, this diversity will provide us with a huge following if we were to work together. I have already made plans. (student teacher)*
> *Yes, I have created some connections with teachers so that we can work on common projects in the future. We also get to use several materials created for the lessons. (teacher)*

The fact that most participants were interested in engaging in a VE in the future is an indicator of their success. In fact, expressions of gratitude, enthusiasm, and excitement are emotional indicators that align with

Bandura's concept of how emotions can impact an individual's belief in their own capabilities and contribute to the development of self-efficacy.

RQ3: Perceived Gains in Professional Knowledge, Skills, and Attitudes to Teaching and Online Professional Networks

Like self-efficacy, the qualitative analysis elaborates on how teachers and student teachers perceive teaching and online professional networks (attitudes), as well as how they perceive their growth in skills development and professional knowledge. Similar to the transversal skills development measured in the quantitative analysis, teachers also perceive positive gains in pedagogical skill development on the open-ended items included in the pre- and post- VE surveys.

First, both groups believe they gain important **knowledge in the profession**. For example, both in-service and student teachers **value practicing and learning (new) digital tools***,* stating*:*

> *Yes, the exchange has provided me with valuable information to develop both my teaching career and student activities. For instance, it has offered me **varied useful digital tools** to use in class in the future and **help me develop my language learning skills**. (student teacher)*
> *It is affected me by giving me **inspiration to use more technological tools** in my classroom. (teacher)*

Second, both groups believe VEs provide access to **alternative perspectives and solutions to teaching problems.** For some, these new insights were related to COVID-19-related challenges to emergency-remote teaching. For others it was insightful to learn about new tools to facilitate online learning and to consider flipped approaches as a positive option for the future regardless of the COVID-19 pandemic. For example:

> *As aforementioned, it helped me become much more aware of my role as a teacher. Furthermore, it convinced me that a mixture of online and offline methods could be highly desirable, even in a post-pandemic world. This has been quite the shift for me since I originally thought that after COVID-19 these methods would just be abandoned since they were more replacements for their face-to-face counterparts than active improvements on our teaching methods. (student teacher)*
> *I learned that we teachers have the same problems no matter our origins. I learnt about possible ways of motivating members of the school community. I learnt to use audio and video apps. (teacher)*

Importantly, student-teachers uniquely benefit from an **increased understanding of the realities of teaching *and* how to deal with them.** They could ask questions, hear anecdotes from their classroom teaching experiences and get a better sense for what their future profession is like. For example, one student teacher remarks:

> *It was great to get to know the insight of two teachers who have been of course already working a lot of years and have a lot of experience. They have **countered some myths** and **explained how things really work** in a school setting (the real world). (student-teacher)*

In addition, student teachers **increased their knowledge of teaching methodologies through feedback from "experienced peers"**. They also learned how teachers were adapting to the challenges of the COVID-19 pandemic in real-time. Since the teachers had years of experience, their perspectives were of value to the student teachers. Furthermore, they could benefit from their expertise by receiving their feedback and asking for help with the VE-associated tasks. The following quotes from two student teachers convey these perceived gains in knowledge:

> *Taking part in this Virtual Exchange **I've learnt about new tools that can be used effectively in lessons**, how teachers from different countries work during the pandemic situation, **what ways of teaching can improve pupils' skills**.*
> *Well, it definitely helped me to gain a better understanding of my future profession due to the fact that **they mentored us about possible challenges we may face** or how we can make our **training more efficient**. They also **helped us to complete our tasks** and were available whenever we had a problem or question.*

This finding also aligns with theme two from the self-efficacy qualitative analysis whereby student teachers can apply pedagogical concepts and teaching strategies as a result of mixed (teachers and student teachers) VEs. However, skill development in VEs is not exclusive to student teachers. The results show that teachers also benefit from student teachers. For example, the data suggest that teachers **learn from the alternative (students') perspective on classroom practices**. For example, one teacher states:

> *The learning process is mutual. I get a lot of feedback from students who are still on the other side of the learning process. Even though some of them have teaching experience. **They are still very young and have lots of ideas and practical examples***

> *of how they would deal with the situation. When I had a conundrum, I shared it with them, and **they offered some advice.***

Similarly, both groups perceive gains in **skill development** as a result of VEs, specifically collaborating effectively in online networks and improving digital and personal communication skills. One interesting finding that emerged is that both groups state they **improved (global) communication skills and confidence in communicating in English.** The following quotes illustrate these beliefs:

> *It's been a great experience that has made me more **confident about interacting with people from abroad**. (student teacher)*
> *I can say that it helps me to **practise in speaking skill**. I have social phobia and I get nervous when talking to a group. The project helps me to overcome it. (student teacher)*
> ***I've never thought I could participate in VE like this**, neither my students. Only two or three years ago it was an utopy. (teacher)*

Finally, both teachers and student teachers indicate positive **attitudes** toward collaborating online and value having a global support network of teachers. One student teacher explains:

> *I have learned how valuable it is to exchange with teachers from other cultures and to get to know **new perspectives on teaching and learning**. One is automatically encouraged to question one's own methods and points of view, to **reflect and to engage with unfamiliar things**.*

This positive value further corroborates self-efficacy theme two whereby teachers and student teachers become more aware of international support networks. In fact, there were several statements indicating **the educational value of VEs for their own (future) pupils**.

