CLILNetLE

DIGITAL PRACTICES IN AND OUT OF THE CLIL CLASSROOM: A PAN-EUROPEAN SURVEY OF STUDENTS AND TEACHERS

A Report by CLILNetLE Working Group 4

Katharina GHAMARIAN, Craig NEVILLE, Marta SEGURA, and Ute SMIT

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Katharina GHAMARIAN, University College of Christian Churches of Teacher Education Vienna (Data Analyst)
Craig NEVILLE, University College Cork (Working Group 4 Vice Leader)
Marta SEGURA, Universitat Internacional de Catalunya (Report Editor)
Ute SMIT, University of Vienna (Working Group 4 Leader)

With contributions from:

Rahime Filiz AGMAZ, Necmettin Erbakan University
Dorothea BAGALOVA, Constantine the Philosopher University in Nitra
Patricia BÁRCENA TOYOS, Universidad Internacional de la Rioja
Onorina BOTEZAT, Bucharest University of Economic Studies
Letizia CINGANOTTO, University for Foreigners of Perugia
Francesca COSTA, Università Cattolica del Sacro Cuore
Merita HOXHA, Aleksandër Xhuvani University
Sviatlana KARPAVA, University of Cyprus
Elena KOVACIKOVA, Constantine the Philosopher University in Nitra
Valentina MORGANA, Università Cattolica del Sacro Cuore
Hilary O'CONNOR, University College Cork
Ana Filipa OLIVEIRA, Lusófona University
Suheyla Demirkol ORAK, Fırat University
Valentina PIACENTINI, University of Aveiro
Evdokia PITTAS, University of Nicosia
Mari Carmen SÁNCHEZ VIZCAÍNO, University of Economics Bratislava
Ekaterina STRATI, Aleksandër Moisiu University
Pia SUNDQVIST, University of Oslo
Liss Kerstin SYLVÉN, University of Gothenburg

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1. Introduction

As laid out in the Memorandum of Understanding (MoU, 2022) of the COST Action CLILNetLE (CA21114), the surveys reported here focus on the digital practices that CLIL learners and teachers engage in both in their CLIL lessons and in their spare time. In addition, the influence that these activities have on students' bi/multilingual disciplinary literacies acts as an additional focus. Administered in 11 European countries between March and June 2024, this large-scale quantitative investigation is the first of its kind to provide detailed information on the range and diversity of the digital practices that CLIL teachers engage in for learning and teaching purposes and those that students are engaged in and outside of school. Consequently, the resultant dataset provides an urgently needed baseline for future research into the potential of such practices for CLIL education.

CLIL, short for Content and Language Integrated Learning, is best understood as a cover term for a range of teaching realities that differ in terms of who does the teaching (language or content teacher), the subjects in which it takes place, for how long it is delivered, the role and function of the main language of schooling, and what explicit and implicit language learning aims are pursued (e.g., Banegas & Zapa-Hollman, 2024). What these different CLIL practices have in common, though, is that content teaching is done through a second or foreign language (L2) in pursuit of the widely shared endeavour to help "**school-leavers** achieve the competence to use at least **one foreign language confidently for professional and academic purposes**." (MoU, p. 3, emphasis original).

It is in view of this overarching learning objective that CLILNetLE is dedicated to investigating bi/multilingual disciplinary literacies (BMDLs) in CLIL, and to do so from various conceptual and empirical angles (see Figure 1).

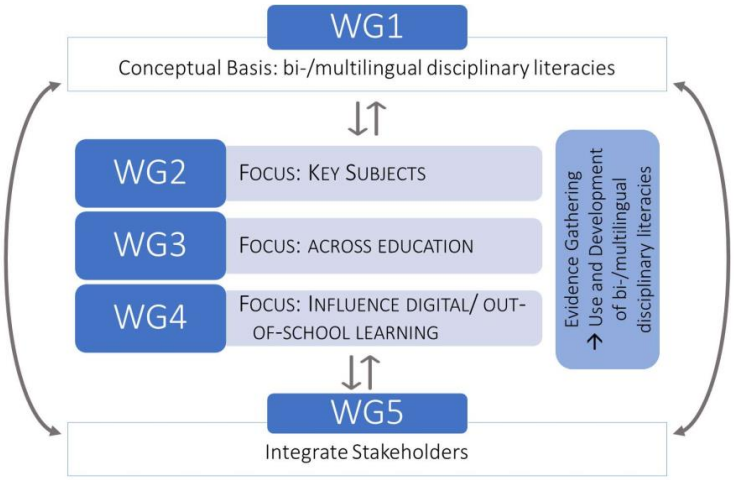


Figure 1. Structure and tasks of working groups WG1 to WG5 in CLILNetLE (MoU, 2022, p. 17)

Based on the literature and in-depth discussions in WG1, disciplinary literacy is conceptualised here as both:

> "…a **goal** and a **dynamic process**. It involves a deep reciprocal relationship between disciplinary content and ways of constructing knowledge and communicating it. Disciplinary literacy starts from **knowledge building**; it is about **learning** the typical ways of **thinking, meaning-making and communicating** in different disciplinary areas inside and outside of school contexts… [and] in **age-appropriate** ways."
>
> (Nikula et al., 2024, p. 8-9; emphasis original).

Gaining such literacies requires development along five dimensions (see Figure 2), of which the *bi-, multi- and translingual dimension* acknowledges the inherent multilingual nature of CLIL teaching and learning. Additionally, this conceptualisation appeals directly to the research interests of WG4:: it underlines that literacies develop not only in school, but also in spare time activities, and foregrounds the importance of digital practices (cf. *technological dimension* in Figure 2).

