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Pre-service Teachers' Experiences with Virtual Exchange and their Attitudes Towards Implementing Virtual Exchange into the curriculum

- A needs analysis report

INVITED

INVITED - Integrating primary and pre-school virtual exchange projects into language teacher education

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Introduction

Virtual exchange (VE) in language education is the process of communicating in a shared foreign language and collaboratively learning with peers from different countries through the use of technology (adapted from Dooly & Vinagre 2021, 393). The most common virtual exchange projects at primary and secondary level of education are carried out through the eTwinning platform, which is part of the Erasmus+ programme under the auspices of the European Commission. eTwinning provides support, tools and services to educational institutions (https://school-education.ec.europa.eu/en/etwinning). In 2019, the Council of the European Union adopted a recommendation calling for the support for foreign language learning of school-age children and the use of innovative teaching methods, including eTwinning (Renard & Milt, 2023). Pennock-Speck and Clavel-Arroitia (2022) argue that primary school pupils are rarely involved in various VE projects and therefore this area is under-researched. They assert that virtual exchanges increase motivation and interest in learning a foreign language (FL) and enhance students' intercultural awareness (Pennock-Speck & Clavel-Arroitia, 2022). Similarly, Nemiña et al. (2023) state that integrating the eTwinning platform into teaching practices could provide various benefits, such as increasing ICT skills, expanding learning opportunities and dialogue with peers in other contexts, cultural awareness and improvement of a FL.

Few studies have been carried out about the impact of virtual exchanges and eTwinning projects on foreign language learning, however, not many have investigated prospective FL primary school teachers' views on virtual exchange. This report aims to fill this gap, adding to the body of research in this area. The study presented in this report was conducted transnationally, among 501 pre-service primary FL teachers in four different teaching contexts, i.e. Spain, Poland, Slovenia and Germany. The study is part of the ***INVITED Erasmus+ project (Integrating primary and pre-school virtual exchange projects into language teacher education)***, which is led by the Pädagogische Hochschule Freiburg and partners from the University of Warsaw, the University of Ljubljana and the University of Murcia. The main goals of the project are to promote the use of VE projects in primary and pre-school language education and to develop primary and pre-school teacher's competencies regarding VE in the language classroom. For this purpose, a questionnaire was developed to explore pre-service teachers' experiences with VE and their attitudes towards implementing VE in the curriculum. We also wanted to enquire about their needs for this implementation in order to support them in the process of planning, organising and implementing VE into their future lessons.

Methodology

The study as such is conceptualised as needs analysis related to how ubiquitous and manifested is virtual exchange with pre-service teachers, the latter being predominantly limited to university-level programmes of pre-school and primary education.

First phase began in December 2023 with questionnaire drafting, which was after several revisions piloted online in January 2024 (active data gathering between 18th and 29th January). In that period, we managed to obtain 31 valid responses whose data allowed for final instrument adjustment. Although small in sample, preliminary findings indicated that characteristics of measurement have been addressed.

The final version of the questionnaire was launched immediately after and was open till March 29th 2024. It consisted of 27 questions that were realised in 92 variables, for which respondents required an average of 10 minutes to answer (median being 7 min 42 sec). This is in congruence with what was declared in the questionnaire's introduction. As per mode is concerned, we opted for online data gathering, made available by University of Ljubljana *Centre for Social Informatics's* online survey services – *One Click Survey* (1ka), available on https://www.1ka.si/.

The questionnaire was administered exclusively in English language, which we justify with the following reasons: (1) targeted student profile encompasses language teacher education; (2) virtual exchange as such stipulates the use of shared foreign language (which was in our case English); (3) multi-language translations can impact or change meaning; (4) the selected platform has an English user interface; (5) logistically more feasible as it did not warrant any translations and thus extra costs with potential time delays.

The adopted sampling strategy was non-probability *convenience*, which we deemed suitable due to our overall intent to investigate and discern established attitudes in a rather unfamiliar area. Although no tangible bias can be reported, we are aware that we have obtained merely those who were available at that time, which is why generalizability is arguable. Yet, because of time constraints and deadlines, funds allocation, relatively small researcher group and the global objective to even become acquainted with target audience's perceptions and experience, we were willing to risk representativeness which would otherwise be achievable with large-scale research incorporating random sampling.

The instrument was devised into 5 blocks [sections], in order of appearance these being: *understanding of virtual exchange, experiences with virtual exchange*, *competences concerning virtual exchange*, *needs regarding virtual exchange* and *demographic information*. Blocks that were presented to every respondent regardless of prior contact with virtual exchange were all but the one connected with past experiences, as the latter served as a filter for inquiries related to modes of work, class organisation, resource use, etc. Questions combined dichotomous, multiple-choice, Likert-type scales, numerical scales and open format. Open questions were categorised in a multiethnic team of distinct area specialists, which reduced the likelihood of subjective interpretations, whilst coding was mainly closed. The reliability analyses are depicted in the table below; however, their summation is that the instrument can be assessed as of quality. Be that as it may, parts connected to respondents'

experience could not be comprehensively verified for reliability due to low valid counts (often ≤ 60) with simultaneous high number of items.

Scale	***Cronbach α***
Opinion regarding VE (before subscale division)	.643
Opinion subscale: Development of Language Skills and VE Variety	.770
Opinion subscale: Difficulties in VE Related to Learners' Age	.800
Opinion subscale: Students' Proficiency and Background Knowledge	.647
Opinion subscale: Execution and Communication in VE	.535
Resource use in VE as a pupil	.905
Self-assessed VE competence	.920

We can argue that we have a reliable instrument as $\alpha > .60$. This criterion is violated in one instance, for one opinion subscale, which is explained in subsequent sections. Moreover, we were not alluded to this problem in the pilot phase and could therefore not remedy it beforehand.

For validity verification, we can report favourable outcomes as we managed to design an instrument that covered a multitude of aspects related to virtual exchange, therefore be regarded as extensive and operational in terms of our purpose. Upon reviewing survey questions, data as such and research questions, our assessment is that we obtained what was envisaged. Consequently, this permitted us to underpin latent constructs (such as *competence*) and uncover relationships between variables.

Data analysis commenced in late-April 2024 and was finalised for pre-service teachers in early-June 2024, although proofreading, editing and evaluation ensued. As evident from the results, we initially inspected data as a whole, then proceeded to country-based depictions, where pertinent research questions refer to part one. Analyses were computer-assisted, employing *MS Excel* and *IBM SPSS Statistics 28.0*.

Research Questions

RQ1: What are the participants' **experience as tertiary students** with virtual exchange (VE) in terms of learning, participation and training?

RQ2: How are participants' former encounters with virtual exchange connected with their perceptions about its facets?

RQ3: What do the participants believe is the **added value of VE** in comparison to on-site teaching?

RQ4: What do the participants consider as the **most challenging aspects** of conducting VE projects?

RQ5: How have those with previous experience regarding VE been **coordinated, treated and managed** during their projects?

RQ6: Which areas of VE projects would the participants like to **develop professionally**?

RQ7: How do participants **perceive their competence** regarding VE projects?

RQ8: How many participants plan to carry out **VE projects in their future** professions?

a) *Do study programme, year of study and past experience predict the likelihood that students would opt for VE in their future careers?*

b) Does tertiary level contact with VE affect students' willingness to incorporate it into their future lesson planning?

c) Is willingness to have VE incorporated in future lessons dependent on students' self-reported competence regarding VE?

Project Report

Participants. Participants were 501 university students, enrolled in selected pedagogical study programmes that are implemented in five European institutions of tertiary education; according to latter, we were able to ascertain participants' country of study. Demographic data such as gender, age, study programme and year of study are presented in more detail below.

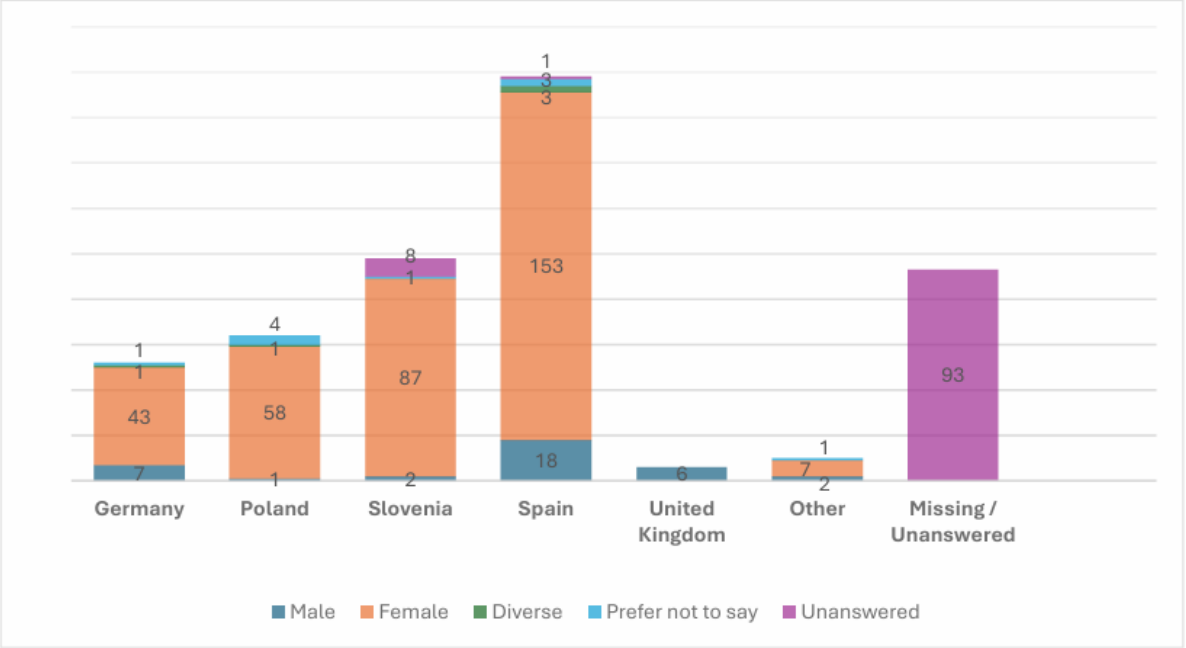


Figure 1: Participants by Country and Gender

Overall, we had 399 valid responses for the variable *gender* and 408 for *country*. Out of that, the vast majority of participants identified as female (354 or 88.7%), the second largest category being male (35 respondents or 7.5%). Although the categories of gender are not equally represented, this distribution was expected acknowledging the actual student structure of selected pedagogical programmes.

Unfortunately, not all demographic data was entered by our respondents which we attribute to the voluntary nature of the survey, the result being relatively high proportion of missing values (102 or 20.4% for *gender* and 93 or 18.6% for *country*).

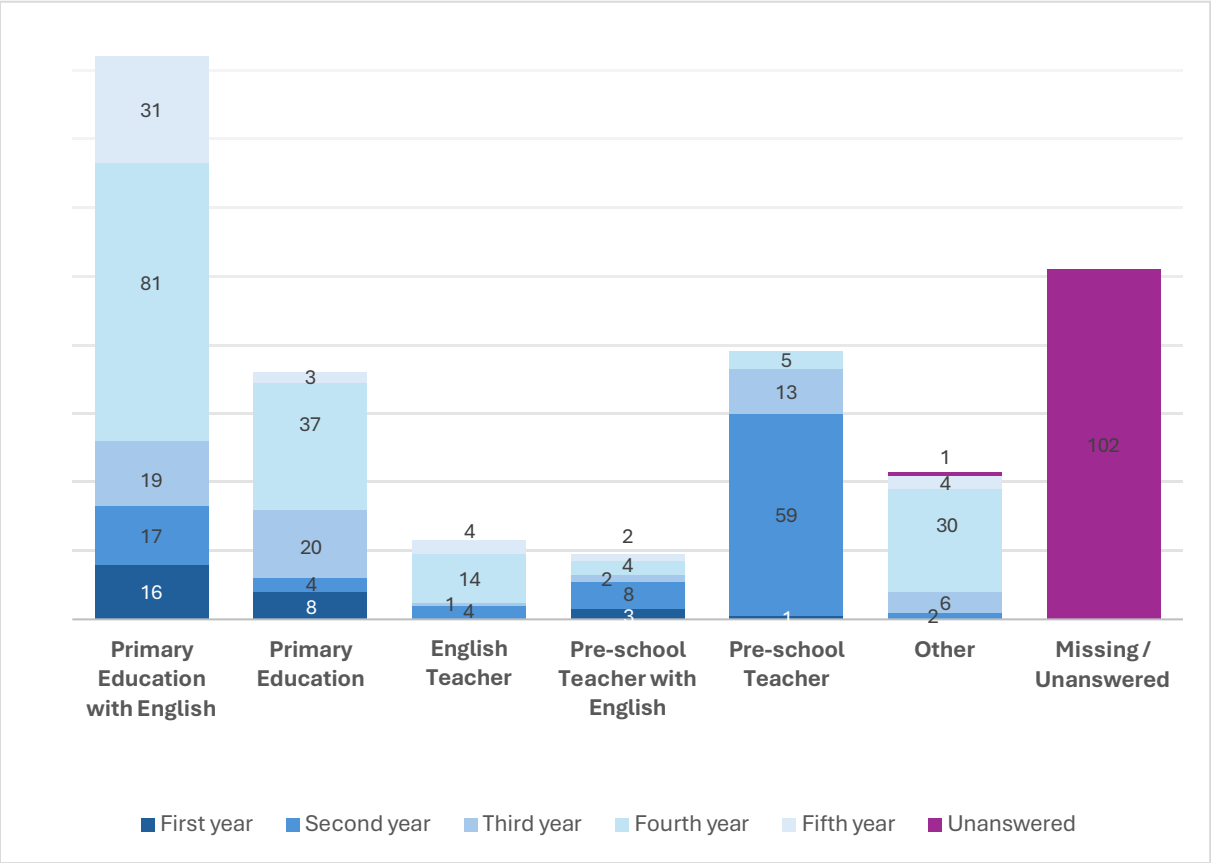


Figure 2: Participants by *Study Programme* and *Study Year*

Respondents could opt for just one answer when asked about their study programme, where it was revealed that out of 399 valid responses, 164 (41.1%) are enrolled in *Primary Education with English*, 78 (19.5%) study to become *Pre-school Teachers*, 72 (18.0%) have decided for *Primary Education*, 23 (5.8%) for *English Teacher* and 19 (4.8%) for *Pre-school Teacher with English*. The category *Other* (43 or 10.8%) revealed that 32 respondents have a double major of *Pre-school and Primary Teacher* and an additional 5 aspire to become *Pre-school and Primary Teachers with English*.

Regarding *study year*, most are currently in their fourth year (173, 43.3%), followed by those in year two (94, 23.5%), then year three (61, 15.3%), next are fifth year students (44, 11.0%), the smallest subsample being first years (28, 7.0%). Only valid percents are reported.

Primary analysis confirmed participants ranged in age from 19 to 78 years (M = 22.85, SD = 5.931). As this is an extremely wide range given the sample characteristics, we provide additional explanation. The modal value was 21, which is in congruence with what one would expect from student population. Moreover, only 3 respondents entered their age to be over 55 and these have been in subsequent analyses sorted as outliers.

Upon removing them, age ranged from 19 to 52 years (M = 22.51, SD = 4.352), mode remains unchanged with 21 as the most frequently stated value. The range of 33 can be explained by participants who enrolled in a programme as part of their continuous professional development, attend further in-service training as part of their domain change (e.g., were pre-

school teachers but are now studying to become primary teachers), altered their career path and study at an older age, etc. Admittedly, we have not inquired about their background in the survey but speculate based on knowing student cohorts.

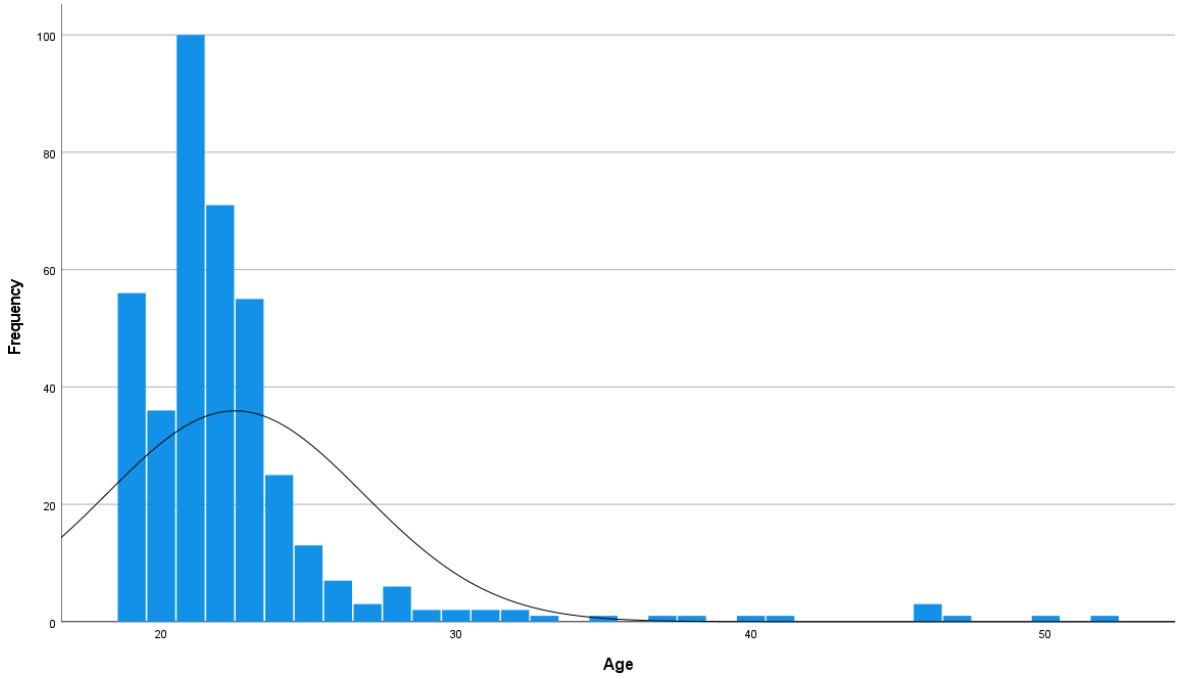


Figure 3: Participants by *Age,* presented in a histogram.