> *Yes, it has. Before participating in this Virtual Exchange, I would never think about using Virtual Exchange programs in my future classes, but now **I would really love to try it** with my own students. (student teacher)*
> ***This VE makes me realise how important it is to interact with others and work collaboratively.** In this way, I would like to do something similar in my job. I am working with refugees in Spain and I think that it would be very beneficial for them to participate in a VE in order to meet other refugees in Spain, share their experiences, put into practice the Spanish language… (teacher)*

Perhaps most importantly, VE instils in studentteachers a confidence and positive attitude of talking to future peers to mitigate challenges that will arise in the future.

> *I have learnt a lot of new information that helps me feel comfortable in a digital world and it becomes more understandable discussing with partners because **sharing experiences with each other helps** to see how pupils are taught in class, if we, teachers, face the same problems and how it is possible to overcome challenges. (student teacher)*

Overall, the quantitative results show that VE participation has a positive effect on building teachers' self-efficacy (RQ1) and increasing specific transversal skills for both teachers and student teachers (RQ2). The most effective types of exchanges for developing self-efficacy were those where teachers collaborated with student teachers. The greatest improvements they reported were in their ability to collaborate with external local and international organisations to further improve their teaching skills.

Problem-solving transversal skills reflect the largest significance for both groups which corresponds with the qualitative findings (RQ2, RQ3) for both teachers and student teachers, albeit in unique ways. Where student teachers benefit from experienced peers by becoming more aware of their future profession and potential solutions to face challenges related to the realities of teaching, teachers learn from student teachers about alternative perspectives that reveal their proximity to the learning environment as recent or, in some cases, current language learners themselves. Furthermore, teachers benefit from sharing problems and challenges by feeling less isolated. Interestingly, only student teachers believe they improve teamworking skills whereas teachers do not. One potential interpretation is that student teachers perceive that by discussing problems related to their future profession, they are growing teamwork skills by problem-solving with educational experts. Teachers, on the other hand, may not perceive an increase in teamworking since they are accustomed to working with peers in schools.

According to Bandura's discussion on the sources of self-efficacy, our qualitative results, responding to RQ1, suggest that the student teachers derived significant advantages from engaging in collaborative activities because they enabled them to acquire *positive mastery experiences*, particularly when they were involved in VEs that fostered

collaboration between student teachers and teachers. This is evident in how the student teachers discussed their gains in professional knowledge, responding to RQ3. They acquired insights into teaching methodologies and classroom practices by actively engaging in the teaching process, designing lesson plans, receiving feedback from experienced educators, and observing the positive impact of their ideas when implemented by teachers. In this regard, these VEs contained core features of an internship, providing student teachers with access to the reality of the teaching profession which represented a valuable, practice-oriented learning opportunity for them.

The findings suggest that these *vicarious experiences,* even when they involved failures, played a crucial role in shaping the student teachers' self-confidence and preparedness for the challenges they would face as teachers. Furthermore, the chance to receive *constructive feedback* and guidance on their projects and teaching-related challenges during the VEs encouraged self-reflection and motivated the student teachers to persevere in their pursuits.

It is intriguing that a subset of the participating teachers experienced a sense of relief upon realising that teachers from various countries share similar experiences, especially when it comes to encountering difficulties in teaching. The findings indicate that this realisation played a crucial role in helping these teachers understand that they are not alone in facing these difficulties. Consequently, their knowledge of the reality of teaching shared by the experiences of "expert peers" increased their confidence in their ability to overcome these challenges and elevated their perceived level of self-efficacy.

Finally, it is evident that a considerable number of teachers value the opportunity to temporarily assume the role of mentors for motivated students revealing a perceived favourable attitude toward online professional networks (RQ3). This experience prompted them to engage in introspection regarding their own level of knowledge and practical skills acquired throughout their careers, as well as the noticeable knowledge gap between them and the student teachers. Within Bandura's conceptual framework, this accurate self-reflection pertaining to one's competence emerges as a crucial factor in accurately assessing one's abilities and determining an appropriate level of self-efficacy (RQ1). It is possible that amidst the demanding nature of teachers' daily lives, these moments of success may be overshadowed and relatively fleeting, thereby potentially failing to

provide sufficient grounds for effectively calibrating one's belief in their own capabilities.

Conclusion

Our findings have shown that in such challenging times (such as the COVID-19 pandemic), initiatives like the VALIANT program can provide a platform for teachers to share their knowledge and learn from collective mistakes and successes. Quantitative and qualitative analyses show that frequent interaction with peers establishes healthy community expectations and bolsters what teachers believe they know and can do in their educational practice. Furthermore, online collaboration is a place where teachers practise critical skills for the workforce as well as for their own teaching practice. Teachers value online collaboration and participating in an international teaching community. This is important because when teachers become more aware that their struggles are shared globally and not the result of a personal failure, their self-efficacy increases. Studies have shown (e.g., Ortan et al., 2021) that teacher turnover rates often result from factors like attrition, burnout, and emotional exhaustion. Our findings suggest VE can mitigate these issues while simultaneously building perceived gains in knowledge about the profession and develop skills for innovative educational practices. Finally, networking opportunities in a less formal setting allows both student-teachers and teachers to share their expertise and perspectives thereby fostering the transition of individual self-efficacy beliefs into collective ones.

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