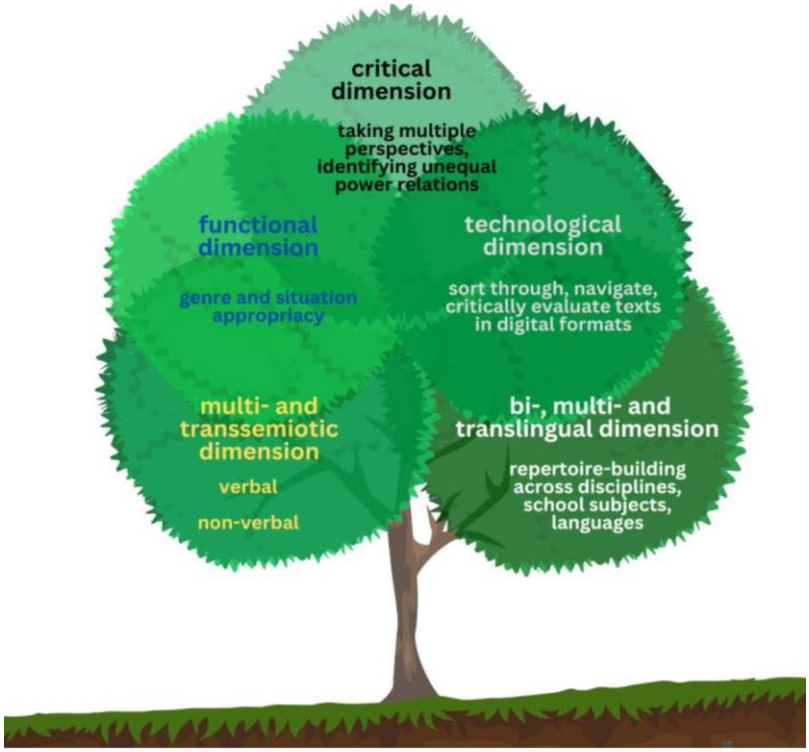


Figure 2. Key dimensions of bi/multilingual disciplinary literacy (Nikula et al., 2024, p. 10)

Reflecting this comprehensive understanding of BMDLs in CLIL, we decided to pursue the WG4 research focus in two surveys, one targeting CLIL students and the other focusing on CLIL teachers. The principal research question for each survey (see Figure 3) reveal, on the one hand, the individuality of each survey, while, on the other, establish possible crossover themes for further analysis in future comparative research. See Chapter 2 for more information on how these research questions were devised.

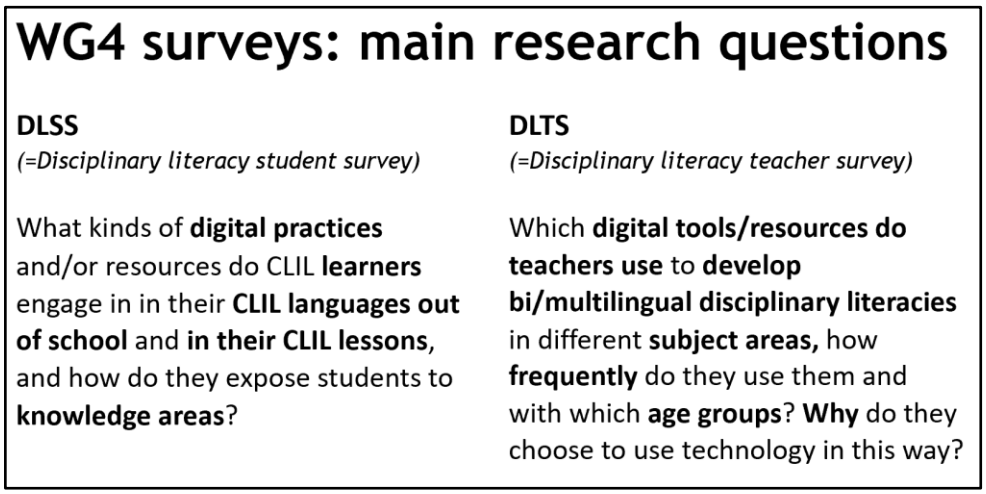


Figure 3. Main research questions of the two surveys, DLSS and DLTS

More specifically, this difference is evidenced by the structure of the final questionnaire instruments, both of which were structured somewhat differently (see Figure 4). Nonetheless, they elicited information on the core interests of digital practices used in CLIL lessons and out of school, and how these might support BMDLs in CLIL.

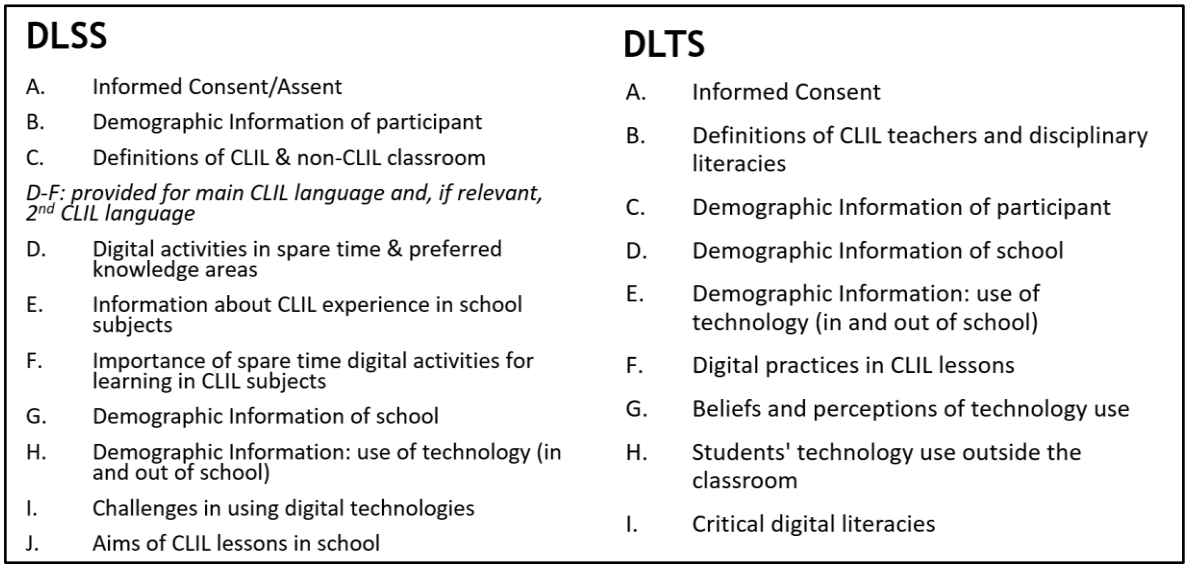


Figure 4. Basic structure of DLSS and DLTS

Overall, this investigation caters to **three different gaps in the CLIL research landscape**: it focuses on BMDLs, rather than general language skills; it elicits data from teachers and students, thus giving equal weight to both core stakeholder groups; and it is truly pan-European given the diversity of not only the researchers who composed the surveys but also the locations in which the survey was administered. The aim of this report is to provide a first description of the DLSS and DLTS datasets; more in-depth investigations and elaborations will follow in future publications.