Although not part of *participant description,* we hence present a more detailed variable exploration, prompted precisely by discussed unexpected values. Shapiro-Wilk normality testing (p.<0.000) together with histograms and QQ-plots confirmed that the variable of age significantly deviates from normal distribution.

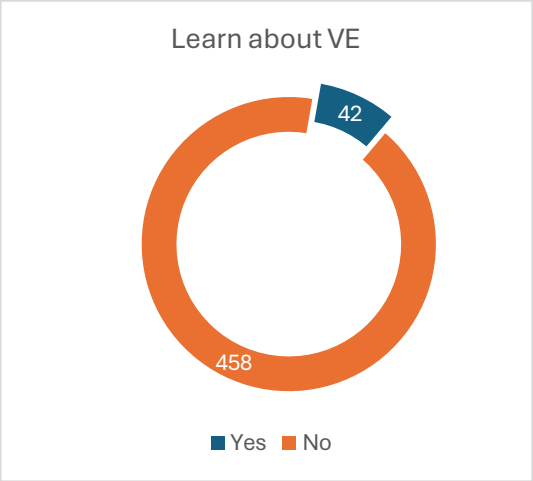
RQ1: What are the participants' experience as tertiary students with virtual exchange(VE) in terms of learning, participation and training?

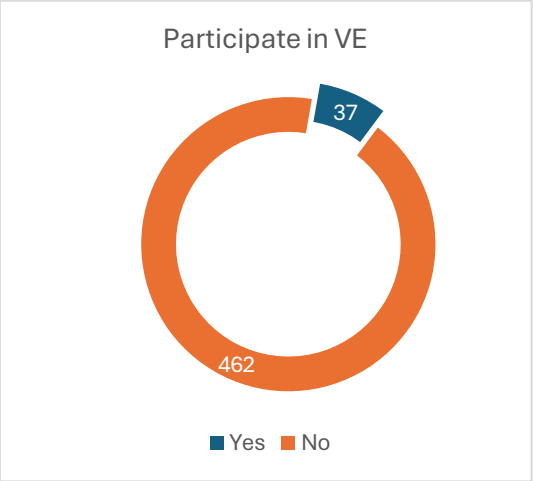
In order to obtain data that would give us an insight into how *virtual exchange* is represented in the university curricula, participants were asked three sets of questions. If they responded affirmative to the first question in the set, they were offered a follow-up open-ended question, in which they could provide more context and detail. Their answers were categorised and are here ordered by descending counts.

1. *Does your study programme have any course in which you LEARN ABOUT virtual exchange?*
   What kind of a course is it? Please, describe it briefly.

2. *Does your study programme have any course in which you PARTICIPATE in virtual exchange with other students?*
   What kind of a course is it? Please, describe it briefly.

3. *Have you taken any course on the development of virtual exchange activities as part of your training?*
   What kind of a training was it?





Category	*Frequency*
eTwinning in general	6
TEFL in general	6
Activities for primary classroom	6
Course related to natural science	4
Virtual collaboration in general	4
Digital media	3
Course whose main focus is communication	1
Hybrid teaching	1

Category	*Frequency*
Course related to natural sciences	7
eTwinning in general	6
Virtual collaboration in general	6
ERASMUS course	4
Course whose main focus is communication	3
Course related to social sciences	2

Students report extremely poor exposure to virtual exchange, be that with or without participation, during their university studies as only 8.4% are learning about it, whilst merely 7.4% are actually involved in it.

It was anticipated that respondents with virtual exchange experience would not dominate, yet their exact proportion in this study was still somewhat surprising. In a recent study by Jager et al. (2019) about the awareness of virtual exchange in higher education, the authors report that only 19.6% of educators (ibid. pp 14-16) had a precise idea about what virtual exchange even is. Additionally, O'Dowd (2023) asserts that virtual exchange was up until relatively recently a "bottom-up" activity in tertiary education, meaning that it was executed by those who simultaneously researched it as well as tried to implement it in their classes (ibid., p. 25). Thus, if it is not or was not endemic with educators, it cannot be notable with students.

In continuation we performed *binomial tests* to see if the observed result is significantly different from the expected, having set the test proportion for category NO to 0.85 based on the evidence and theory above.

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (1-tailed)
*Course in which they **LEARN ABOUT** virtual exchange.*	Group 1	No	458	0.92	0.85	<0.001
	Group 2	Yes	42	0.08		
	Total		500			
*Course in which they **PARTICIPATE IN** virtual exchange with other students.*	Group 1	No	462	0.93	0.85	<0.001
	Group 2	Yes	37	0.07		
	Total		499			

Binomial tests indicated that the proportions of those without any experience with virtual exchange as tertiary students of 0.08 and 0.07 respectively were significantly lower than the expected 0.15 (p. <0.001). Content-wise, this gives a preliminary insight into the situation regarding the presence of virtual exchange in selected countries, indicating a need to increase efforts towards VE being more advocated.

Furthermore, we wanted to test for differences between countries in that respect. Due to several expected counts being initially lower than 5, we have recoded the variable and merged the category *United Kingdom* with *Other*.

Crosstab

		Learn about VE		
		Yes	No	Total
Germany	Count	10	42	52
	Expected count	4.6	47.4	52.0
	%	19.2%	80.8%	
Poland	Count	8	56	64
	Expected count	5.6	58.4	64.0
	%	12.5%	87.5%	
Slovenia	Count	10	88	98
	Expected count	8.6	89.4	98.0
	%	10.2%	89.8%	
Spain	Count	5	173	178
	Expected count	15.7	162.3	178.0
	%	2.8%	97.2%	
United Kingdom and Other	Count	3	13	16
	Expected count	1.4	14.6	16.0
	%	18.8%	81.3%	
Total	Count	36	372	408
	Expected count	8.8%	91.2%	408.0

	value	*df*	*Asym. Sig. (2-sided)*
Pearson Chi-Square	18.272	4	0.001
N of valid cases	408		

		Value	Approximate Sig.
Nominal by Nominal	Cramer's V	0.212	0.001

According to test results there was a significant association between country and whether or not participants are learning anything about virtual exchange as part of their university studies (χ^2 = 18.272, p = 0.001). Although students without any instruction about virtual exchange present the majority across all countries, Germany tends to have a somewhat larger proportion of those who do learn about VE, whilst Spain the smallest.

Cramer's V of 0.212 denotes an otherwise significant effect size, but the latter implies a rather weak association, because of which other variables apart from country should be considered. Due to this, practical significance is at best questionable as the difference between countries' counts in "yes" category might not be large enough to have a meaningful real-life impact. This tentativeness is further reinforced by varied group sizes.

As chi-square is conditioned by expected counts to be above 1 and that no more than 20% of expected counts are under 5, we have again opted for recoding that was described above. However, we must emphasize that the category of *United Kingdom and Other* is in itself problematic as it did not reach the quota of at least 50 valid cases and therefore thwarts interpretation.

Crosstab

		Participate in VE with other students		
		Yes	No	Total
Germany	Count	4	48	52
	Expected count	4.2	47.8	52.00
	%	7.7%	92.3%	
Poland	Count	6	58	64
	Expected count	5.2	58.8	64.00
	%	9.4%	90.6%	
Slovenia	Count	15	83	98
	Expected count	7.9	90.1	98.0
	%	15.3%	84.7%	
Spain	Count	6	172	178
	Expected count	14.4	163.6	178.0
	%	3.4%	96.6%	
United Kingdom and Other	Count	2	14	16
	Expected count	1.3	14.7	16.0
	%	12.5%	87.5%	
Total	Count	33	375	408

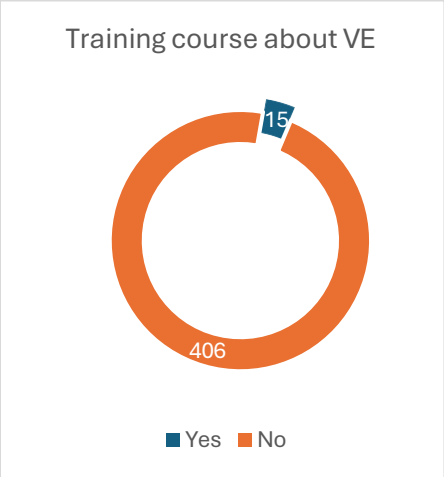
	value	*df*	*Asym. Sig. (2-sided)*
Pearson Chi-Square	12.769	4	0.012
N of valid cases	408		

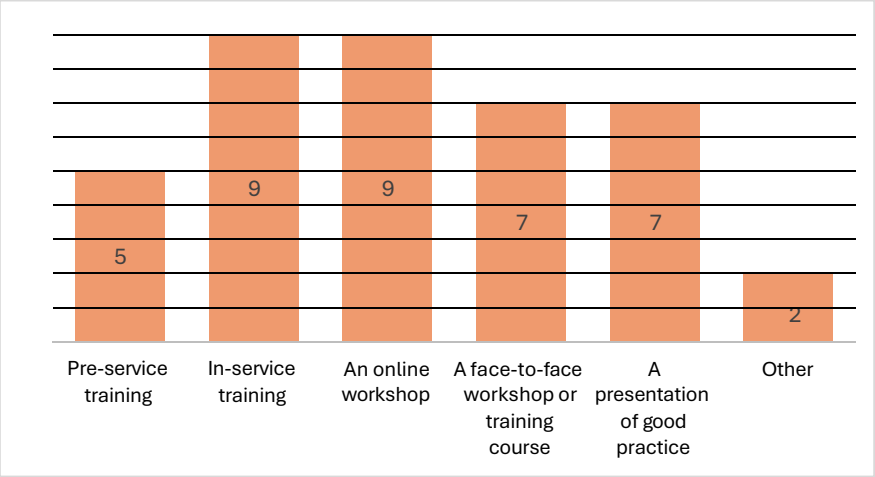
		Value	Approximate Sig.
Nominal by Nominal	Cramer's V	0.177	0.012

Similar to previous analysis, significant association was found between country and student participation in VE with others ($\chi^2 = 12.769$, $p = 0.012$). Data shows Slovenian students tend to have more experience with participating in VE activities (15.3%) than their colleagues from other countries, whilst Spanish students report the lowest proportion of those with participatory experience (3.4%). However, descriptive data clearly indicate that regardless of country, those that do not participate in VE as part of their tertiary studies constitute the predominant share.

Cramer's V of 0.177 denotes an otherwise significant effect size, which is again low or weak. As a result, practical significance of these results is debatable, whilst same reservations should be considered as above.

As can be observed from the graph below, only 15 students report that they had any kind of training about VE. Those that confirmed prior training were asked to specify its kind in a multiple response set.

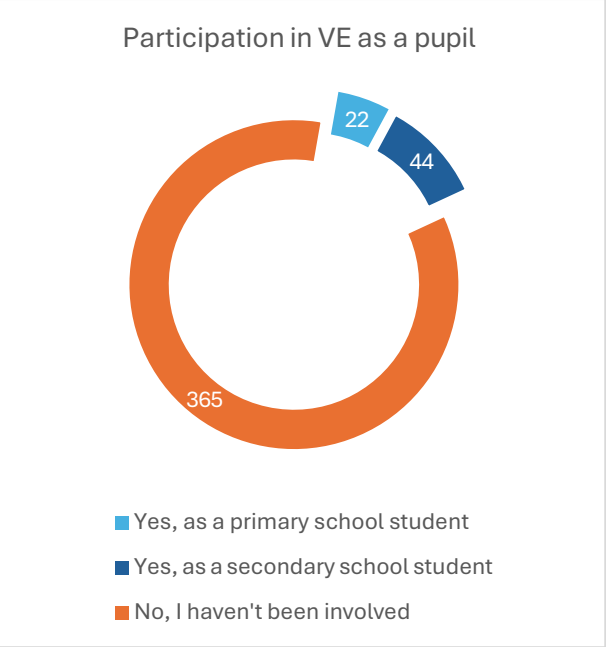




To put things into perspective, 15 students correspond with 2.99% of the entire sample and 3.56% of valid values (N = 421). As individual answers pertaining to training kinds contain just a handful of counts, inferential analysis was not carried out.

RQ2: How are participants' former encounters with virtual exchange connected with their perceptions about its facets?

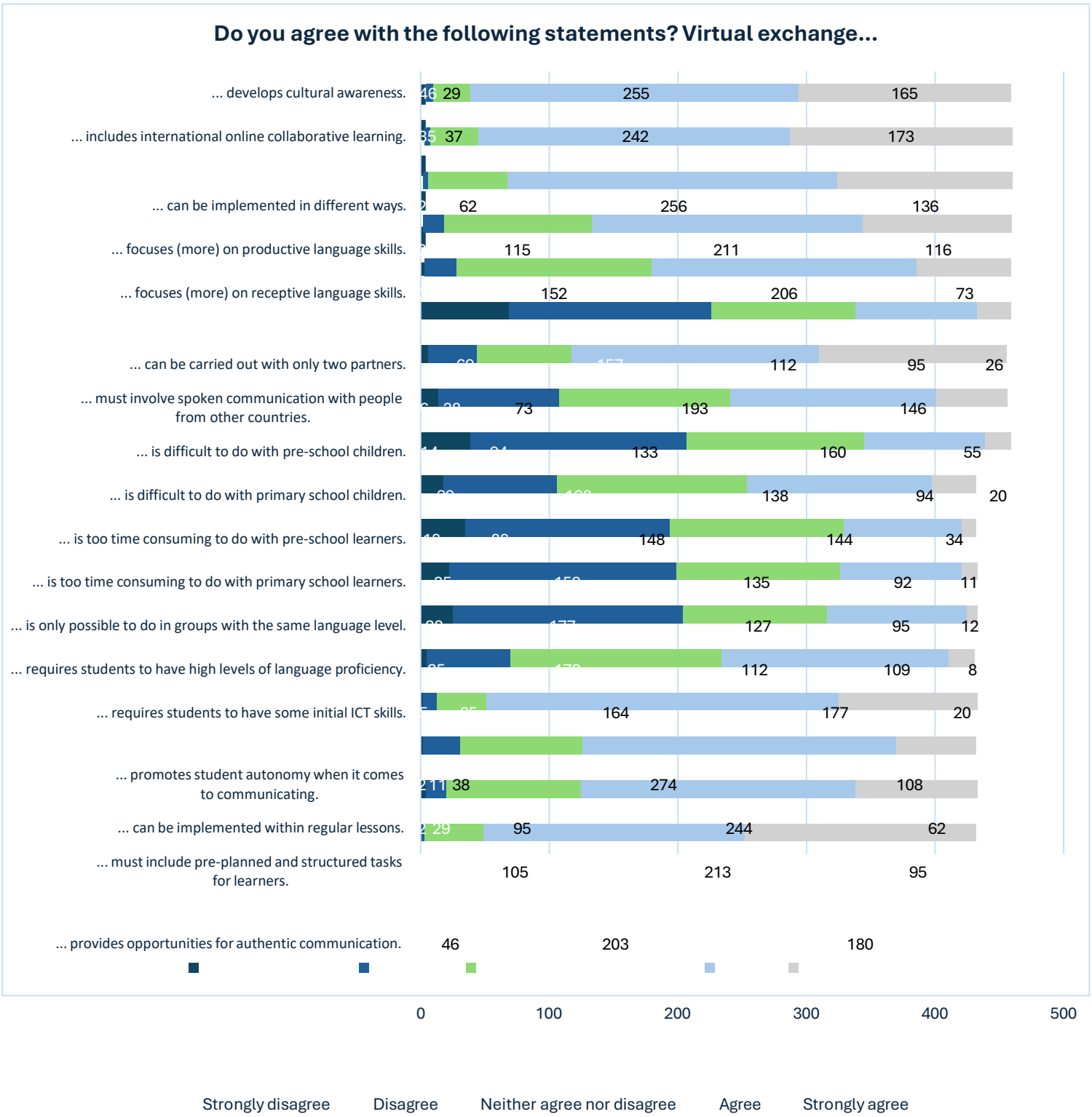
Apart from providing information about their engagement in virtual exchange during their primary and secondary levels of education, all participants were asked to answer 18 five-point Likert-type scales about virtual exchange, ranged from *strongly disagree* to *strongly agree*.



If they had participated in a virtual exchange project in primary as well as in secondary school, they were asked to select the school whose project left a more memorable impression.

Additionally, the affirmative responses served as a major condition for the survey, as those who had not previous experience, did not answer the survey question block about activities, resources, organisation.

Combined, 66 (15.3%) students report that they had the opportunity to partake in a virtual exchange project during their years in either primary or secondary school. Viewed separately, with a valid proportion of 10.2%, those who were involved in virtual exchange as secondary school students present a larger share than those whose contact with virtual exchange commenced or was linked to primary school (5.1%).



Taking this as an independent variable we wanted to ascertain differences between said groups in how they respond to statements pertaining to virtual exchange. The latter are provided here with corresponding counts, however, due to their scope, we first opted for dimension reduction in terms of *exploratory factor analysis* (as all statements were positively valenced, no reverse scoring was required). Nevertheless, preliminary analysis of *correlation matrix* revealed a large number of low correlation coefficients ($r < \pm .30$). The ordinary

approach of removing problematic variables could not be utilised in this case. The solution was, acknowledging the nonnormality and ordinal nature of statements, to run a *polychoric correlation matrix* as well, which is for the sake of transparency attached below (however, the

names of statements have been substituted for *items no. X* to save space and make it more legible). Since SPSS has no direct command, we conducted these tests via *POLYMAT-C* (2015). Although it offers smoothing as well, we have not considered it to be necessary.

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17	Item 18
1	1.00	.596	.487	.448	.351	-.127	.257	-.113	-.239	-.194	-.214	-.195	-.268	-.110	.424	.261	.086	.425
2		1.00	.508	.460	.342	.121	.211	.015	-.170	-.237	-.276	-.190	-.205	-.128	.334	.201	.069	.366
3			1.00	.343	.318	-.036	.188	-.174	-.216	-.251	-.290	-.209	-.254	-.072	.269	.296	.086	.340
4				1.00	.607	.036	.220	-.017	-.068	-.060	-.162	-.075	-.084	-.047	.222	.134	.047	.298
5					1.00	.133	.251	-.027	.018	-.011	-.074	-.009	-.052	-.005	.220	.120	.073	.177
6						1.00	.233	.143	.195	.108	.114	.064	.061	.035	-.138	-.048	.022	-.193
7							1.00	.120	.105	.048	-.035	-.025	.061	.086	.278	.116	.307	.287
8								1.00	.624	.511	.385	.219	.306	.170	-.045	-.196	.236	.041
9									1.00	.396	.537	.323	.382	.177	-.156	-.183	.158	-.134
10										1.00	.721	.330	.359	.293	-.049	-.235	.189	-.105
11											1.00	.414	.471	.250	-.126	-.258	.150	-.230
12												1.00	.521	.340	-.116	-.188	.195	-167
13													1.00	.345	-.036	-.173	.188	-.140
14														1.00	.171	-.013	.245	.026
15															1.00	.400	.227	.487
16																1.00	.077	.287
17																	1.00	.331
18																		1.00

Although we can hardly argue that we have the optimum scenario for factor analysis, as patterned relationships are somewhat questionable, polychoric correlations suit better and have revealed a higher number of desired scores. Furthermore, as no correlation is above ± .90, problem of multicollinearity did not occur (corroborated by *Determinant score* being .007, thus above the required .00001).