After sketching the process of developing both questionnaires in the next section, Chapters 3 and 4 are dedicated to the pan-European results of the DLSS and the DLTS respectively. Given that these chapters are lengthy, each chapter starts with a brief description of the dataset before offering a bulleted summary of the main findings. This is then followed by discussions of individual findings and its accompanying data, presented in graphs and/or tables. The final two content chapters combine the information gained from both surveys and offer a list of similarities and differences between the DLSS and DLTS in Chapter 5 and, in Chapter 6, a list of recommendations for teachers, policy makers, and teacher trainers. The final chapter summarises the main findings in relation to the research tasks and sketches relevant next steps, within CLILNetLE, and beyond.

In addition to this report that deals with the pan-European study in its entirety, the data sets of the participating countries, are presented in individual country reports, i.e., (in alphabetical order) Albania, Austria, Cyprus, Ireland, Italy, Portugal, Romania, Slovakia, Spain, Sweden and Turkey. In addition, the piloting phase and insights gained from it for the main surveys are presented in a separate report.

2. Report on the creation of the research instruments for WG4 of CLILNetLE

*With contributions from **Merita HOXHA** (Aleksandër Xhuvani University) and **Ekaterina STRATI** (Aleksandër Moisiu University).*

2.1. Rationale for DLSS and DLTS

One of the main objectives of COST Action CA21114 CLIL network for Languages in Education: Towards Bi- and Multilingual Disciplinary Literacies (CLILNetLE) is to "provide an accessible collection of **standardized research instruments** and research training" and "to **identify patterns of use**, development and existing good practices in terms of supporting bi/multilingual disciplinary literacies at school, focusing on grades 5-13" (MoU, 2022).

In order to achieve these objectives, the five working groups have specific objectives, tasks and deliverables. *WG4: Learning and using bi/multilingual disciplinary literacies in digital media and outside school* focuses on **learners' engagement with bi/multilingual disciplinary literacies in the digital world and in their lives outside of school**. Two of the tasks of WG4 are:

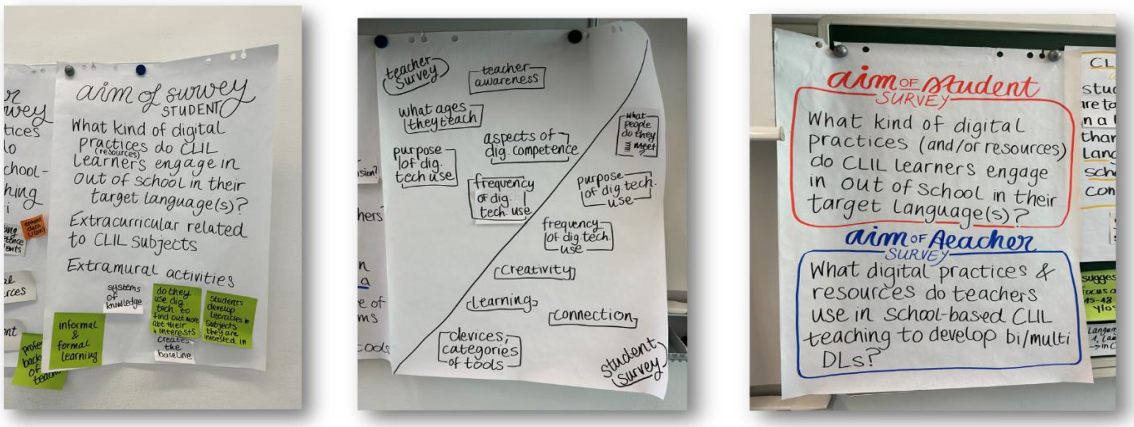
- T4.1 Survey a) digital practices CLIL learners engage in outside education in English or other CLIL target languages, and b) digital practices and resources used in school-based CLIL teaching (D8).
- T4.2 Evaluating the potential of digital practices (inside and outside of school), and other out of school learning opportunities on bi/multilingual disciplinary literacies (MoU, 2022 p. 18).

2.2. Initial conceptualisation of DLSS and DLTS

The fulfilment of these tasks began in Vienna in March 2023 when WG4 met for the first time. Through collaborative brainstorming, researchers from ITC[1] and non-ITC countries devised a roadmap on how to complete these tasks. One of the most important decisions taken in that meeting was the outline of two research instruments that sought to collect data on the digital practices of students and teachers in CLIL classrooms and outside of school. At this initial meeting, WG4 decided to create two research instruments:

1. **Digital Literacy Student Survey (DLSS)**, which aims to investigate digital practices CLIL learners engage in outside education in English or other CLIL target languages.
2. **Digital Literacy Teacher Survey (DLTS)**, which aims to investigate digital practices and resources used in school-based CLIL teaching; and to what extent digital practices outside school impact on their bi/multilingual disciplinary.

[1] Inclusiveness Target Countries (ITC)



Picture 1. Images from the brainstorming activity. Vienna meeting, March 2023

To guide the creation of the survey instruments, WG4 devised main and sub research questions for each survey:

Main research question for the DLSS:

What kinds of digital practices and/or resources do CLIL learners engage in their CLIL languages out of school and in their CLIL lessons?

Sub- research questions for the DLSS:

- *To what extent do CLIL learners use which digital tools in their CLIL language?*
- *For what knowledge areas do CLIL learners use which digital tools in their CLIL languages?*
- *For what (literacy) purposes do they use digital tools in their CLIL languages?*
- *What challenges do students face when engaging in digital practices in the CLIL languages?*
- *How do students evaluate the potential of their digital practices for learning?*

Main research question for the DLTS:

Which digital tools/resources do teachers use to develop bi/multilingual disciplinary literacies in different subject areas, how frequently do they use them and with which age groups? Why do they choose to use technology in this way?

Sub-research questions for the DLTS:

- *Who are the CLIL teachers?*
- *Which digital tools/resources do teachers use to develop bi/multilingual disciplinary literacies?*
- *What is the rationale behind using such digital tools and resources to develop bi/multilingual disciplinary literacies, i.e., what value does the digital element add?*
- *Do teachers' practices differ depending on which age group they are using them with?*
- *How do these practices differ between disciplines/subject areas?*
- *What do teachers know about what students do extramurally in terms of technology to support their development of bi/multilingual disciplinary literacies?*
- *What are teachers' beliefs and perceptions of using technology for the development of bi/multilingual disciplinary literacies in CLIL?*
- *What are the perceptions of teachers with regard to the effectiveness of their digital practices in the CLIL classroom?*
- *How do teachers develop critical digital literacy skills in CLIL lessons with their students as an inherent part of any literacy development in the 21st century?*

A second decision that was taken at this initial meeting in Vienna focused on the type of data that would be collected. A key challenge of working as part of a COST action is the large number of researchers involved in such tasks. In this case, approximately 50 researchers have played a role in developing the research instruments. It was decided that two quantitative-based survey instruments in the form of questionnaires would be created to operationalise the key concepts contained within our research questions.

2.3. Methodology

The following methodological structure was followed to create the survey instruments; however, this methodology was not borrowed from any specific existing research. Instead, it was developed through dialogical, reflective practice between experienced and less experienced researchers. Although it may seem like a cohesive process in the way that it is presented here, the reality was more organic:

1. Members of WG4 were all invited to **join the social media platform Slack** (Slack Technologies, 2024) as used by the Action. New members, who were not in Vienna, were joining the group at different points. All members were informed of the purpose of the DLSS/DLTS research instruments and research questions.
2. A Short-Term Scientific Mission (STSM) was undertaken by Ekaterina Strati at the University of Vienna to **review existing research** (quantitative, qualitative, and mixed methods) that focused on the digital practices of young people and educators in CLIL teaching. During this process, aside from extracting key details about the conclusions

of the research, survey items were also extracted to help the creation of the DLSS and DLTS.

3. **The platform Qualtrics** (Qualtrics, 2024) was chosen to administer the surveys and **the repository PHAIDRA** at the University of Vienna to house and analyse our data. By making these decisions at an early stage in relation to the long-term storage of our data, this helped us make decisions about the types of metadata and additional materials that would be required to help future researchers make sense of our data according to FAIR data principles (European Commission, 2016). This also promoted the creation of a **Data Management Plan** (DMP) for this working group as well as the rest of the COST Action (Neville et al., 2024).
4. To support WG4 members to reflect on quantitative research and the tools that can be used to undertake it, **Qualtrics Training** was provided for WG4 members via a Virtual Mobility Grant (VM) by Craig Neville.
5. Once the training had taken place and the results of the literature review were shared, all members were invited to **generate questionnaire items** that reflected the research questions. These were generated in online Google Docs and were managed by Ute Smit (WG4 Leader) who took responsibility for the DLSS and Craig Neville (WG4 Vice-leader) who took responsibility for the DLTS. Individual online meetings were held to discuss and streamline the potential items.
6. A core group of WG4 members then came together to **analyse the individual items** and streamlined them according to the research questions.
7. Once the **list of potential survey items** had been created, they were **formulated in Qualtrics**. This was a highly complex and lengthy task as the surveys included a large amount of 'piping' and Boolean logic. The reason for this was so that the survey experience of participants would be as personalised and streamlined as possible. Feedback was then provided by the core group of WG4 on the survey instruments.
8. The **DLSS questionnaire was piloted** with several young adults who were related to members of WG4. The reason for this decision was that the survey had to be completed by learners aged between 11 and 21 years of age. Therefore, the challenge was to ensure that the language, ideas, and concepts were refined enough so that students could undertake the survey without too much intervention from an adult. The **DLTS** survey was **analysed by outside experts**.
9. This resulted in a considerable amount of **revision** to ensure that the questionnaires were ready for piloting. At this stage, we recognized that the questionnaires took, at least, 25 minutes to complete. This was a concern, but we felt that as participants moved through the surveys, their experience would become increasingly personalised, and the length of time required to complete the survey would be reduced.
10. The surveys were then **piloted in Albania** (DLTS *N*=71; DLSS *N*=88) and a think-aloud protocol was undertaken to evaluate the survey instruments also. Albania was chosen as an appropriate pilot country because ethical approval could be granted centrally by the ministry of education. In other European countries, the process would have been lengthier.
11. **Preliminary data analysis** was undertaken by Katharina Ghamarian, a member of WG4, who then suggested several changes to the survey instruments to ensure that they were as effective as possible.

12. The survey was then **translated into 11 different languages** through the Qualtrics platform. The platform is highly sophisticated and first performed a Google Translation of all the items, which then could be edited by the members of WG4.
13. **Ethical approval** was sought from the University of Vienna to undertake the survey. For many participants, ethical approval from an EU institution was enough to allow the survey to take place in other EU countries. Nonetheless, for some jurisdictions there were additional steps that needed to be taken.
14. **To disseminate the survey instruments**, it was decided that members of WG4 from different ITC and non-ITC countries should be recruited as 'local' experts who would be responsible for any extra ethical requirements at a local level and for getting the questionnaire to teachers and students through local networks. A part of the success criteria for the survey instruments and the resultant data was that **data had to be gathered in 6 different countries** (3 ITC countries and 3 non-ITC, at least). This took place between April 2024 and June 2024.
15. Once the questionnaires were shut in Qualtrics, the **dataset was downloaded and cleaned** by Katharina Ghamarian and Ute Smit. This mainly required the re-coding of a number of variables and filling empty cells with values. At this stage, the data dictionary and glossary were also created to be used during the analysis process.
16. The dataset was then divided into **country-specific sub datasets and analysed** at this level. The dataset was also **analysed at a pan-European level**.

2.4. Ethical research

Ethical research basically boils down to **doing the right thing** and as researchers we are bound by different ethical codes of practice most of which, at least in Europe, are based on the supranational framework, **The European Code of Conduct for Research Integrity** (ALLEA, 2023). Ethical research requires us to show respect for persons (that is, our participants), beneficence (avoiding doing harm), and justice (fairness, impartiality, and beneficiaries of research).