But since items 6 (*… can be caried out with only 2 partners*) and 7 (*… must involve spoken communication with people from other countries*) had the smallest number of acceptable correlations – if any – they were dealt with caution in further analysis.

KMO and Bartlett's Test

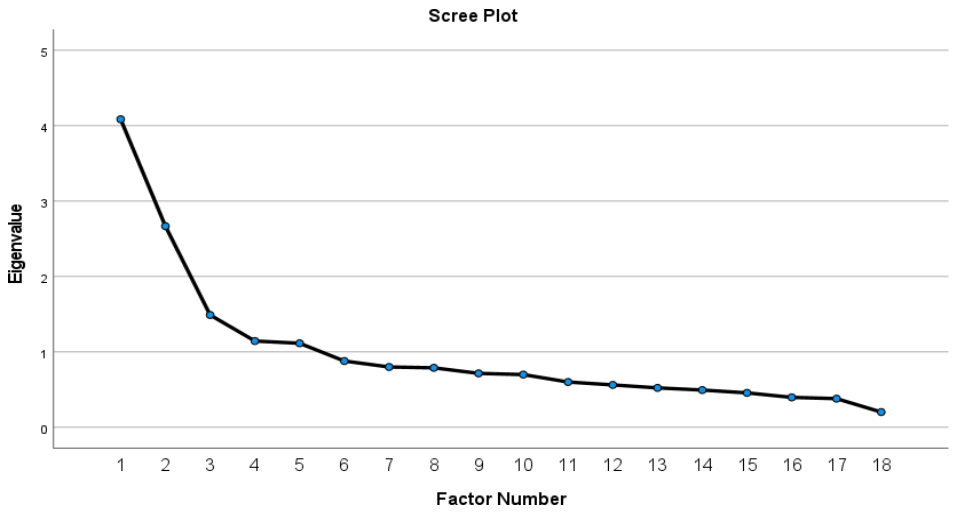
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.761
Bartlett's Test of Sphericity	Approx. Chi-Square	2050.947
	df	153
	Sig.	.000

KMO and Bartlett's tests confirmed that our data set is suitable for factor analysis. KMO value of 0.761 can be interpreted as *good*, as values of >.60 are deemed acceptable for FA. Moreover, a significant Bartlett's test confirms that in spite of previous dilemma, we do have correlations between variables as a result of potential laten factors. Diagonal elements in the *anti-image correlation matrix* had an "a" superscript with values well above the cut-off of .5 (the lowest being .65).

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Comulative %	Total	% of Variance	Comulative %	Total	% of Variance	Comulative %
1	4.085	22.697	22.697	3.556	19.756	19.756	1.989	11.051	11.051
2	2.668	14.822	37.519	2.117	11.758	31.514	1.830	10.169	21.220
3	1.490	8.275	45.794	.885	4.914	36.428	1.799	9.993	31.213
4	1.144	6.357	52.151	.610	3.387	39.815	1.407	7.819	39.032
5	1.115	6.192	58.343	.490	2.721	42.536	.631	3.504	42.536
6	.879	4.883	63.225						

Extraction method: **Principal Axis Factoring**



Rotated Factor Matrix[a]

	Factor				
	1	2	3	4	5
Virtual exchange... focuses (more) on productive language skills.	,706				
Virtual exchange... focuses (more) on receptive language skills.	,668				
Virtual exchange... includes international online collaborative learning.	,581				
Virtual exchange... develops cultural awareness.	,557				
Virtual exchange... can be implemented in different ways.	,467				
Virtual exchange... is difficult to do with pre-school children.		,783			
Virtual exchange... is difficult to do with primary school children.		,624			
Virtual exchange... is too time consuming to do with pre-school learners.		**,553**	,443		
Virtual exchange... is too time consuming to do with primary school learners.		**,530**	,519		
Virtual exchange... is only possible to do in groups with the same language level.			,611		
Virtual exchange... requires students to have high levels of language proficiency.			,601		
Virtual exchange... requires students to have some initial ICT skills.			,489		
Virtual exchange... provides opportunities for authentic communication.				,602	
Virtual exchange... promotes student autonomy when it comes to communicating.				,587	
Virtual exchange... must include pre-planned and structured tasks for learners.				,405	
Virtual exchange... can be implemented within regular lessons.				,327	
Virtual exchange... can be carried out with only two partners.					,517
Virtual exchange... must involve spoken communication with people from other countries.					,402

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Principal axis factoring (with varimax rotation) and scree plot suggested a 5-factor solution, however, this proved inadequate in comparison to a 4-factor model, as the fifth factor had only two items that loaded onto it (these two items being the two statements that were rather unsuitable from the start) – these two variables were excluded in subsequent procedures. The two complex loadings were resolved in favour of factor 2 for fit of content. Together, 4 factors account for 52.15% of total variance and 39.82% of common variance.

- Factor 1: **Development of Language and Intercultural Skills and VE Variety** (comprised of 5 statements [scales] whose Cronbach alpha was measured at .770)
- Factor 2: **Difficulties in VE Related to Learners' Age** (comprised of 4 statements [scales] whose Cronbach alpha was measured at .800)
- Factor 3: **Students' Language and Technology Proficiency** (comprised of 3 statements [scales] whose Cronbach alpha was measured at .647)
- Factor 4: **Execution and Communication in VE** (comprised of 4 statements [scales] whose Cronbach alpha was measured at .535)

Whilst first three factors [sets] have at least acceptable levels of internal consistency (i.e., above the threshold of .6), the last set has a poor reliability level (though still borderline permissible, would warrant further research) is something we have not recognised in the pilot study.

According to factor weights and reliability analysis we computed new variables, based on the summation of values of individual indicators, which we then divided by the number of statements comprising that set. The composite variables included values on the scale from 1 (strongly disagree / very negative opinion) to 5 (strongly agree / very positive opinion).

		Development of Language Skills and VE Variety	Difficulties in VE Related to Learners' Age	Students' Proficiency and Background Knowledge	Execution and Communication in VE
N	Valid	460	460	433	433
	Missing	41	41	68	68
Mean		4.0492	3.0011	2.9523	4.0100
Median		4.00	3.00	3.00	4.00
Std. Deviation		.54264	.79580	.69853	.48607

Now that we have reduced the number of original statements to a more operable assortment of compounds, it was time to analyse respondents' opinions in relation to their existing experience with VE during their years as elementary or secondary school pupils. In other words, we wanted to ascertain whether past experience affects their opinions (and understandings) about VE in any way.

In order to verify this, we used Kruskal-Wallis H test and additionally checked for pairwise comparisons with Dunn's post hoc test in case of significant omnibus test (Monte Carlo estimate of significance was used in that respect). Based on obtained results we conclude that Kruskal-Wallis H test did not reveal any significant differences in respondents' opinions given their diverse past experience with VE. In the tables enclosed below, more data is available.

	Involvement in any VE project as a primary/secondary school student	N	Mean Rank	Kruskal-Wallis	df.	Monte Carlo Sig. Lower bound (99% CI)	Monte Carlo Sig. Upper bound (99% CI)	Sig.[a]
Development of Language Skills and VE Variety	Yes, as a primary school student	22	208,14	1.534	2	.448	.474	.461
	Yes, as a secondary school student	44	237,51					
	No, I haven't been involved	365	213,88					
	Total	431						
Difficulties in VE Related to Learners' Age	Yes, as a primary school student	22	193,75	.774	2	.672	.696	.684
	Yes, as a secondary school student	44	220,03					
	No, I haven't been involved	365	216,85					
	Total	431						
Students' Proficiency and Background Knowledge	Yes, as a primary school student	22	256,41	3.865	2	.132	.150	.141
	Yes, as a secondary school student	44	233,28					
	No, I haven't been involved	364	210,88					
	Total	430						
Execution and Communication in VE	Yes, as a primary school student	22	243,45	1.213	2	.532	.558	.545
	Yes, as a secondary school student	44	214,55					
	No, I haven't been involved	364	213,93					
	Total	430						

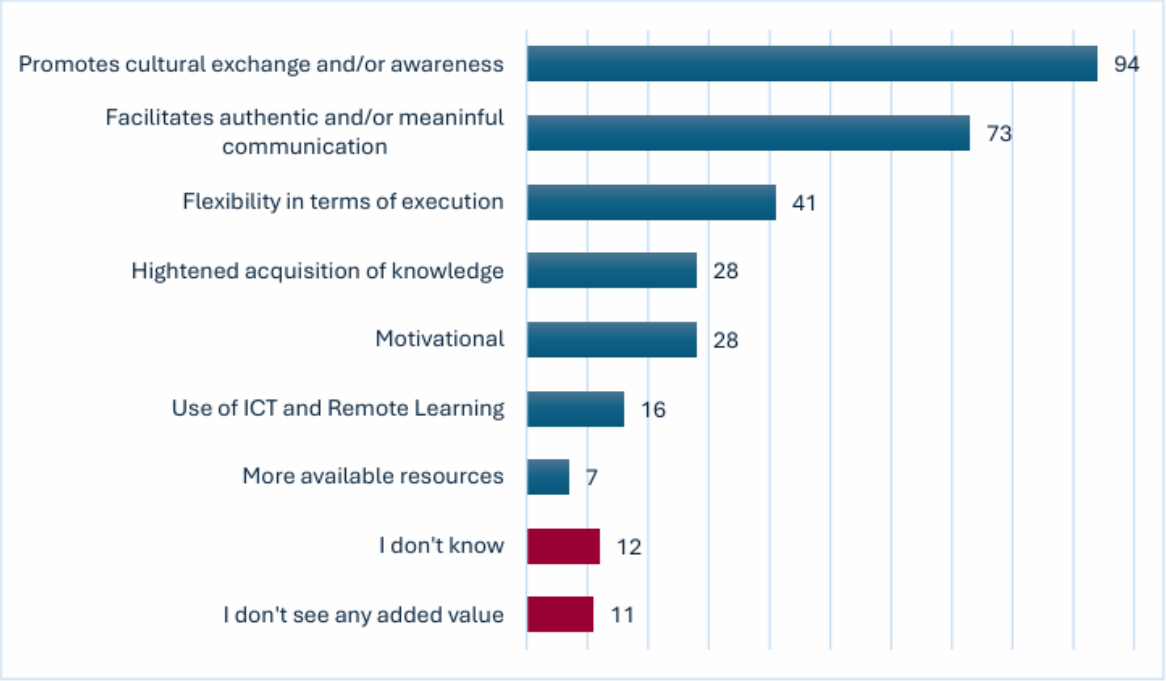
a. Based on 10,000 sampled tables with starting seed 2,000,000.

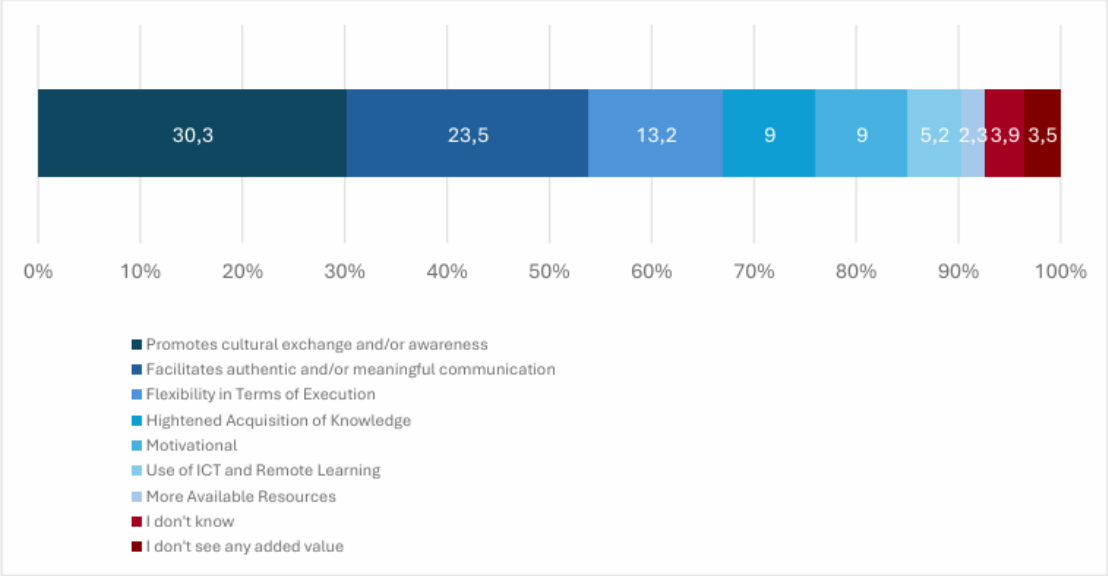
The next step of the analysis was to merge the category "*Yes, as a primary school student*" with "*Yes, as a secondary school student"* and re-run the analysis with Mann-Whitney U test (because we no longer had *K-independent* samples, but *2-independent* samples). Results are comparable as we still had to retain the null hypothesis in all four cases.

If we were to comment sample data, we can potentially argue that those that have previously encountered VE, have higher mean ranks in most cases, indicative of higher degrees of concord, yet we advise caution about such interpretation.

RQ3: What do the participants believe is the added value of VE in comparison to on-site teaching?

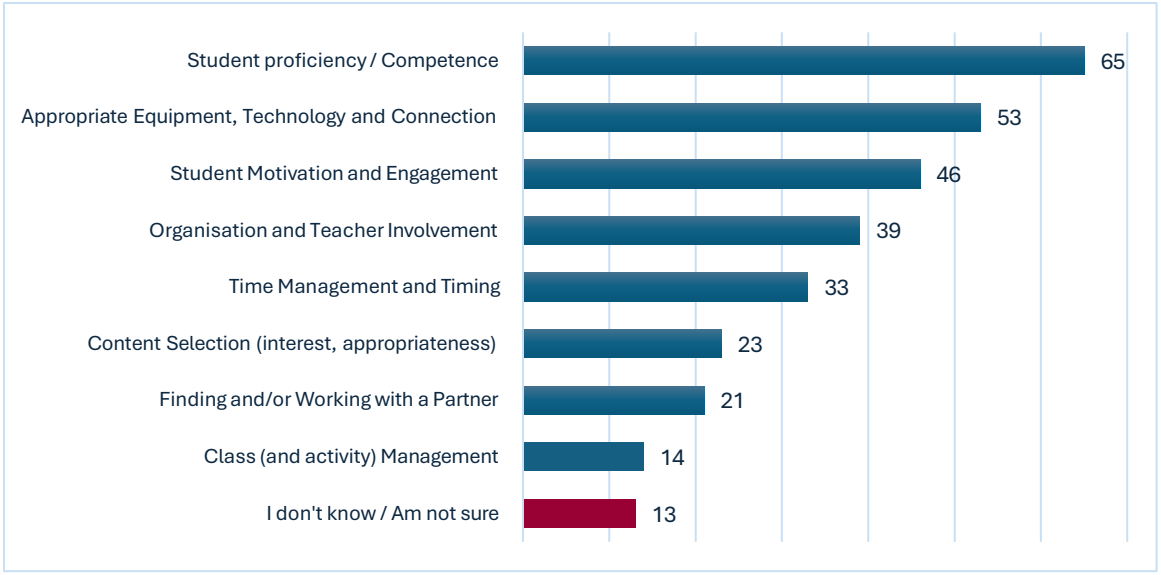
We presented this question completely opened as we refrained from confining participants in any way. In return, we received 310 responses which were sorted into 9 distinct categories (content suitability was achieved through researcher triangulation, whilst non-English answers were translated into target language by native speakers).





After seeing that respondents state "*cultural exchange and awareness*" (94 or 30.3%) as the most advantageous element of VE in comparison to face-to-face education (followed by "*authentic and meaningful communication* with 73 counts representing 23.5%), we wanted to check if the presence of VE (either learning about it or participation) in tertiary education curricula affects how students perceive its added value. However, chi-square tests did not indicate any significant difference between subgroups.

RQ4: What do the participants consider as the most challenging aspects of conducting VE projects?