To satisfy these policy and ethical principles our surveys were:

- **Voluntary** – No questions were made obligatory apart from the informed consent questions and ones referring to language which required piping. But this was made clear in the informed consent.
- **Free withdrawal** – Participants could cease completion of the questionnaire at any point, but they were told during the informed consent process that any data that they added would be recorded. One difficulty that we did have was ensuring that teachers did not mandate that their students had to complete their questionnaire. Although this was difficult to ensure, we decided to create a number of PowerPoint and paper-based resources that could be used by teachers to help them ensure that this happened.
- **Avoiding harm** – Although the surveys were long, we tried to use as much 'piping' and personalisation as possible to reduce the time burden on participants. Participants were informed at the informed consent stage of how long the questionnaire would take to complete before they gave their consent.

2.5. Opportunities, challenges and recommendations

The process of creating the research instruments was challenging in many ways but at the same time taught us great lessons. The table below summarises some of the challenges and benefits of creating these two research instruments.

Opportunities	Challenges	Recommendations
Working with a large group of researchers from different backgrounds helps to create a questionnaire that can function across Europe in different contexts.	Ensuring that everyone's wants and desires are satisfied in terms of conceptualising and operationalising the questionnaire.	Clear strategy to manage a large group of researchers.
Learning from different types of expertise (e.g., quantitative methods, Education vs. Applied Linguistics)	Streamlining communication, required to work at different times unlike in directly funded research projects.	Clear leaders who can chunk down and communicate tasks easily.
	How to think quantitatively when writing survey items.	Pilot comprehensively (length, unclear wording, too complex for age ranges, interpretation of CLIL).

3. Digital Literacies Student Survey (DLSS): Pan-European report

3.1. Introduction

The DLSS questionnaire was administered between **March and June 2024** by a team of administrators working in several COST association countries. Figure 1 displays the different areas from where participants completed the questionnaire. In total we received 5153 responses to the survey. After the compulsory consent question, this number reduced to 4970 (Figure 2).

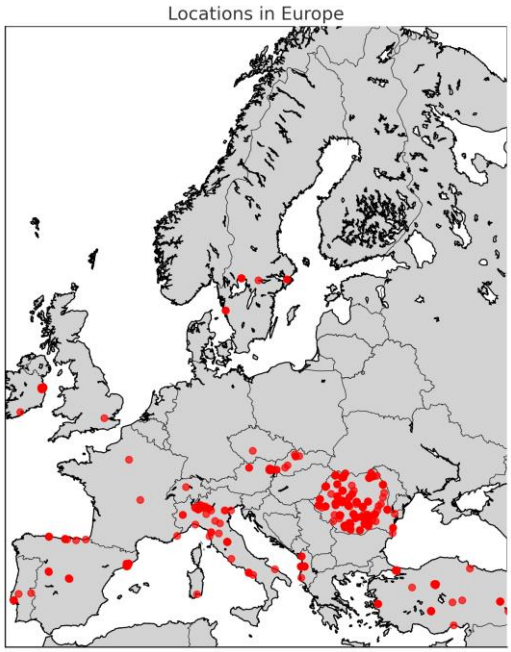


Figure 1. Locations of DLSS participants.

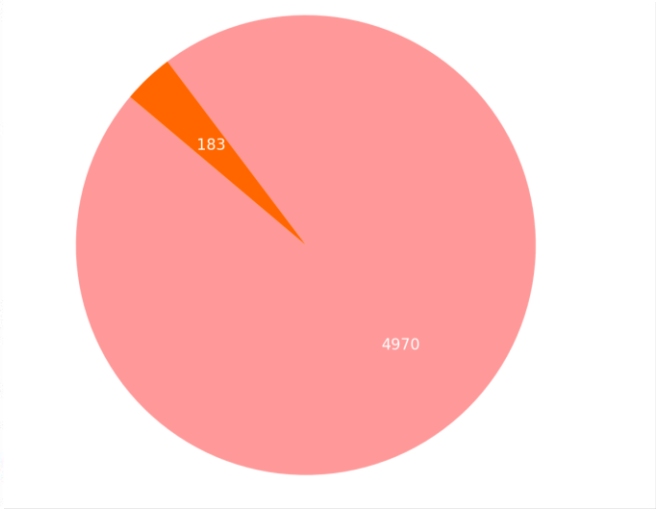


Figure 2. Consent figures

After data cleaning, 4229 valid data entries were left for analysis.

This questionnaire was administered via a team of administrators based in the following eleven countries who were also members of Working Group 4 of CA21114:

- Albania (ITC)
- Austria (non-ITC)
- Slovakia (ITC)
- Sweden (non-ITC)
- Romania (ITC)
- Italy (non-ITC)
- Ireland (non-ITC)
- Spain (non-ITC)
- Portugal (ITC)
- Türkiye (ITC)
- Cyprus (ITC)

Questionnaires were distributed via networks in each of the target countries. For DLSS questionnaires, there were also different protocols for working with underage participants. For more information about how this took place, please refer to the individual country reports.

The target group for the DLSS survey were learners between the ages of 11-21 years old engaged in CLIL learning. Consequently, the questionnaire that was devised had to be targeted to a target participant group with potentially very different literacy levels. Moreover, the interpretation of CLIL is very different in different countries. Creating questionnaire items that related to our specific research questions and that were understandable to learners from very different target audiences was a challenge. As we can see from Figure 3, the amount of time that participants took to respond to the survey ranged considerably and perhaps is reflective of the different levels of literacy when surveying a group of learners from such a considerable age range. The median time to complete the survey was 21.02 minutes. The lower quartile (13.52 minutes) and upper quartile (29.45 minutes) show that the questionnaire took principally between a little less than a quarter of an hour to half an hour. In this analysis, we discounted extreme outliers as these participants possibly left their survey open in the browser and did not complete it in one sitting.