Most challenging in conducting VE projects

		Time management and timing	Appropriate equipment...	Student motivation and engagement	Student proficiency / Competence	Content selection	Finding and/or Working with a partner	Organisation and teacher involvement	I don't know / Am not sure	Class (and activity) management	Total
Germany	Count	6	7	4	5	1	6	5	0	0	34
	Expected count	3.6	5.9	5.3	7.4	2.4	2.3	4.3	1.5	1.5	34.0
	%	17.6%	20.6%	11.8%	14.7%	2.9%	17.6%	14.7%	0.0%	0.0%	100.0%
Poland	Count	4	11	6	6	3	3	5	0	3	41
	Expected count	4.3	7.1	6.4	8.9	2.9	2.8	5.1	1.8	1.8	41.0
	%	9.8%	26.8%	14.6%	14.6%	7.3%	7.3%	12.2%	0.0%	7.3%	100.0%
Slovenia	Count	11	8	10	14	10	4	9	6	0	72
	Expected count	7.5	12.4	11.2	15.6	5.1	4.9	9.0	3.2	3.2	72.0
	%	15.3%	11.1%	13.9%	19.4%	13.9%	5.6%	12.5%	8.3%	0.0%	100.0%
Spain	Count	8	21	24	38	6	6	16	6	9	134
	Expected count	14.0	23.1	20.8	29.0	9.5	9.1	16.8	5.9	5.9	134.0
	%	6.0%	15.7%	17.9%	28.4%	4.5%	4.5%	11.9%	4.5%	6.7%	100.0%
United Kingdom and Other	Count	2	4	2	1	1	1	2	1	1	15
	Expected count	1.6	2.6	2.3	3.2	1.1	1.0	1.9	.7	.7	15.0
	%	13.3%	26.7%	13.3%	6.7%	6.7%	6.7%	13.3%	6.7%	6.7%	100.0%
Total	Count	31	51	46	64	21	20	37	13	13	296

	value	*df*	*Asym. Sig. (2-sided)*
Likelihood ratio	50.606	32	0.019
N of valid cases	296		

		Value	Approximate Sig.
Nominal by Nominal	Cramer's V	0.196	0.057

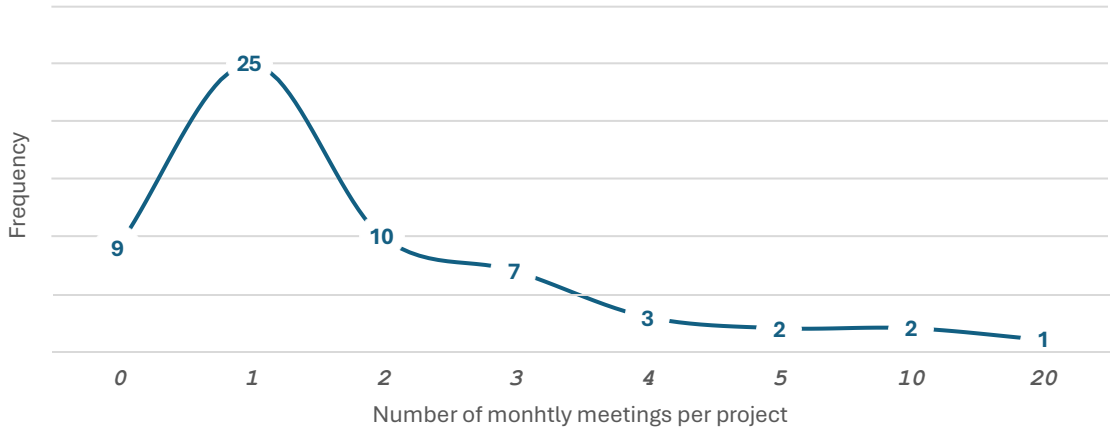
Conditions for chi-square were not met, but the alternative likelihood ratio (2î = 50.606; df. = 32; p = 0.019) showed significant differences between countries and participants' evaluation of VE's most challenging aspect. We have conducted a further *post hoc test* of adjusted standardised residual values (without correction), based on which we can emphasise and expose the following:

- The proportion of those who consider *finding/working with a partner* is significantly higher in German students (17.6%) than in any other country (which are all below 8%).
- *Content selection* was recognised as most challenging by 13.9% of Slovenian respondents which is significantly higher than what was reported by their foreign colleagues (the mean being at around 7%).
- Spain has the lowest share of students (6.0%) who acknowledge *time management and timing* as most difficult compared to other countries (between 10 and 17%), whilst they identify *student proficiency/competence* as the aspect that would be most challenging (28.4%) which is significant in relation to other countries whose part ranges from 7 to 19%.

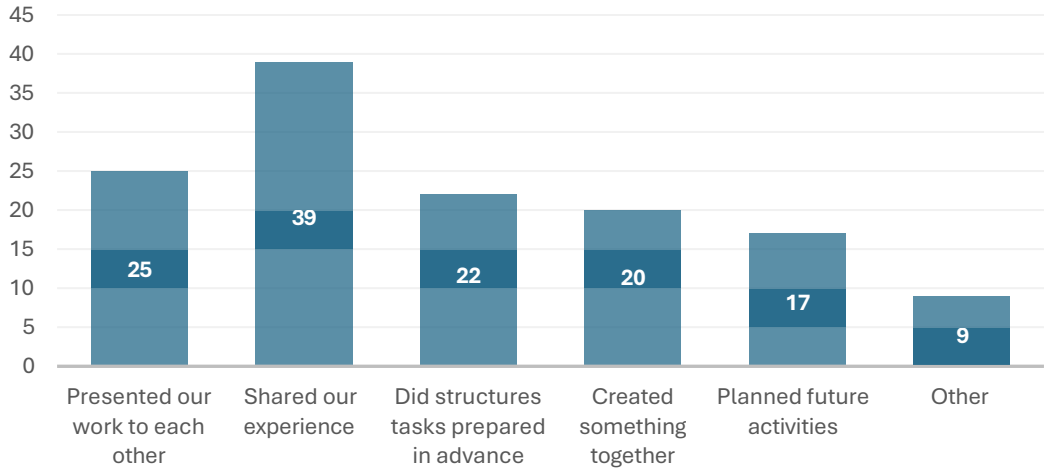
The association measure between these categorical values exhibits weak results, ergo, any real-world relevance would be erroneous.

RQ5: How have those with previous experience regarding VE been coordinated, treated and managed during their projects?

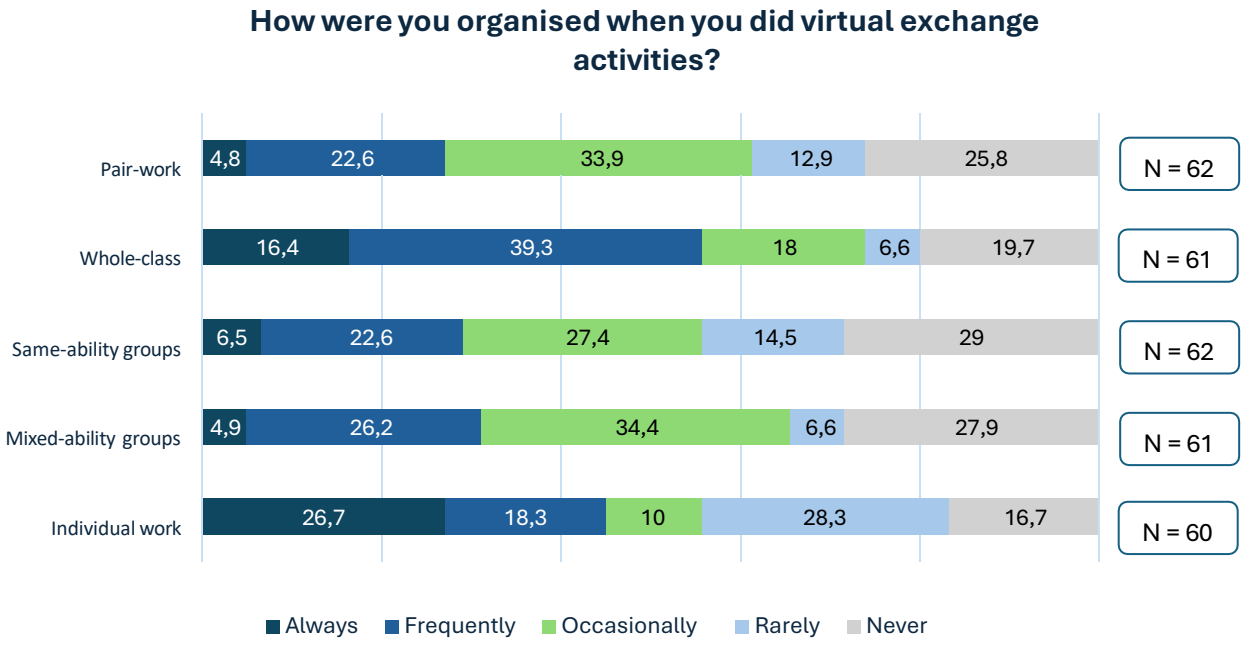
In terms of organisation, we were interested primarily in the frequency of meetings in a period of one month, planned activities, class organisation and use of resources.



We managed to obtain 59 responses, out of which 25 respondents (42.4%) report that they only met once per month. Zero meetings (9 or 15.3%) and two meetings (10 counts or 16.9%) would in practical terms tie for second place. Additionally, 3 answers reported an almost unforeseen number of assemblies (that being 10 and upwards to 20), which would suggest – based on the number of school days – that they had contact almost every other day if not every day. We consider this as extremes, the exception rather than the rule.



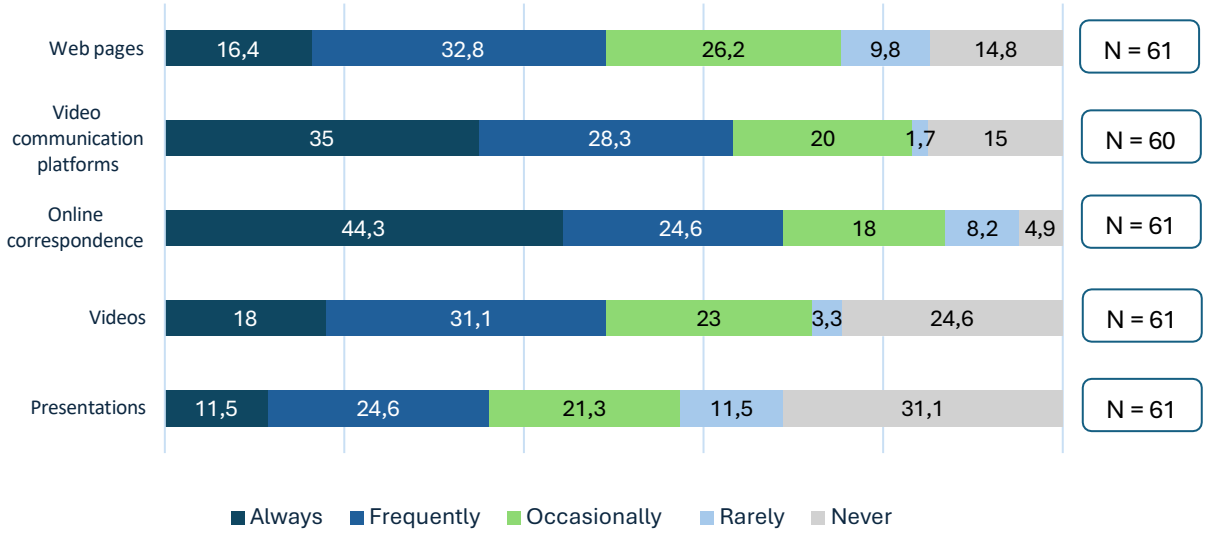
In terms of what they were doing, most (39 out of 132; 29.5%) stated that they shared their experiences, therefore the emphasis was on communication as such. Presenting work to each other followed with 18.9%, while other forms of work received between approximately 13 to 16 % of all reports.



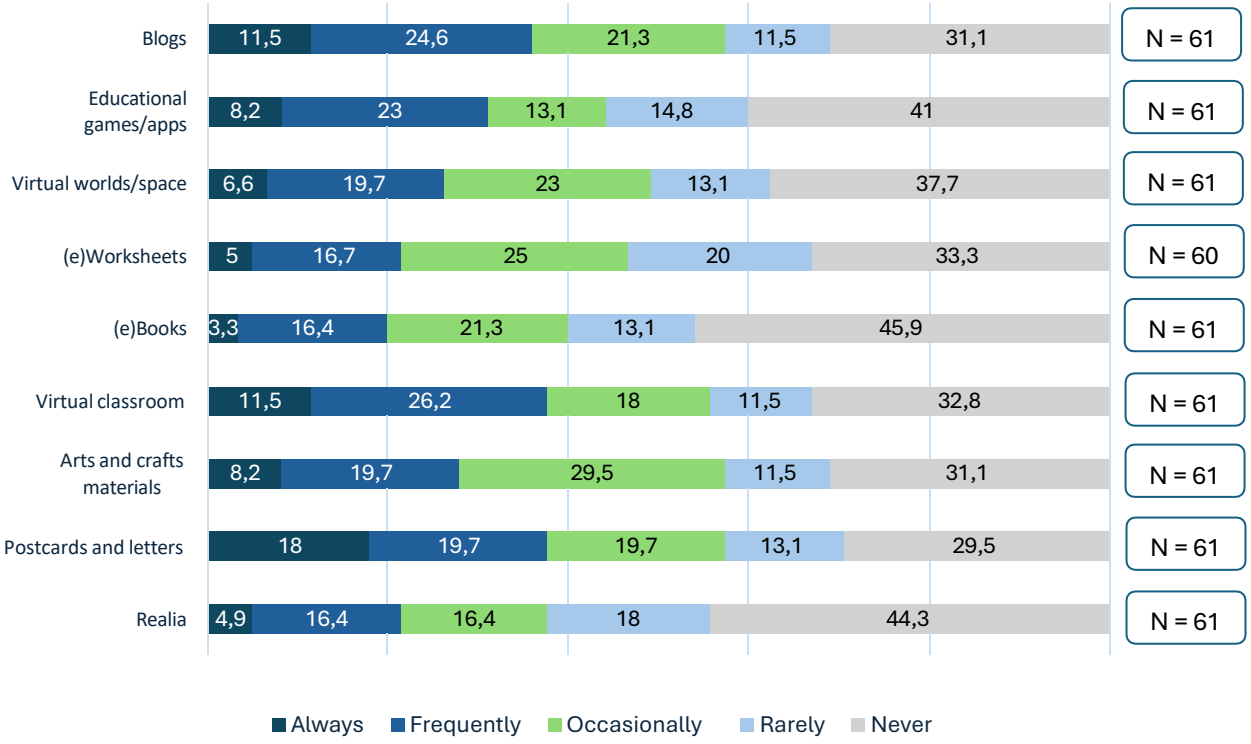
As matters would soon turn monotonous otherwise, we shall comment only the most frequently selected option. In connection with pair-work, the majority of students (33.9% or 21 individuals) said that they had opted for such an approach *occasionally* during project's duration. Same goes for mixed-ability groups, where again a good third (34.4% or 21 counts) of respondents favoured this form of organisation. Whole-class was by far the most recurrent form as it amassed 55.7% by merging *always* with *frequently*.

Same-ability groups have the highest (and dominant) proportion of those whose teachers or instructors *never* organised activities in corresponding way. Individual work is eventually equally difficult to interpret content-wise, as we have obtained the same share of those who had it *at least frequently* (45.0%) and *rarely or never* (45.0%).

When you participated in **VIRTUAL EXCHANGE** as a student, how often did you use the following **resources**?



When you participated in **VIRTUAL EXCHANGE** as a student, how often did you use the following **resources**? (cont.)



Data pertaining to resource use exhibit a somewhat contrastive reality with a few options to which respondents were systematically and regularly exposed, whilst a majority of other varieties was frequently enforced only in a handful of cases, thus most study participants never worked with them at all.

In terms of constant or at least frequent use, *web pages, video communication platforms* (e.g., ZOOM, MS Teams, Skype)*, online correspondence* (e.g., texting, email, e-forums) and *videos* are established as preferred when conducting a VE project, since approximately 50% of respondents (precise shares presented in graphs above) report they had used them on a regular basis. Additionally, these four resource types have the lowest proportion of students who report never using them in the duration of a project, ranged from 5 (for *online correspondence*) to 25% (for *videos*).

All other resource types have between 30 to 45% of respondents who claim never to have used them at all and a further 11 to 20% of accounts that disclose rare use of resources. Analysed together, ergo, joining the category of *never* and *rarely*, the most unpopular seem to be *realia* (62.3% of all cases feature this kind of negative reply), *(e)Books* (59% of those who used it less often than even sporadically) and *educational games or apps* (55.8% recount infrequent use). If we interpret *occasionally* as middle ground, a neutral response of a kind, all other resources have more counts on the negative (i.e., rarely and never) than on the positive (i.e., frequently and always) side of the scale.

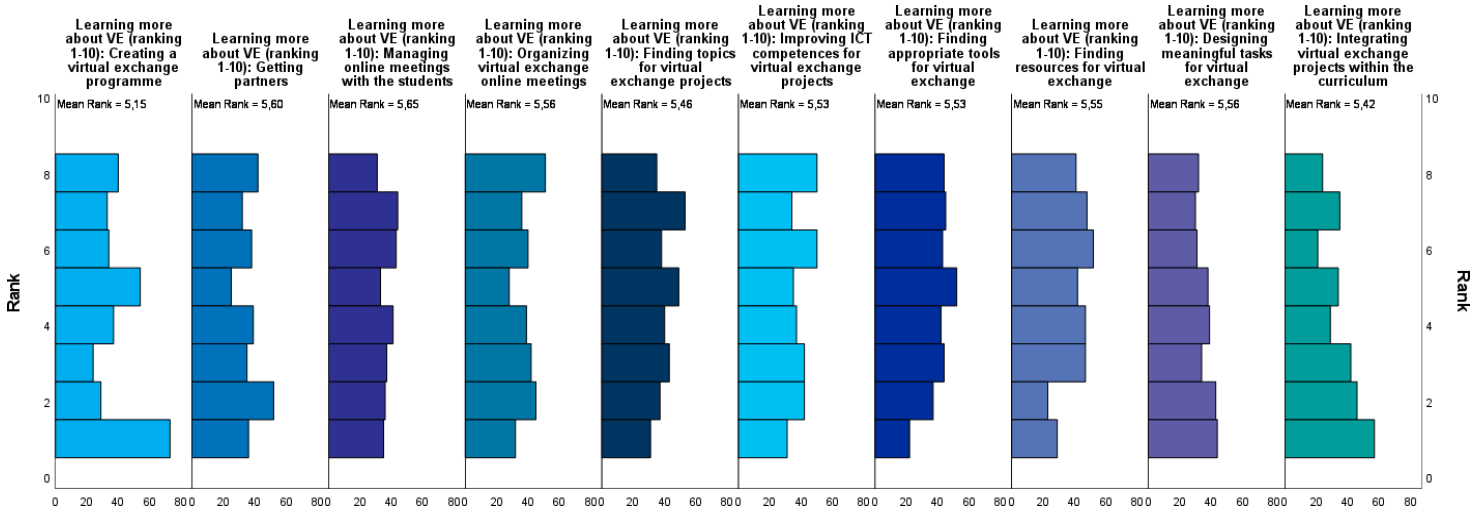
RQ6: Which areas of VE projects would the participants like to develop professionally?

Participants were asked to rank ten areas related to VE about which they would have liked to learn more. Ranking followed the logic of 1 meaning "*the most*", 10 standing for "*the least*"; that is, the lower the mean score, more important is the area in respondents' perception. We hereby provide the table in ascending order mean-wise.