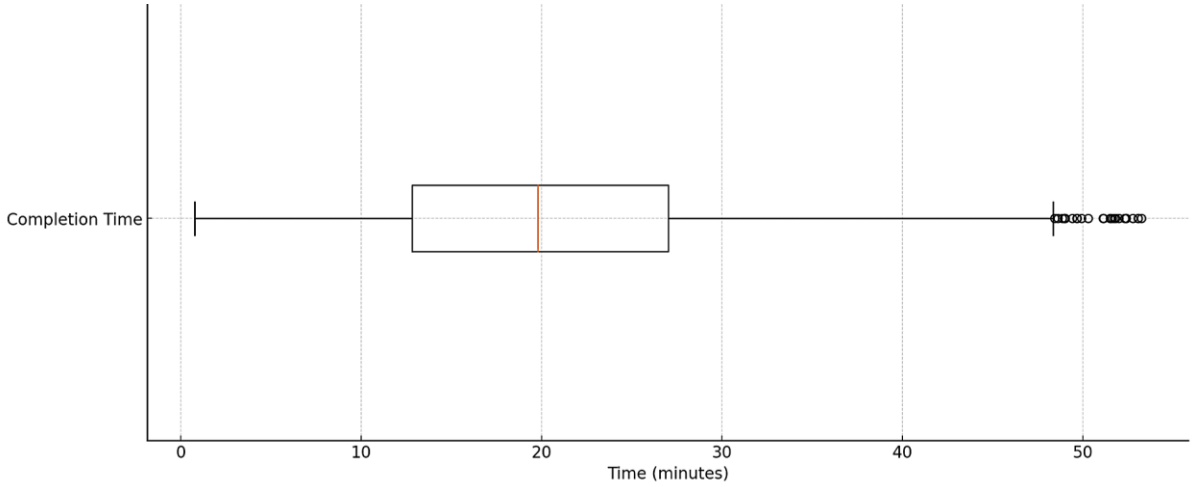


Figure 3. Time to complete the questionnaire

However, despite the varied amount of completion times, the vast majority of participants (just under 3500 participants) worked their way through 75-100% of the survey. A smaller group of around 650 participants completed less than 50% of the survey (Figure 4).

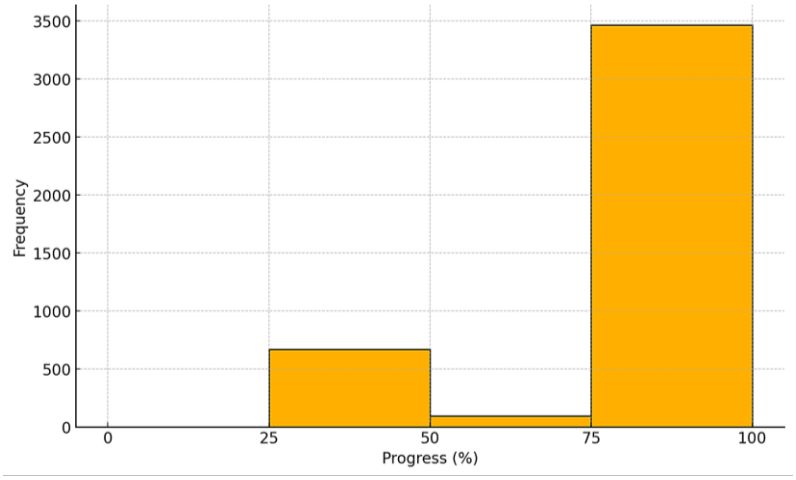


Figure 4. Progress (%) completing the questionnaire

Interestingly, when the age of participants is correlated with the progress that they make there is a weak negative correlation suggesting that as age increases, the amount of the questionnaire completed decreases (correlation coefficient -0.109). Equally, when age and those that completed the questionnaire between 13 and 30 minutes are compared, there is a weak negative correlation (correlation coefficient of -0.112.) showing that as age increases, the time spent on the survey decreases. These two correlations, therefore, align in that the older the students, the less of the survey they completed. Therefore, we can possibly conclude that the survey was appropriate for the wider age range.

The questionnaire was compiled and distributed through the Qualtrics platform and, therefore, could also be distributed multilingually. The survey was translated into 11 languages and the vast majority of responses were in Romanian (see Figure 5). Given the number of responses from Romania, this is understandable. However, a large number of responses were also given in English, suggesting that some participants did not respond in their L1.