Area	Valid N	Mean Rank
Creating a VE programme	398	5.151
Integrating VE projects within the curriculum	398	5.423
Finding topics for VE projects	396	5.456
Finding appropriate tools for VE	399	5.526
Improving ICT competences for VE projects	400	5.526
Finding resources for VE	399	5.554
Designing meaningful tasks for VE	399	5.556
Organising VE online meetings	398	5.556
Getting partners	399	5.597
Managing online meetings with students	398	5.654

Mean ranks signalled little difference in how participants ranked given areas, yet for the sake of certainty Friedman analysis of variance was conducted as data stemmed from rank-order survey questions with no repeated ranks between areas. The hypothesis we set was: Do mean ranks differ between areas that participants would like to learn more about? Or in other words, are certain areas ranked significantly different (i.e., lower, higher) than others?

Friedman Test (χ^2 = 7.367, df. = 9, p. = 0.599) left us with the decision to retain the null hypothesis, because of which we did not perform any multiple comparisons.



RQ7: How do participants perceive their competence regarding VE projects?

We presented participants with 10 competences related to organising and carrying out virtual exchange projects, where they had to assess themselves on a numerical scale ranged from 1 (*not competent at all*) to 10 (*extremely competent*). For those that had no previous experience, instructions clearly stated that they should estimate their ability in spite of their non-existent prior exposure. Apart from being anchored at the extremes, no other label was provided for the scales.

The inquiries started with *How competent do you feel at/in…:*

1. *Finding partners*
2. *Communicating with partners*
3. *Finding content*
4. *Designing tasks that develop students' linguistic competence*
5. *Designing tasks that develop students' sociocritical competence*
6. *Designing tasks that develop students' digital competence*
7. *Designing tasks that develop students' intercultural competence*
8. *Working with students*
9. *Setting up the classroom for online meetings (e.g., setting up ZOOM sessions)*
10. *Preparing students for online meetings*

Our initial premise was that all these items pertain to the domain of *competences*; nevertheless, in order to simplify this set, we again decided for *exploratory factor analysis*. Seeing that scales were equally coded, there was no need for any alterations.

	Finding partners	Communicating with partners	Finding content	Linguistic competence	Sociocritical competence	Digital competence	Intercultural competence	Working with students	Setting up the classroom	Preparing students
Finding partners	1.00	.524	.538	.469	.493	.398	.413	.360	.284	.365
Communicating with partners		1.00	.614	.553	.532	.408	.530	.595	.377	.434
Finding content			1.00	.652	.618	.527	.563	.538	.402	.525
Linguistic competence				1.00	.750	.680	.748	.602	.400	.555
Sociocritical competence					1.00	.741	.776	.602	.418	.587
Digital competence						1.00	.728	.563	.470	.599
Intercultural competence							1.00	.635	.473	.603
Working with students								1.00	.517	.607
Setting up the classroom									1.00	.728
Preparing students										1.00

It is rather obvious that we do not have a lack of patterned relationship or multicollinearity (determinant score was .001). Judging from that, our data is suitable for EFA.

KMO and Bartlett's Test

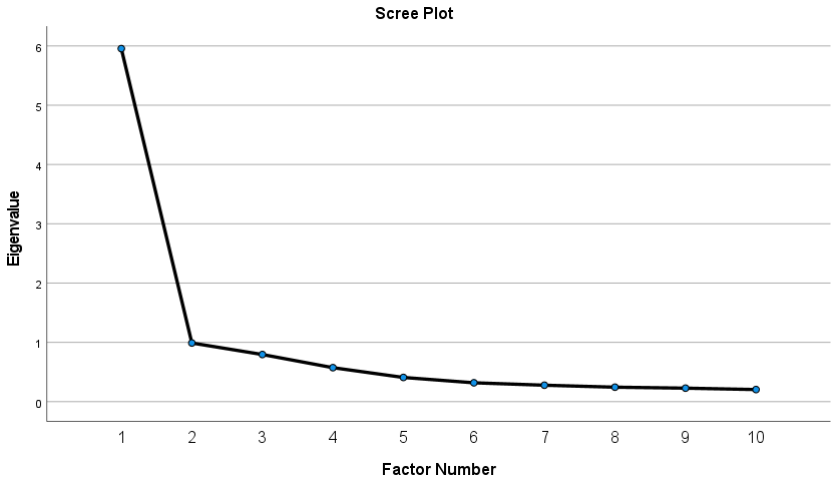
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.917
Bartlett's Test of Sphericity	Approx. Chi-Square	2791.542
	df	45
	Sig.	.000

Kaiser-Meyer-Olkin (.917) and Bartlett's tests ($\chi^2 = 2791.542$; $p < .001$) indicate that correlation matrix is suitable for principle axis factoring, whilst KMO value on itself warrants an interpretation of being marvellous. Furthermore, inspecting diagonal values in the anti-image correlation matrix revealed they were all above .840, whilst off-diagonal values were indeed small. Based on this, no individual item needed to be removed from factor analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
Factor	Total	% of Variance	Comulative %	Total	% of Variance	Comulative %
1	5.956	59.558	59.558	5.539	55.393	55.393
2	.990	9.902	69.460			
3	.796	7.958	77.418			

Extraction method: **Principal Axis Factoring**



Based both on eigenvalues as well as visual examination of scree plot's inflexion point, one factor solution was adopted, where all 10 items strongly loaded onto that factor. However, as only one was extracted, solution could not be rotated (yet this one factor explains 59.56% of total and 55.39% of common variance). We have designated it as **self-assessed VE competence**, whilst its 10 component numerical scales had the Cronbach α coefficient of .92, which implies high internal consistency and more than just an acceptable degree of reliability. Collectively, this suggests that our scale items denote to the same latent variable of "competence" (i.e., unidimensional), and since our score is < 0.95, concerns about redundancy (content duplication) are minimal.

Competence	**Valid N**	**Mode**	**Mean**	**Mean Rank**
Finding partners	**419**	**5**	**5,56**	**3.66**
Communicating with partners	419	8	7,06	6.00
Finding content	418	8	6,76	5.53
Linguistic competence	418	8	6,48	4.91
Sociocritical competence	**419**	**7**	**6,30**	**4.55**
Digital competence	418	7	6,38	4.73
Intercultural competence	418	7	6,75	5.37
Working with students	**419**	**9**	**7,75**	**7.54**
SeFng up the classroom	**419**	**8**	**7,40**	**6.67**
Preparing students	419	8	7,05	6.03

We have ascertained significant differences in how respondents assess their VE-related competences (χ^2 = 623.663; df. = 9; p < 0.001). Pairwise comparisons with Bonferroni corrections revealed that *finding partners* was scored significantly lower than any other area, which means respondents feel least capable in relation to strategies, procedures and requirements necessary to establish a working relationship with some other institution. Respondents being predominantly students with a lack of professional contacts and presumptively not yet fully aware of the system and its operation, their doubt can be legitimately explained with these arguments.

The other, albeit positive extreme was *working with students*. Significant comparisons were found for every possible pair, whilst the scale itself was ranked the highest with no immediate and close runner-up. We hypothesise that this outcome is the result of respondents being familiar with this domain due to their teaching practice, (pre)school job shadowing and observations, their individual performances that established at least a partial sensation of know-how.

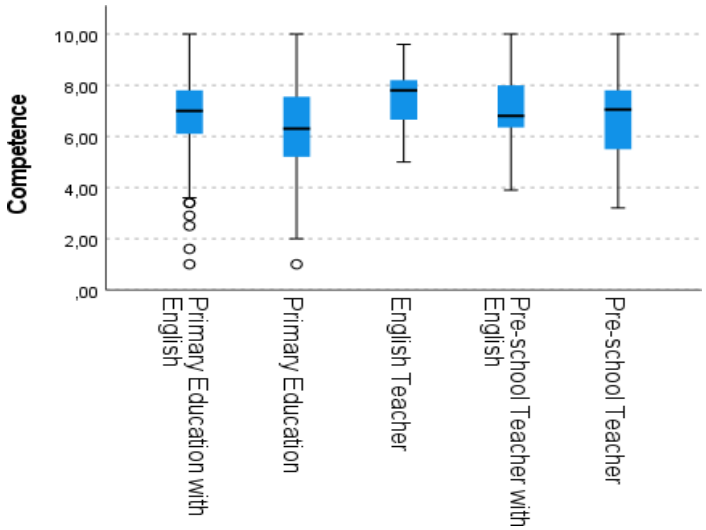
Setting up the classroom had – apart from combinations already listed above – significant differences with all four task designs (i.e., for linguistic, sociocritical, digital, intercultural

competence) and with *finding content*. This is a way logical as well since launching ZOOM sessions, breakout and chat rooms, meetings, etc., is a domain they are accustomed to (either because of COVID19 or ongoing educational processes) and is not as cognitively demanding as planning targeted activities, assignments that need to be authentic and have at least some communicative purpose. In order to achieve the latter, educational theory must first be learnt, then internalised and finally implemented with evaluation. If *learning* can be attributed to their studies, the other two steps require a notable amount of teaching with some degree of trial-and-error, seeing which task functions as intended and which does not, i.e. experience is vital, yet that of students is limited.

In that respect, *sociocritical competences* were ranked second lowest and had significantly lower scores than most other domains (not significant only with *digital* and *linguistic* competence). We assume this can be attributed to rather ambiguous and oblique conceptualisations of *sociocritical competences*, so the respondents might not have been certain how to even transfer this from abstractness to more concrete realisations. If this was fairly anticipated, low *digital competence* score was not (*post hoc* revealed p-values < 0.05 for every combination apart from those that were associated with other three task designs). Seeing that digitalisation, more reinforced integration of technology into education is often advocated, if not campaigned for by students who often use novelties prior to their instructors and are generally quite tech-savvy, such low rating was indeed surprising. Admittedly, designing tasks that would develop students' digital competence is relatively less troublesome for those who work in primary school than for pre-school teachers who are often advised against introducing technology before a certain age.

						Monte Carlo Sig.		
	Study Programme	N	Mean Rank	Kruskal-Wallis	df.	Lower bound (99% CI)	Upper bound (99% CI)	Sig.[a]
Self-assessed Competence	Primary Education with English	164	184.47	13.469	4	.005	.009	.007
	Primary Education	72	146.45					
	English Teacher	23	227.02					
	Pre-school Teacher with English	19	199.29					
	Pre-school Teacher	78	176.17					
	Total	356						

a. Based on 10,000 sampled tables with starting seed 2,000,000.



Based on the results in table above, Kruskal-Wallis H test showed that there were statistically significant differences between students of different study programmes in terms of their self-assessed VE competence (χ^2(H) = 13.469, df. = 4, p. = 0.007). Students who study to become *English Teachers* reported their competence level with regard to VE the highest among all groups ($\bar{R} = 227.02$), whilst *primary education* students were much more conservative in their estimations, having the lowest score overall ($\bar{R} = 146.45$). Seeing that differences between groups were significant, we used Dunn's test to verify which pairs had significant differences. Findings are presented in table below.

Pairwise Comparisons of Study Programme

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Primary Education-Pre-school Teacher	-29,715	16,815	-1,767	,077	,772
Primary Education-Primary Education with English	38,015	14,545	2,614	,009	,090
Primary Education-Pre-school Teacher with English	-52,838	26,536	-1,991	,046	,465
Primary Education-English Teacher	**-80,570**	**24,643**	**-3,270**	**,001**	**,011**
Pre-school Teacher-Primary Education with English	8,300	14,151	,587	,558	1,000
Pre-school Teacher-Pre-school Teacher with English	23,123	26,322	,878	,380	1,000
Pre-school Teacher-English Teacher	50,855	24,412	2,083	,037	,372
Primary Education with English-Pre-school Teacher with English	-14,823	24,933	-,595	,552	1,000
Primary Education with English-English Teacher	-42,555	22,908	-1,858	,063	,632
Pre-school Teacher with English-English Teacher	27,732	31,896	,869	,385	1,000

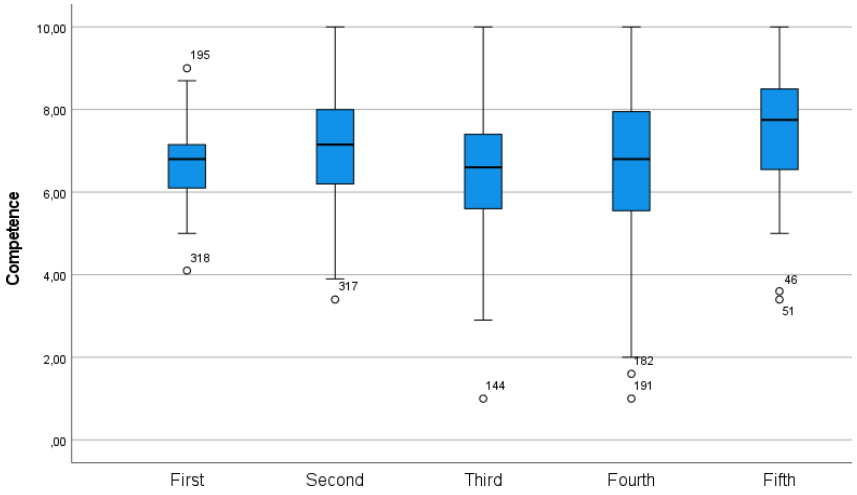
Whilst only one pair was found to be significant, it was predictably between those with highest mean rank (i.e., *English Teacher*) and students with lowest (i.e., *Primary Education*). However, if we inspect just sample data, a rather interesting reflection can be construed regarding *Primary Education*, namely that when combined with English, students tend to report an overall higher competence assessment than when without this FL.

Seeing that programme-wise differences were ascertained, we merely wanted to investigate whether study year has any impact on competence scores. Our assumption was that upper-year students would have greater competence scores, where we could see a gradual improvement from year one to fifth year.

						Monte Carlo Sig.		
	Study Year	N	Mean Rank	Kruskal-Wallis	df.	Lower bound (99% CI)	Upper bound (99% CI)	Sig.[a]
Self-assessed Competence	First	28	183.55	15.614	4	.002	.005	.003
	Second	94	213.94					
	Third	61	174.75					
	Fourth	172	190.29					
	Fifth	44	253.65					
	Total	399						

a. Based on 10,000 sampled tables with starting seed 2,000,000.

As the combined variable of *self-assessed competence* did not follow normal distribution, we had to again employ Kruskal-Wallis H test for differences between groups' ranks of data values. Results indicate significant differences between students enrolled in different study years (χ^2(H) = 15.614, df. = 4, p. = 0.003) in how they assess their own competence regarding VE domains. Not surprisingly, best scores can be attributed to fifth years ($\bar{R} = 253.65$), which can be explained by both their knowledge corpora and gathered experience, which should prevail over that of their younger colleagues. Yet, lowest mean ranks ($\bar{R} = 174.75$) were not found with first years, but with third year students. If we apply the principle of parsimony, we can attribute it to questionable sample representativeness, but this would be perfunctory. Another possible explanation might be linked to students' capacity of critical thinking, being in elementary stages and prompting somewhat inflated (self-)estimates during their initial period of university studies. With internalised abstract and practical knowledge, myriad of exposure to problems and on-site experience, this ability becomes less and less biased. In other words, it requires time to become aware of what one's not familiar with or capable of doing and ultimately to begin appreciating your own skillset.



As per results of omnibus testing, pairwise comparisons were executed to confirm not only differences as such, but which groups are different.

Pairwise Comparisons of Year of study

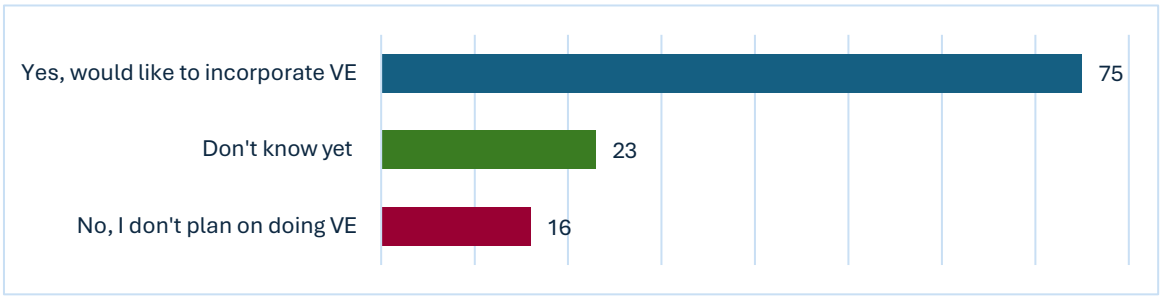
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Third-First	8,799	26,318	,334	,738	1,000
Third-Fourth	-15,537	17,181	-,904	,366	1,000
Third-Second	39,182	18,956	2,067	,039	,387
Third-Fifth	**-78,894**	**22,804**	**-3,460**	**<,001**	**,005**
First-Fourth	-6,737	23,495	-,287	,774	1,000
First-Second	-30,383	24,822	-1,224	,221	1,000
First-Fifth	-70,094	27,872	-2,515	,012	,119
Fourth-Second	23,645	14,788	1,599	,110	1,000
Fourth-Fifth	**-63,357**	**19,478**	**-3,253**	**,001**	**,011**
Second-Fifth	-39,712	21,060	-1,886	,059	,593

Differences stem from comparison with fifth year, specifically, in connection with third year (i.e., lowest-highest mean ranks) and fourth year. Namely, upper three years of study (Years 3, 4, 5) and their combinations constitute significant differences, where the state of affairs follows our prior expectations, seeing that there is an overall increase in competence scores from year 3 to 5. The justification for year 1 and 2 has already been provided, nevertheless, subsequent studies should address the possible sampling inadequacy and try to equalise the number of units per category within this independent variable.

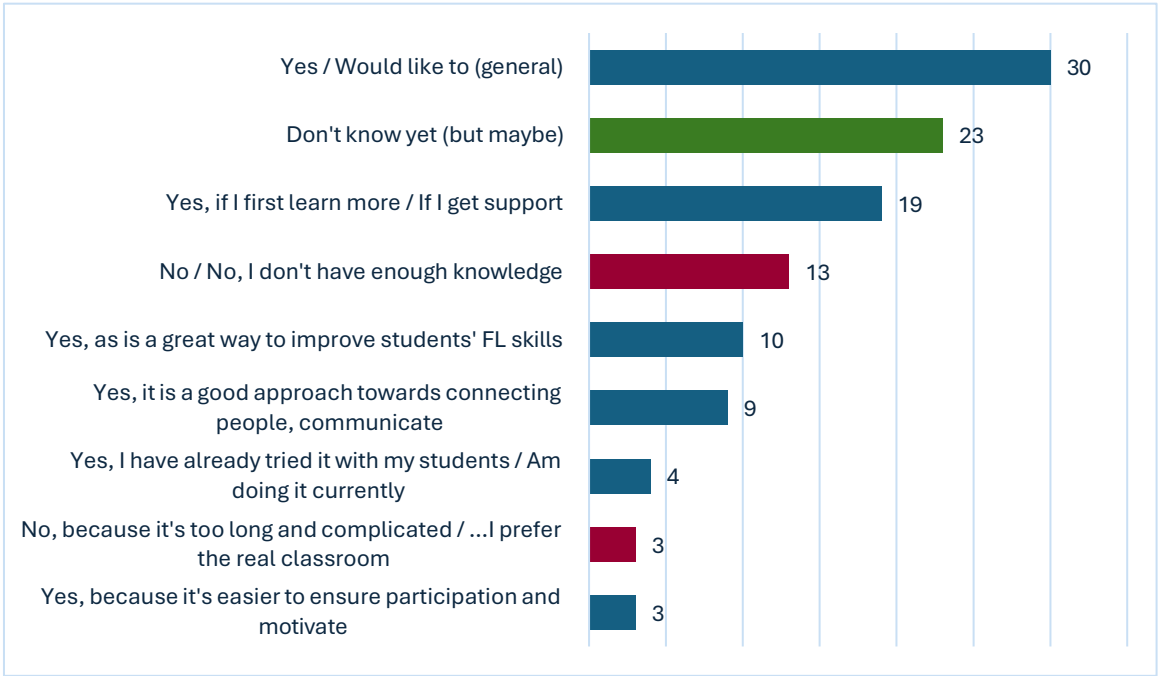
In addition, to see competence scores rise in relation to study year is a fitting indicator that students are ultimately able to reflect their progress and themselves as future professionals. The situation would be more perilous had there been no differences whatsoever or a negative trend as that might signal a more systemic shortcoming, overreaching virtual exchange.

RQ8: How many participants plan to carry out VE projects in their future professions?

Apart from either confirming, negating or being ambivalent, students had to provide their own justification concerning the introduction of VE into their future lesson plans. As this was open-ended and positioned towards the end of the survey, we anticipated a substantial drop-out, which has indeed happened. Nevertheless, 114 open answers were given which were categorised by several researchers to obtain the least subjective division. Data is presented in descending counts.



It clearly shows that most students (75 out of valid 114 or 65.8 %) have a positive inclination towards integrating VE into their future pedagogical work. Further clarification is presented below; however, even though the category of "yes" is now split into several more distinct arguments, the general positive response received the majority of counts (30 out of 114 or 26.3%).



We wanted to assess the impact of predictors (*study programme*, *year of study, past involvement*) on students' willingness to introduce VE into their lessons. Prior to that, variables needed to be recoded due to small or missing counts.

Variable	*Values (categories)*	*Recoded values that were analysed*
Study Programme	1 – Primary Education with English 2 – Primary Education 3 – English Teacher 4 – Pre-school Teacher with English 5 – Pre-school Teacher 6 – Other	1 – Primary Education w/wo English 2 – Pre-school Teacher w/wo English
Year of study	1 – First 2 – Second 3 – Third 4 – Fourth 5 – Fifth	1 – First to Third 2 – Fourth and Fifth
Prior Involvement in VE	1 – Yes, as a primary school student 2 – Yes, as a secondary school student 3 – No, I haven't been involved at all	0 – No, I haven't been involved at all 1 – Yes, I was involved as a primary/secondary student
Carrying VE in the Future	1 – No / No, I don't have enough knowledge 2 – No, because it's too long and complicated / Prefer the real classroom 3 – Don't know (but maybe) 4 – Yes, if I first learn more / If I get support 5 – Yes, a great way to improve students' FL skills 6 – Yes, a good approach towards connecting people, communication 7 – Yes, because it's easier to ensure participation / Motivate students 8 – Yes, I have already tried it with my students / Am doing it currently 9 – Yes / Would like to (general)	0 – No, I don't plan on doing VE / I don't know 1 – Yes, I would like to incorporate VE

Our query consisted of four categorical variables, three independent (i.e., study programme, study year, past experience) and one dependent (i.e., carrying out VE in the future). Since the latter has been recoded to encompass two outcomes (i.e., *No, don't plan* and *Yes, would like to*) and our intent is to see which variable is influential in predicting students' adoption of VE, we opted for *binary logistic regression*. Our inquiry was:

> *Does study programme, year of study and past experience predict the likelihood that students would opt for VE in their future careers?*

Since we had no theoretical clues as to what might influence the decision-making process, we first thought about whether study programme (and by extension its content) can play a role, moreover, as they proceed with their education, could perhaps gathered experience and progression itself be of any significance.

The starting model with no prediction [block 0] achieved a classification accuracy of 64.4%. Upon inspecting the entered model with our predictor variables, omnibus tests of model coefficients (testing the hypothesis of predictive capacity of regression) showed no statistical significance (χ^2 = 6.531, df = 3, p = .088). Bear in mind that this *chi-square test* applies to the difference between the model with no explanatory variables (i.e., with no predictors) and the new one.

Pseudo-R^2 values, representing the percentage of variance in the dependent variable (i.e., carrying VE in the future) that can be clarified by our independent variables, explained between 7.2% [Cox & Snell R^2] and 9.9% [Nagelkerke R^2]. In other words, only around 10% of dependent variable variability can be attributed to independent variables. These are just approximations and should not be too eagerly emphasized.

Contrarily, *Hosmer-Lameshow Goodness of Fit Test* (χ^2 =.279, df = 3, p = .964) signals support for our model. Yet, the overall predictive ability [classification accuracy] of our model is now 67.8%.

Variables in the Equation

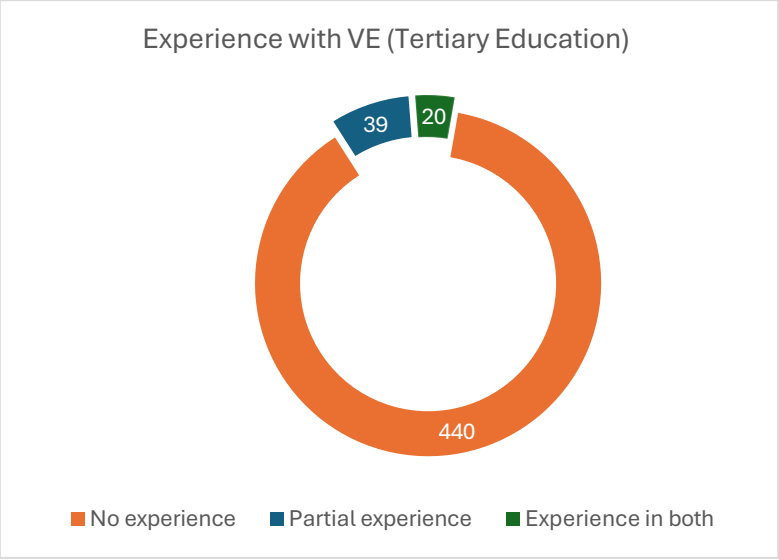
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Study Programme: Combined(1)	-1,156	,571	4,096	1	,043	,315	,103	,964
	Year of Study: Combined(1)	,177	,546	,105	1	,746	1,193	,409	3,479
	Involvement in VE as a pupil(1)	,351	,699	,253	1	,615	1,421	,361	5,593
	Constant	,801	,512	2,453	1	,117	2,229		

a. Variable(s) entered on step 1: Study Programme: Combined, Year of Study: Combined, Involvement in VE as a pupil.

Only *study programme* was found to be a significant predictor, ergo, that it did contribute to the model, recording an odds ratio of 0.315. Overall, we can hardly argue that these predictors have any practical impact on respondents' readiness to include VE into their future teaching. At this point we could devise a new model, conduct multinomial regression, however, the transversal problem appears to be the scarcity of counts, forcing us to join categories or risk subgroup size affecting the test.

Next, we wondered whether tertiary level contact with VE might affect students' willingness to incorporate it into their future lesson planning. To verify it, we first needed to recode certain variables, which we present in the table below with steps.

Variable	*Values (categories)*	*Recoded values that were analysed*
Learn about VE	1 – Yes 2 – No	0 – No 1 – Yes
Participate in VE	1 – Yes 2 – No	0 – No 1 – Yes
Carrying VE in the Future	1 – No / No, I don't have enough knowledge 2 – No, because it's too long and complicated / Pr efer the real classroom 3 – Don't know (but maybe) 4 – Yes, if I first learn more / If I get support 5 – Yes, a great way to improve students' FL skill s 6 – Yes, a good approach towards connecting pe ople. communication 7 – Yes, because it's easier to ensure participatio n / Motivate students 8 – Yes, I have already tried it with my students / Am doing it currently 9 – Yes / Would like to (general)	0 – No, I don't plan on doing VE / I don't know 1 – Yes, I would like to incorporate VE
NEW VARIABLE: Experience with VE (Tertiary Education)	0 – No experience 1 – Partial experience [they have either *learnt about* or *participated*] 2 – Experience in Learning & Participation	



		Carrying VE in the Future		
		No, I don't / I don't know	Yes, I would	Total
No experience	Count	34	63	97
	Expected count	33.2	63.8	
	%	35.1 %	64.9 %	
Partial Experience	Count	3	9	12
	Expected count	4.1	7.9	
	%	25.0 %	75.0 %	
Experience in both	Count	2	3	5
	Expected count	1.7	3.3	
	%	40.0 %	60.0 %	
Total	Count	39	75	114
	%	34.2 %	65.8 %	100.0%

Due to the low number of participants with any kind of experience, conditions for chi-square were not met. Moreover, the alternative likelihood ratio ($2\hat{\imath} = 0.580$; df. = 2; p = 0.748) showed was not significant. As variable categories have already been combined and data gathering over, we had to retain the null hypothesis and conclude this research question.

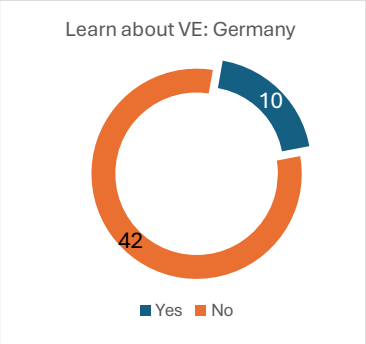
What followed was checking whether having VE as part of students' forthcoming professional activity is dependent on their self-assessed competence. How we have treated *competence* has already been described, so we shall focus only on any additional procedures. Thus, we have taken the combined variable ***self-assessed VE competence*** and recoded it into three groups:

- (Value 1) **Not competent** (6.00 ≥ average score) or [1, 6]
- (Value 2) **Competent** (6,00 < average score < 9.00) or (6, 9)
- (Value 3) **Very competent** (9.00 ≤ average score) or [9, 10]

Here as well, no significant differences were found between groups with differing competence scores with regard to carrying VE in the future ($2\hat{\imath} = 3.420$; df. = 2; p = 0.181). However, sample data suggests that with rising competence scores, the proportion of those who would ultimately realise a VE project also increases (from 54.2% with those who assessed themselves as *not competent* to 87.5% with *very competent* group).

Data Presentation per Country

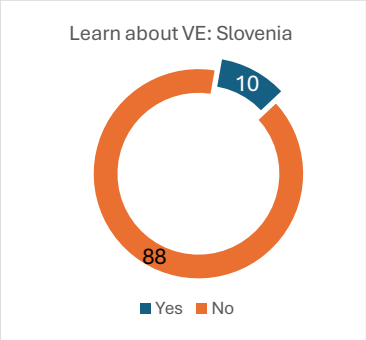
In the following analyses, we have centred around predominantly descriptive group comparisons based on project partners (i.e., Germany, Poland, Slovenia and Spain), which are universally presented in alphabetical order. Causal and inferential statistics have been portrayed in the preceding segments, which is why significant differences might be referred to, yet not calculated anew.



Category	*Frequency*
TEFL in general	4
Activities for primary classroom	3
Virtual collaboration in general	1
Digital media	1



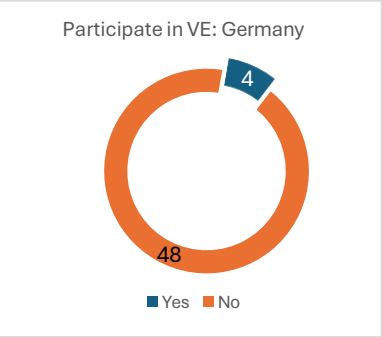
Category	*Frequency*
Virtual collaboration in general	2
Activities for primary classroom	1
Digital media	1
Hybrid teaching	1



Category	*Frequency*
Course related to natural science	4
eTwinning in general	3
Course whose main focus is communication	1



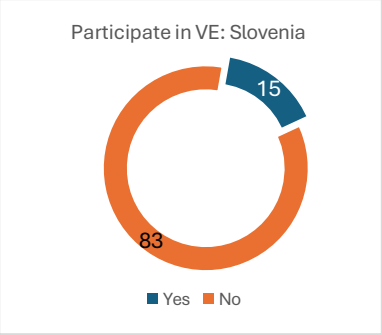
Category	*Frequency*
eTwinning in general	2



Category	*Frequency*
Virtual collaboration in general	2
Course related to natural sciences	1
Course whose main focus is communication	1



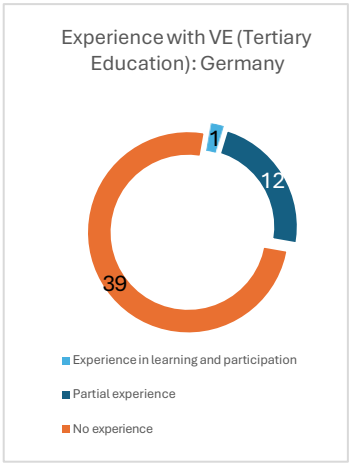
Category	*Frequency*
Virtual collaboration in general	3
Course related to social sciences	1

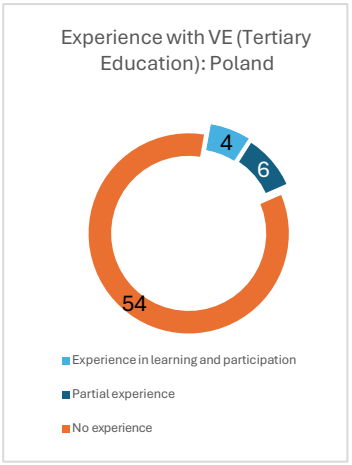


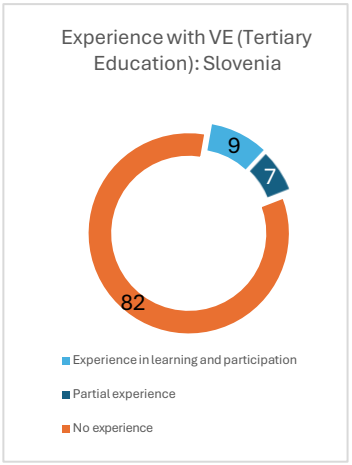
Category	*Frequency*
Course related to natural sciences	6
eTwinning in general	4
Course whose main focus is communication	2
ERASMUS course	1
Course related to social sciences	1

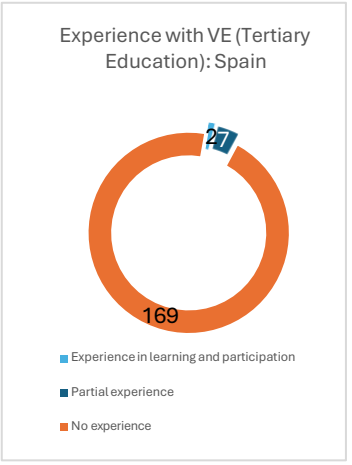


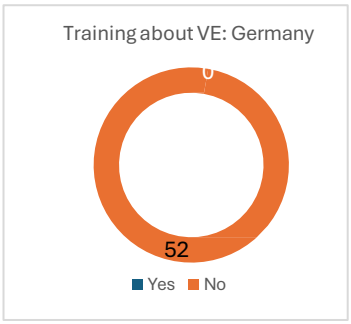
Category	*Frequency*
ERASMUS course	3
eTwinning in general	1



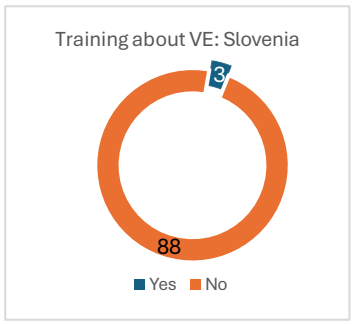


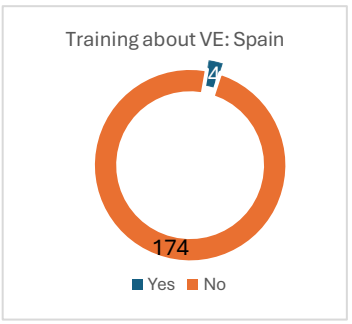








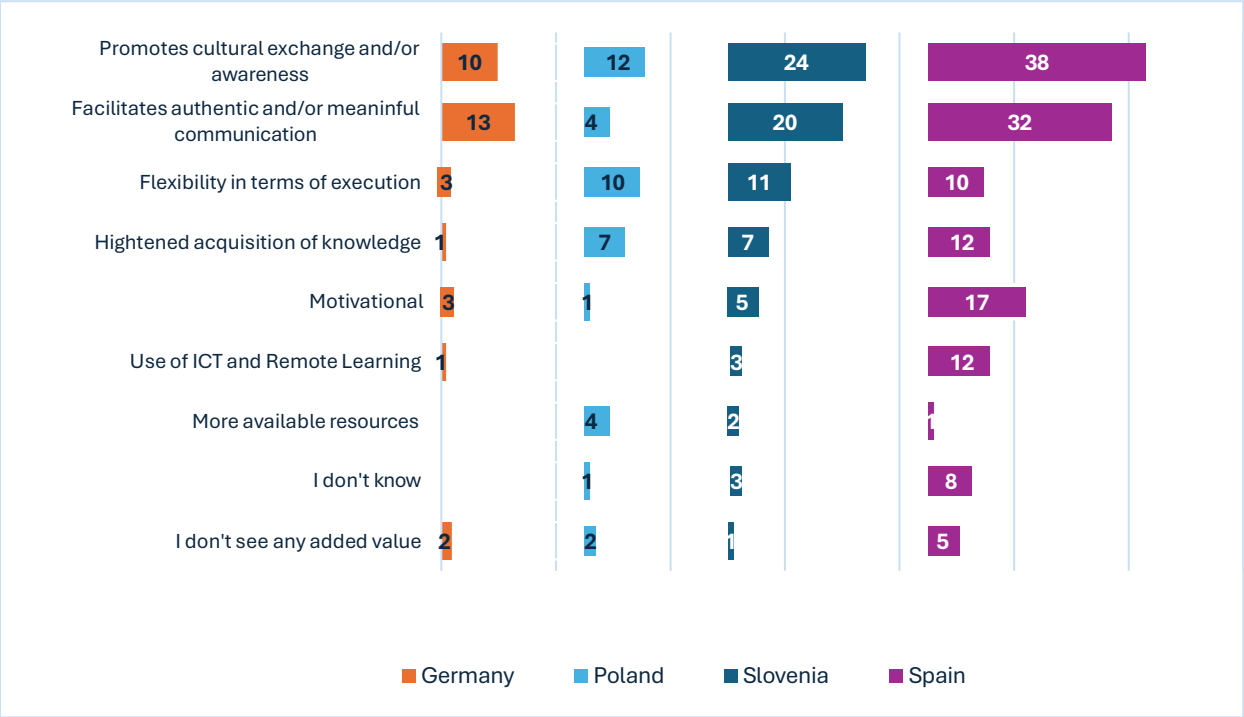




The interpretation of the data for the graphs above can be found in the chapter related to the first research question, i.e., RQ1: What are the participants' experience as tertiary students with virtual exchange (VE) in terms of learning, participation and training? (pp. 10-15).