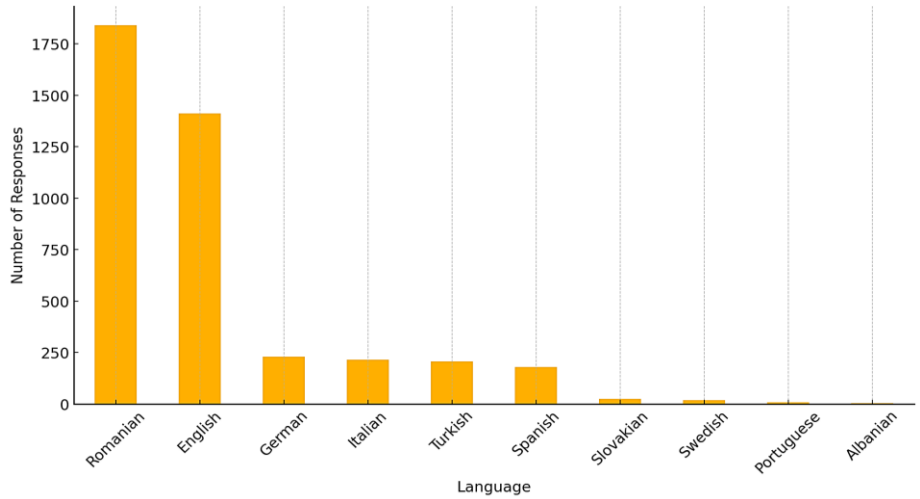


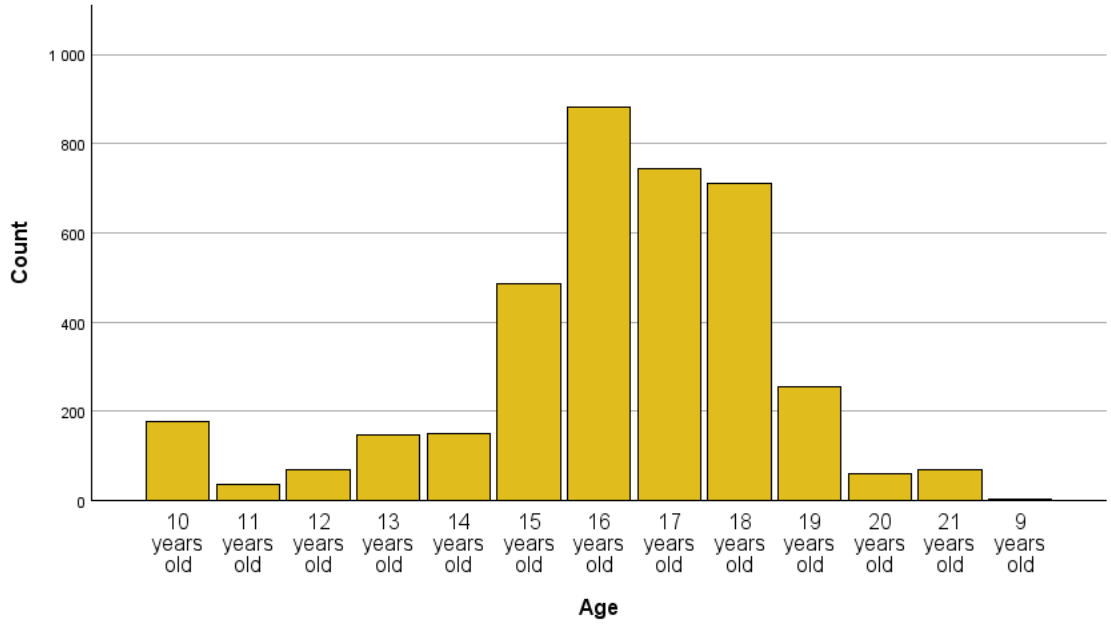
Figure 5. User languages of participants in questionnaire

3.2. Summary of main findings

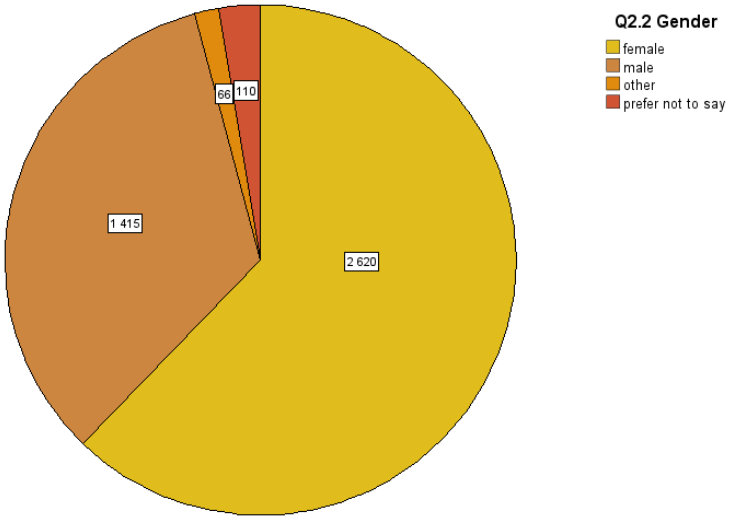
- The DLSS survey received 4229 valid responses from participants aged 11-21 across multiple European countries.
- Most respondents (62.2%) were female, with a significant proportion of parents/carers holding university degrees, indicating a well-educated background.
- Participants reported using various digital activities to support their CLIL learning, with social media, phone apps, instant messaging, and online video sharing being the most important.
- Multiplayer online gaming also played a moderately important role in supporting CLIL learning, whereas VR and digital storytelling were less significant.
- English, French, and German were the most common CLIL languages, with English being the most prominent.
- Students' general interest in disciplinary areas extramurally is different to that of their CLIL languages. The disciplinary areas that are preferred generally are Arts, Social Sciences, Natural Sciences, Technology, and Economics, but there is a preference for Health, Languages, Philosophy, Tourism, and Hospitality in the CLIL language.
- Science-based content areas are aligned with online learning more than Arts subjects which are aligned with a more diverse range of technologies such as social media, photography, and instant messaging. Social media is the only technology that is common across both.
- The primary subjects studied through CLIL were Languages (58%), followed by Arts and Humanities, rather than STEM subjects.
- Most students accessed the internet daily both at home and at school, though a larger proportion accessed it more frequently at home.
- The most frequently used devices outside of school were mobile phones, e-book readers, smart watches, and laptops, thus revealing a preference for portable technologies.
- In schools, mobile phones, laptops, desktops, tablets, and smart TVs were the most frequently used devices.
- There was a stark difference in the use of digital devices between school and extramural contexts, with more frequent use outside of school.
- Significant challenges in using digital technologies included limited internet connection, school policies, time constraints, and limitations set by teachers.
- Outside of school, students faced fewer challenges with digital access, indicating a more stable and prevalent use of technology.
- Privacy concerns were minimal, despite rising internet-related identity fraud rates.
- Participants indicated that the objectives of CLIL lessons were perceived to balance both language and content learning, with a slight skew towards language.
- While the extent of CLIL language use varied between CLIL language only, on the one hand, and, on the other CLIL and main educational language jointly, the responses revealed a balance with a slight skew towards the CLIL language being mainly used in lessons.
- Differences in the importance of digital activities were noted between CLIL languages, with music streaming, instant messaging, and phone apps being universally important.

3.3. Participant background

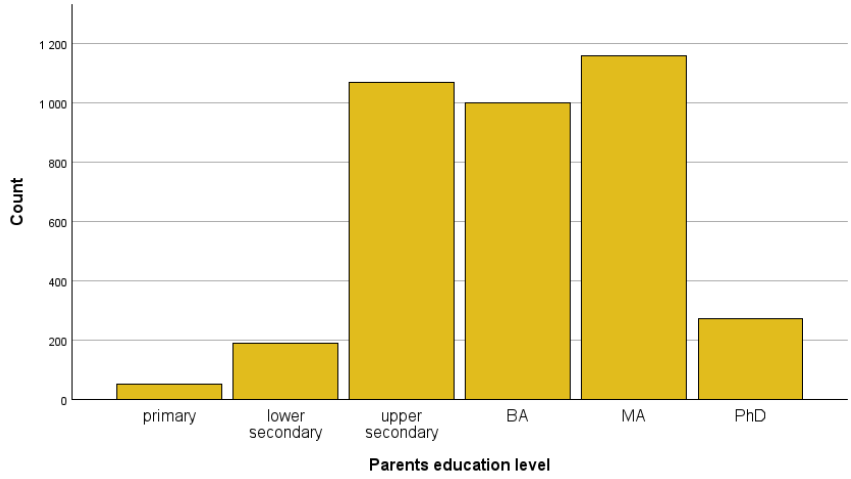
While the survey attracted participants from all intended **age ranges**, most participants fall into the age bracket of upper-secondary, indicating that the digital practices discussed below are more likely to be associated with the age range of 15-19 years.