Added Value of VE

In the table below we can find the answers to the open-ended question as to what the respondents perceive as the added value of VE compared to on-site teaching (RQ3) for each country separately.



Germany

As this was open-ended, categorisation revealed that German students perceive the added value of VE mainly in its charge of facilitating authentic and/or meaning communication (39.4%), closely followed by being cognisant of the possibility that VE promotes cultural exchange and/or awareness (30.3%), whilst other reasons were not so prominent.

Poland

The situation in Poland regarding VE's added value indicates an emphasis of cultural exchange and/or awareness (29.3%), whilst the runner-up impression is that Polish students appreciate its flexibility in terms of execution (24.4%).

Slovenia

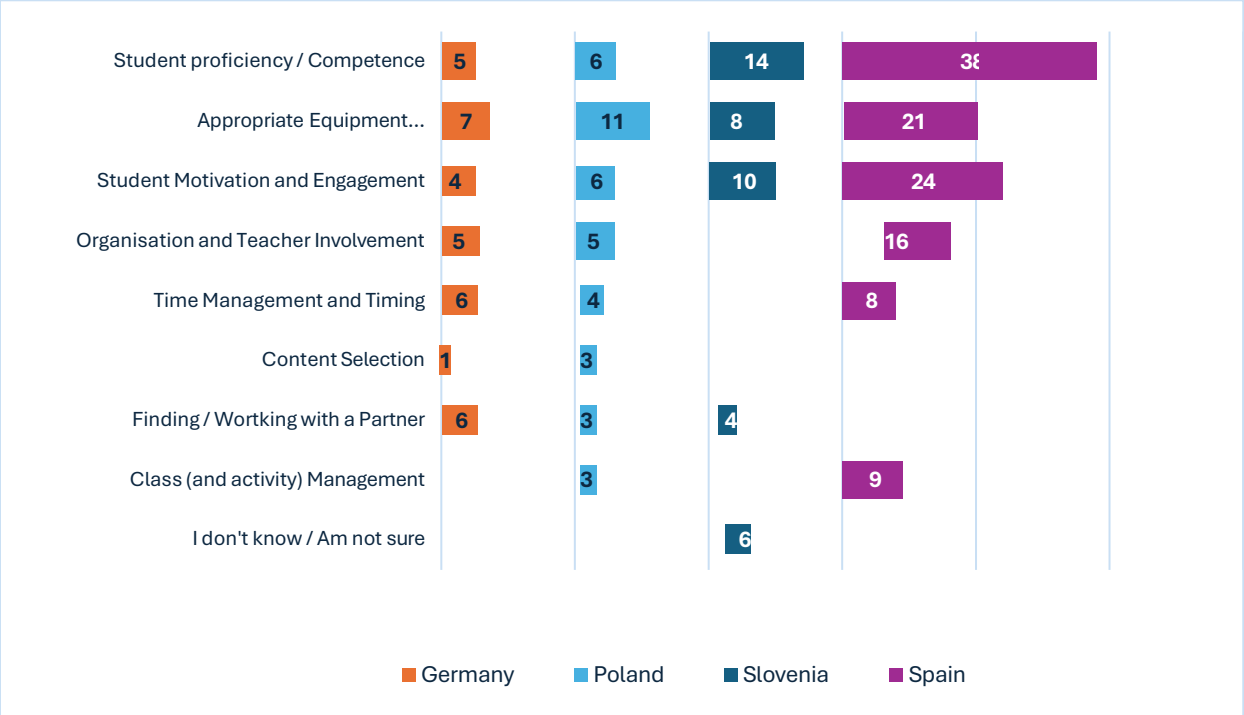
Slovenian students portrayed a tripartite scheme concerning the added value of VE where cultural exchange was favoured amongst respondents (31.6%), however, a strong contender seems to be the ability to establish meaningful communication (26.3%) with a compelling force being attributed to flexibility as well (14.5%).

Spain

Although cultural exchange (28.1%) and authentic communication (23.7%) are the flagship related to VE's added value, we should not disregard the importance ascribed to its motivational power, reported in 12.6% of cases. Other aspects were all below 10.0% which is why they are not commented.

Most Challenging in Conducting VE

Table below presents the answers to the fourth research question (What do the participants consider as the most challenging aspect of conducting VE projects?) for each country separately.



Germany

Responses indicate that no particular aspect is deemed as deterrently challenging or dominantly recognised as demanding as apart from content selection and class management, other answers between approximately 12 and 20% of total (frequency-wise, there are no apparent differences).

Poland

A bit less evenly dispersed than Germany, Polish students have positioned appropriate equipment, technology and maintaining connection as the protuberant facet that might cause problems (26.8%). Other challenges range between 7 and 14% of all counts.

Slovenia

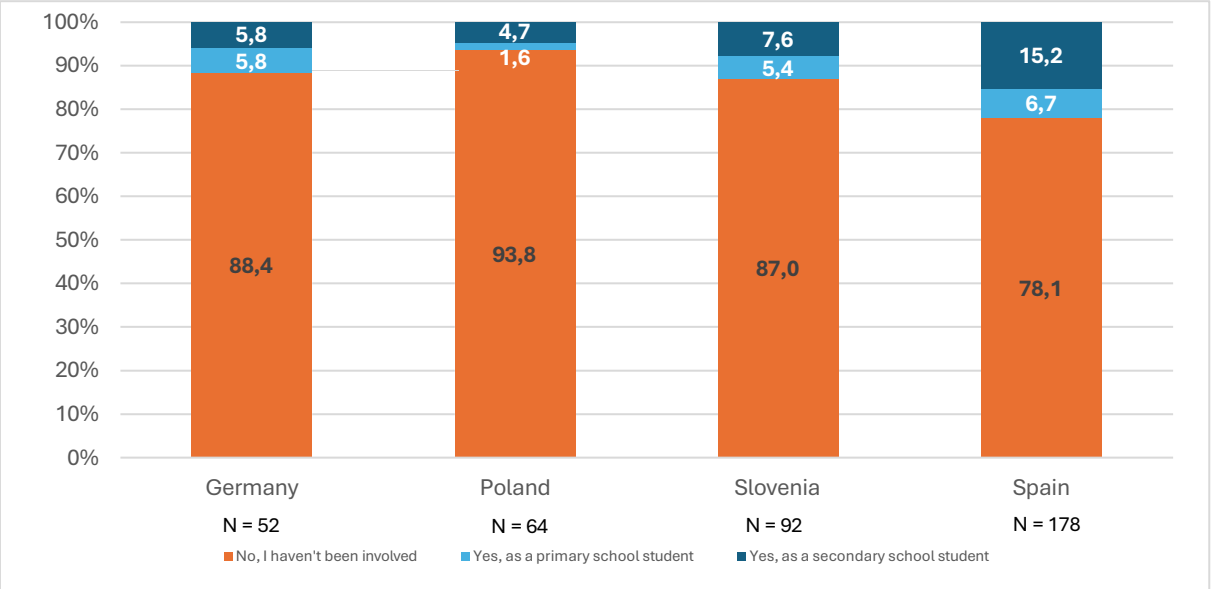
Student proficiency / Competence was regarded as most challenging in 19.4% of answers, followed by student motivation, content selection and time management sharing second place with around 14-15%. Bear in mind that low overall counts make distinctions less rigorous and only referential.

Spain

As Spain's sample is larger than that of other countries, differences become more apparent. Here we can state with less tentativeness that with 38 out of 134 answers (28.4%) student proficiency is construed as most challenging factor associated with VE, followed by student motivation (17.9%) and appropriate equipment (15.7%).

Prior Experience with VE (primary/secondary education)

Table below presents the answers to the fifth research question (How have those with previous experience regarding VE been coordinated, treated and managed during their projects?) for each country separately.



Germany

11.6% (6 out of 52 participants) had previous experience with VE and claim that on average they had **3.17 projects** (CI not reported due to negative lower bound). Although we obtained a scarcity of project descriptions, these were either Email/letter correspondence, reciprocal presentation or ERASMUS+.

Poland

6.3% (4 out of 64 participants) had previous experience with VE and claim that on average they had **2.00 projects** (CI not reported due to negative lower bound). Only 2 people provided more information about these projects that were merely focused on content or various thematic examples.

Slovenia

13.0% (12 out of 92 participants) had previous experience with VE and claim that on average they had **2.36 projects** (95% CI between .60 and 4.12). A total of 9 people detailed their experience which were reciprocal presentations (3), videocalls with another country (2) or eTwinning in general (1) and Email/Letter correspondence (1). Two individuals recounted an actual exchange, not virtual.

Spain

21.9% (39 out of 178 participants) had previous experience with VE and claim that on average they had **2.08 projects** (95% CI between .66 and 3.50). Out of 34 respondents, 12 specified them as Email/letter correspondence, 8 reported videocall sessions, 5 described an actual exchange, 3 stated they focused on presentation and communication, another 3 just said it was eTwinning, 2 labelled them as ERASMUS+ projects, and 1 individual said it was content-centred.

Activities During Online Meetings

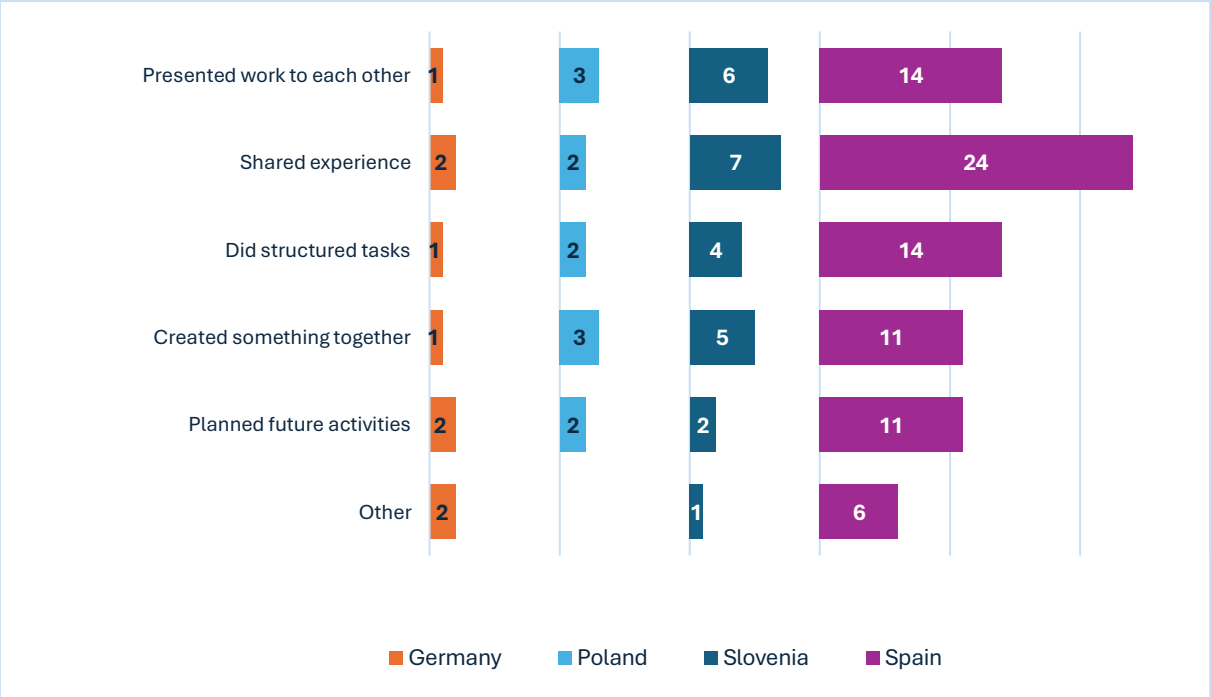


Table above presents data related to the types of activities conducted during VE projects that respondents were involved in.

Germany

Since we have gathered a maximum of 2 selections per option, we cannot interpret any further as it would be entirely redundant if not misleading.

Poland

Since we have gathered a maximum of 3 selections per option, we cannot interpret any further as it would be entirely redundant if not misleading.

Slovenia

Similarly to Germany and Poland, we must refrain from any overly ambitious analyses as we do not have sufficient data to support our claims. There are, however, indications that sharing experience, presenting work to each other and joint creation would otherwise constitute the popular approach towards enacting a VE project.

Spain

Based on 80 responses, 30.0% stated that during VE projects they relied on sharing experience which entailed communication, dialogue. With 17.5% each, presenting their work and doing structured tasks seems to be a relatively popular tactic of completing task during online meetings.

Frequency of Organisation Types

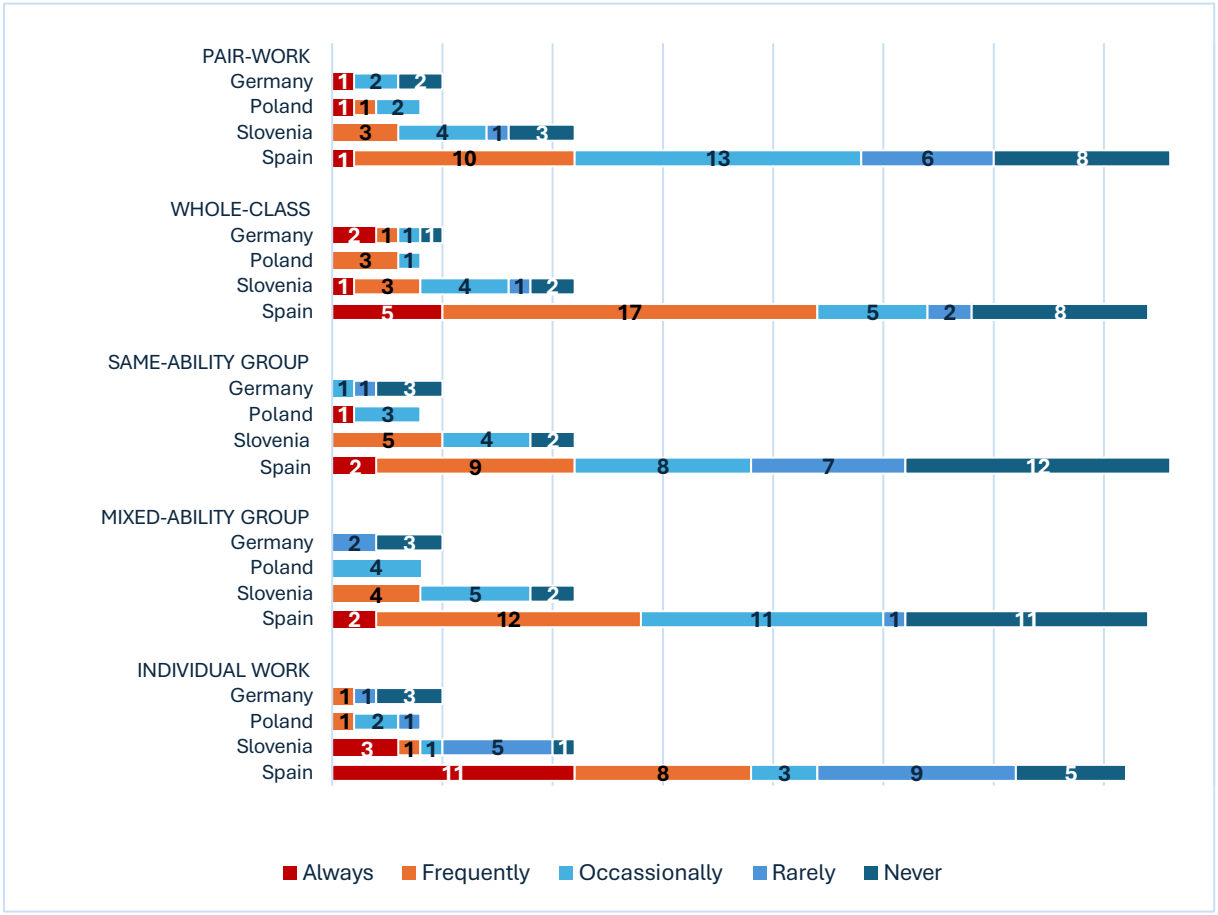


Table above presents data related to the types of classroom organisation during VE projects that respondents were involved in.

Germany

Not enough data for functional quantitative analysis (N = 5) acknowledging dispersion into a 5-point scale.

Poland

Not enough data for functional quantitative analysis (N = 4) acknowledging dispersion into a 5-point scale.

Slovenia

Not enough data for functional quantitative analysis (N = 11) acknowledging dispersion into a 5-point scale.

Spain

Concentrating only on those organisation types where we have a high percentage of reports pertaining to the categories of *always* and *frequently*, it would appear that whole-class and individual work were realised in more than half of all cases (59.5% and 52.8% respectively).

Self-assessed Competence Regarding VE

Tables below present data for self-reported competence related to VE projects (RQ 7) for each country separately. The blue colour indicates the highest perceived competence whereas orange indicates the area in which students reported the lowest perceived competence. The interpretation of RQ7 can be found in the chapters above.

		N	*Mean [95% CI]*	*SD*	*Mode*	*Median*
Germany	*Finding partners*	52	5.90 [5.33, 6.48]	2.070	6	6
	Communicating with partners	52	7.77 [7.33, 8.21]	1.592	8	8
	Finding content	52	6.65 [6.15, 7.16]	1.803	8	7
	Designing tasks that develop students' linguistic competence	52	6.23 [5.82, 6.64]	1.477	8	6
	Designing tasks that develop students' sociocritical competence	52	5.79 [5.34, 6.24]	1.625	5	6
	Designing tasks that develop students' digital competence	52	6.06 [5.53, 6.58]	1.883	5	6
	Designing tasks that develop students' intercultural competence	52	6.63 [6.15, 7.12]	1.738	7	7
	Working with students	52	8.08 [7.69, 8.46]	1.384	7	8
	Setting up the classroom for online meetings (e.g., setting up ZOOM sessions)	52	7.25 [6.66, 7.84]	2.122	8	8
	Preparing students for online meetings	52	6.73 [6.19, 7.27]	1.941	8	7
	Combined	**52**	**6.71 [6.39, 7.03]**	**1.154**	**6.80**	**6.80**

		N	*Mean [95% CI]*	*SD*	*Mode*	*Median*
Poland	*Finding partners*	64	4.95 [4.32, 5.58]	2.529	5	5
	Communicating with partners	64	6.50 [5.89, 7.11]	2.449	7	7
	Finding content	64	6.31 [5.78, 6.85]	2.137	8	6
	Designing tasks that develop students' linguistic competence	64	5.92 [5.35, 6.49]	2.270	5	6
	Designing tasks that develop students' sociocritical competence	64	5.59 [5.04, 6.14]	2.202	5	5
	Designing tasks that develop students' digital competence	64	5.50 [4.94, 6.06]	2.225	5	5
	Designing tasks that develop students' intercultural competence	64	6.25 [5.67, 6.83]	2.330	5	6
	Working with students	64	7.08 [6.50, 7.66]	2.325	8	8
	Setting up the classroom for online meetings (e.g., setting up ZOOM sessions)	64	7.13 [6.47, 7.78]	2.640	10	8

	Preparing students for online meetings	64	6.53 [5.91, 7. 5]	2.494	8	7
	Combined	**64**	**6.18 [5.73, 6.(2]**	**1.773**	**5.50**	**6.30**

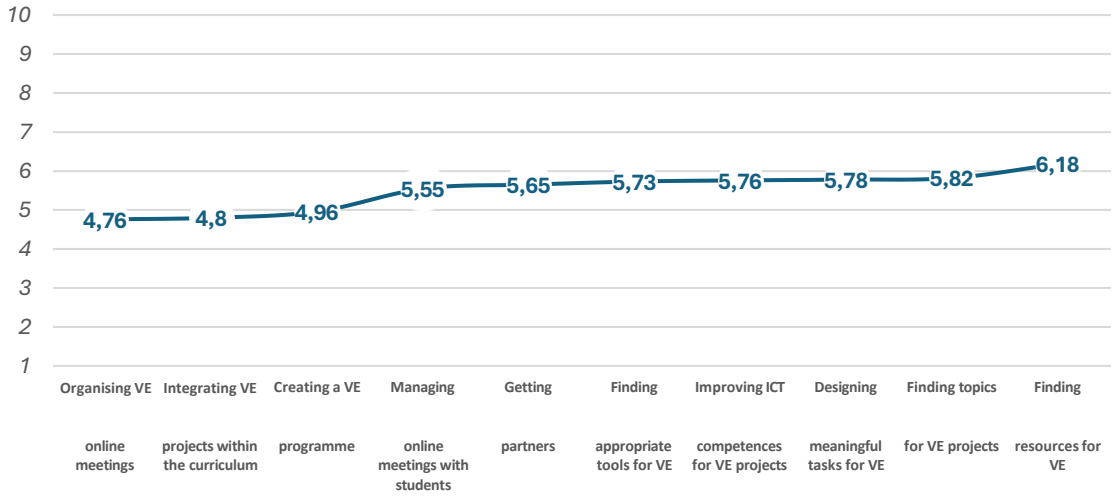
		N	***Mean [95% CI]***	***SD***	***Mode***	***Median***
Slovenia	*Finding partners*	91	5.37 [4.87, 5.87]	2.407	7	5
	Communicating with partners	91	7.08 [6.60, 7.55]	2.291	8	7
	Finding content	91	6.88 [6.43, 7.33]	2.165	8	7
	Designing tasks that develop students' linguistic competence	91	5.96 [5.50, 6.41]	2.201	5	6
	Designing tasks that develop students' sociocritical competence	91	5.97 [5.33, 6.40]	2.079	7	6
	Designing tasks that develop students' digital competence	91	5.84 [5.39, 6.28]	2.115	6	6
	Designing tasks that develop students' intercultural competence	91	6.43 [5.96, 6.89]	2.227	7	7
	Working with students	91	7.62 [7.15, 8.08]	2.215	8	8
	Setting up the classroom for online meetings (e.g., setting up ZOOM sessions)	91	7.56 [7.09, 8.03]	2.272	10	8
	Preparing students for online meetings	91	6.86 [6.41, 7.31]	2.168	7	7
	Combined	**91**	**6.55 [6.19, 6.92]**	**1.738**	**6.90**	**6.80**

		N	***Mean [95% CI]***	***SD***	***Mode***	***Median***
Spain	*Finding partners*	178	5.93 [5.58, 6.24]	2.203	5	6
	Communicating with partners	178	7.14 [6.84, 7.44]	2.025	8	8
	Finding content	177	6.97 [6.69, 7.24]	1.843	8	7
	Designing tasks that develop students' linguistic competence	177	7.13 [6.87, 7.40]	1.755	8	7
	Designing tasks that develop students' sociocritical competence	178	6.97 [6.70, 7.23]	1.759	7	7
	Designing tasks that develop students' digital competence	177	7.19 [6.94, 7.44]	1.661	7	7
	Designing tasks that develop students' intercultural competence	178	7.18 [6.93, 7.44]	1.701	8	7
	Working with students	178	8.07 [7.83, 8.34]	1.750	9	9
	Setting up the classroom for online meetings (e.g., setting up ZOOM sessions)	178	7.58 [7.27, 7.90]	2.082	8	8
	Preparing students for online meetings	178	7.52 [7.22, 7.79]	1.932	8	8
	Combined	**178**	**7.17 [6.95, 7.38]**	**1.449**	**7.40**	**7.40**

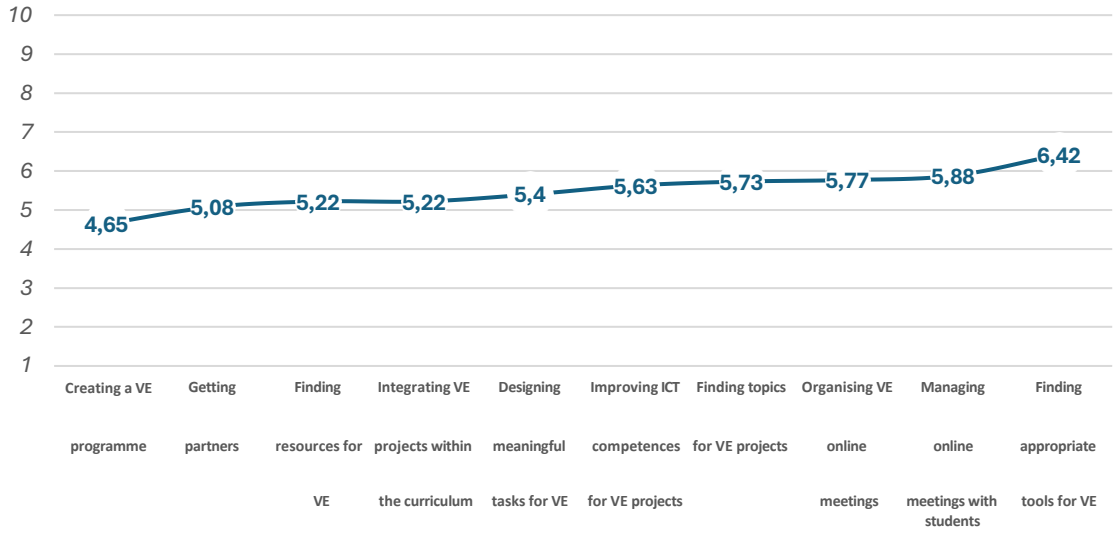
Ranked Areas of Desired Improvement

The following tables and graphs present data for the areas that respondents marked as the ones they would like to know more about (RQ8) for each country separately. The blue colour indicates the area they do not need to improve much, whereas orange indicates the area they would like to develop the most. The interpretation of RQ8 can be found in the chapters above.

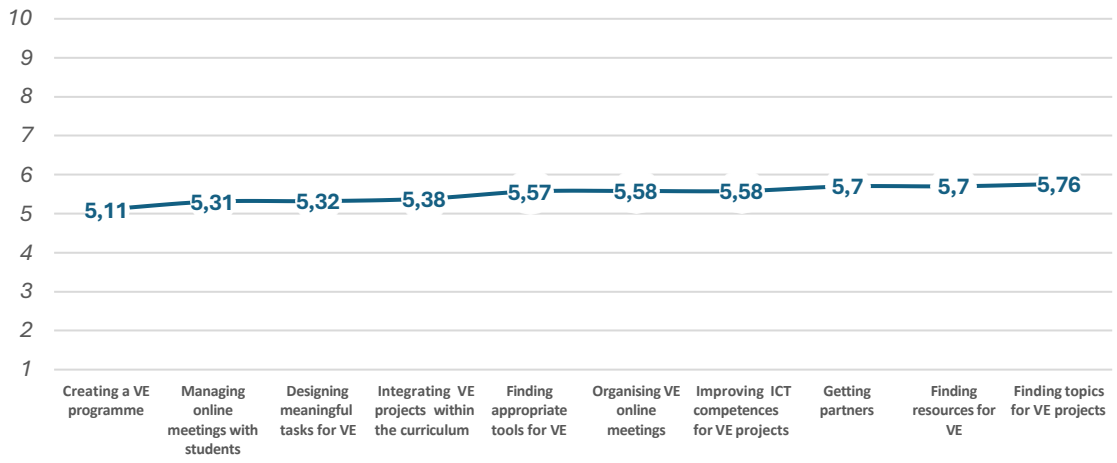
		N	*Mean [95% CI]*	*SD*	*Mode*	*Median*
Germany	*Creating a VE programme*	51	4.96 [4.14, 5.78]	2.919	1	5
	Getting partners	51	5.65 [4.79, 6.51]	3.052	3	6
	Managing online meetings with students	51	5.55 [4.76, 6.34]	2.809	6	5
	Organising VE online meetings	51	4.76 [4.07, 5.45]	2.454	2	4
	Finding topics for VE projects	51	5.82 [5.08, 6.57]	2.659	5	6
	Improving ICT competences for VE projects	51	5.76 [4.95, 6.58]	2.889	4	6
	Finding appropriate tools for VE	51	5.73 [4.99, 6.46]	2.601	8	6
	Finding resources for VE	51	6.18 [5.48, 6.88]	2.488	7	7
	Designing meaningful tasks for VE	51	5.78 [4.84, 6.72]	3.331	9	6
	Integrating VE projects within the curriculum	51	4.80 [3.88, 5.73]	3.286	3	4



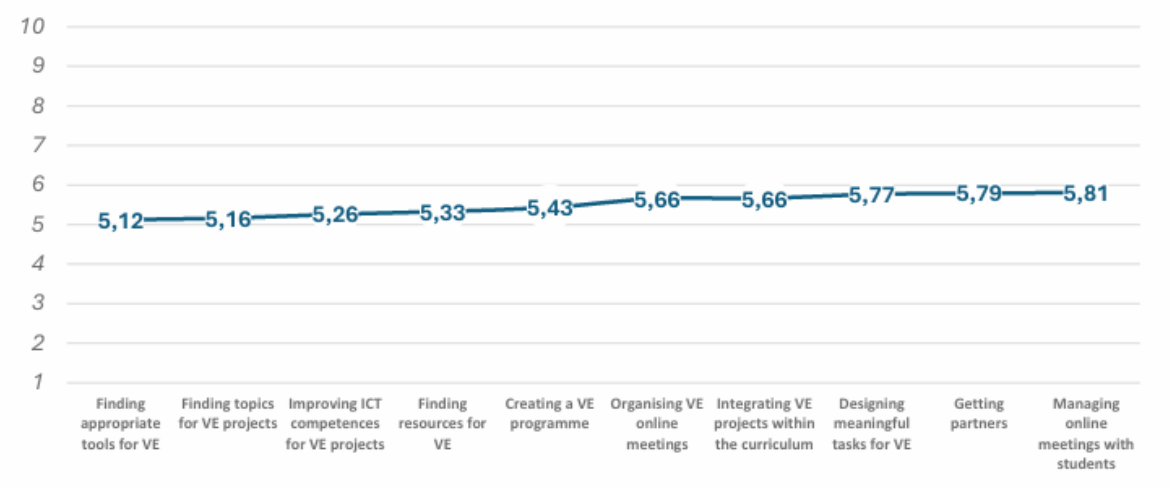
		N	Mean [95% CI]	SD	Mode	Median
Poland	*Creating a VE programme*	60	4.65 [3.81, 5.49]	3.262	1	4.5
	Getting partners	60	5.08 [4.29, 5.88]	3.082	2	4.5
	Managing online meetings with students	60	5.88 [5.18, 6.59]	2.731	5	6
	Organising VE online meetings	60	5.77 [5.02, 6.51]	2.890	7	6
	Finding topics for VE projects	60	5.73 [5.02, 6.44]	2.755	6	6
	Improving ICT competences for VE projects	60	5.63 [4.91, 6.35]	2.792	9	6
	Finding appropriate tools for VE	60	6.42 [5.74, 7.10]	2.638	5	6.5
	Finding resources for VE	60	5.22 [4.55, 5.88]	2.578	4	5
	Designing meaningful tasks for VE	60	5.40 [4.66, 6.14]	2.859	3	5
	Integrating VE projects within the curriculum	61	5.22 [4.46, 5.97]	2.923	3	5

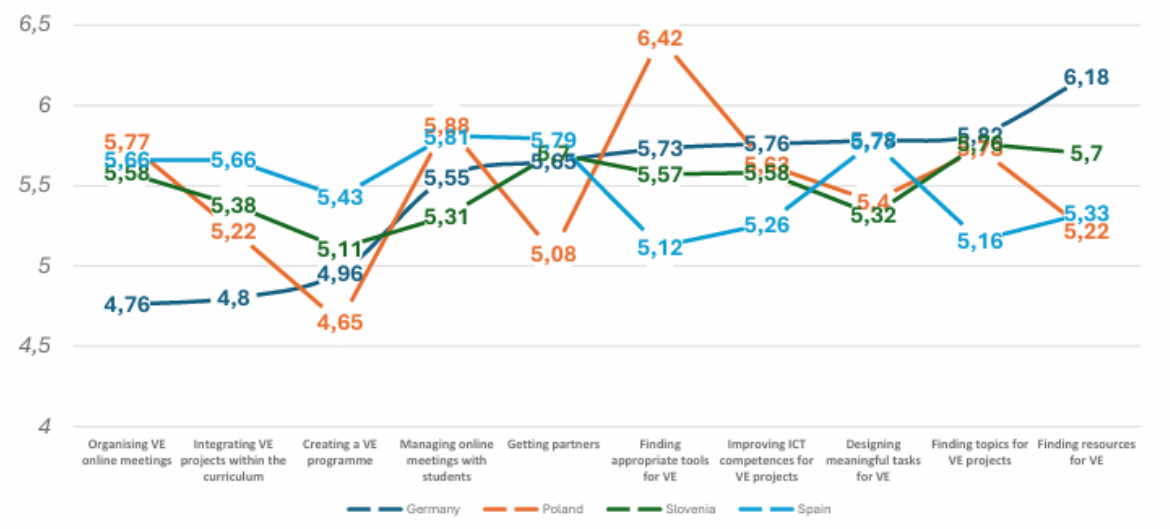


		N	Mean [95% CI]	SD	Mode	Median
Slovenia	*Creating a VE programme*	89	5.11 [4.49, 5.71]	2.889	2	5
	Getting partners	88	5.70 [5.06, 6.34]	3.022	8	6
	Managing online meetings with students	88	5.31 [4.72, 5.89]	2.752	4	5
	Organising VE online meetings	88	5.58 [4.96, 6.20]	2.923	6	6
	Finding topics for VE projects	88	5.76 [5.16, 6.36]	2.832	9	6
	Improving ICT competences for VE projects	88	5.58 [4.97, 6.19]	2.868	3	6
	Finding appropriate tools for VE	88	5.57 [5.03, 6.10]	2.527	7	6
	Finding resources for VE	88	5.70 [5.16, 6.25]	2.556	6	6
	Designing meaningful tasks for VE	88	5.32 [4.68, 5.95]	3.000	2	5
	Integrating VE projects within the curriculum	88	5.38 [4.66, 6.09]	3.357	10	5



		N	Mean [95% CI]	SD	Mode	Median
Spain	*Creating a VE programme*	170	5.43 [4.98, 5.88]	2.969	1	5
	Getting partners	170	5.79 [5.35, 6.24]	2.937	2	6
	Managing online meetings with students	170	5.81 [5.36, 6.25]	2.950	9	6
	Organising VE online meetings	170	5.66 [5.22, 6.11]	2.919	8	6
	Finding topics for VE projects	170	5.16 [4.76, 5.55]	2.605	5	5
	Improving ICT competences for VE projects	170	5.26 [4.85, 5.68]	2.760	2	5
	Finding appropriate tools for VE	170	5.12 [4.74, 5.51]	2.545	5	5
	Finding resources for VE	170	5.33 [4.94, 5.72]	2.604	3	5
	Designing meaningful tasks for VE	170	5.77 [5.32, 6.23]	3.005	9	6
	Integrating VE projects within the curriculum	170	5.66 [5.16, 6.16]	3.314	10	6





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