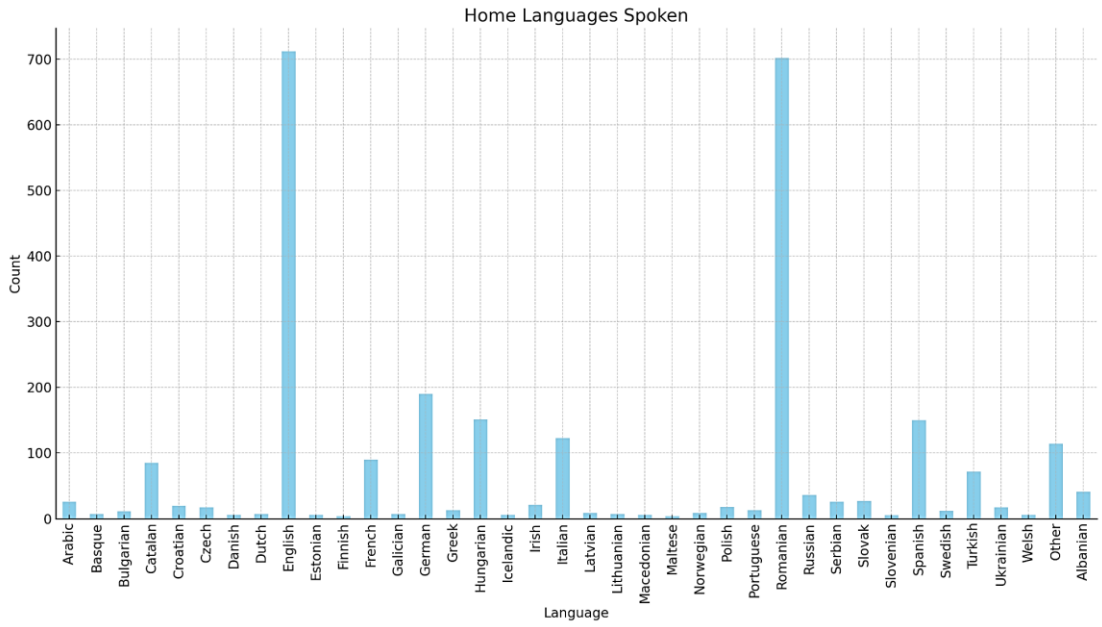
In terms of **gender**, the vast majority of participants that responded to the questionnaire (62.2%) were female. As there are very few quantitative studies that report the gender make-up of CLIL learning across Europe, it is difficult to say whether this is representative of the gender make-up of CLIL learners across Europe. 4% of students did not declare their gender or chose the 'other' option.



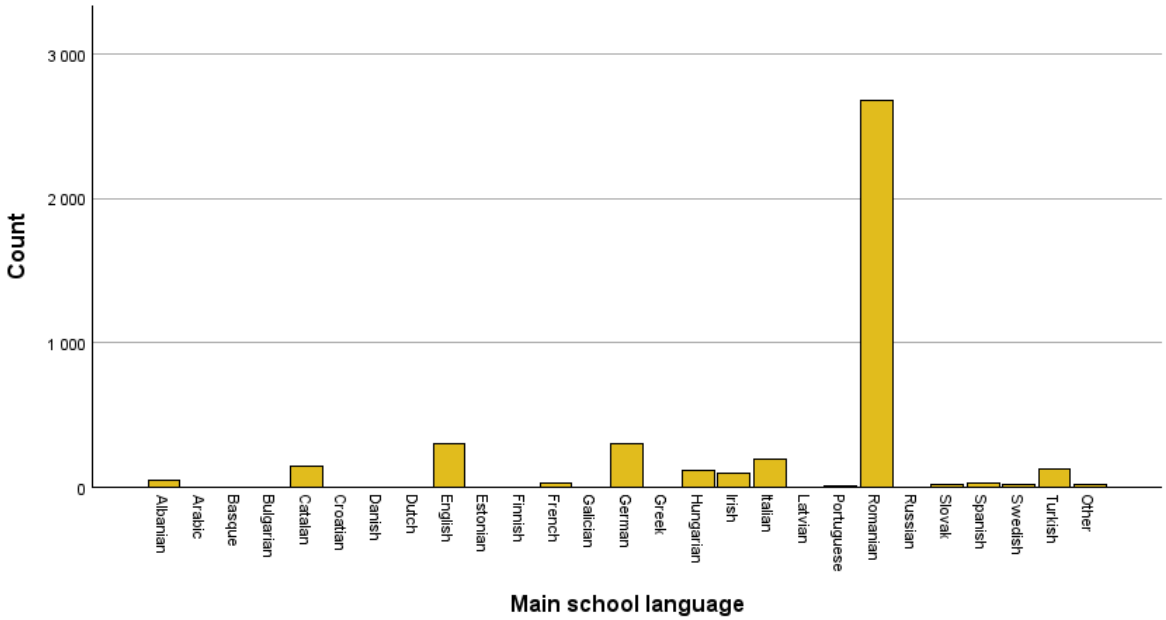
When it comes to the **education of learners' parents**, over half of all parents/carers have a university level degree at undergraduate or postgraduate level. This suggests that the vast majority of CLIL learners have well-educated parents/carers who perhaps see the value of learning content through another language.



Given the large proportion of respondents from Romania, it is unsurprising that Romanian features as one of the most commonly **spoken home languages**. A further surprising feature, however, is the large proportion of participants that have selected English as one of the languages that they speak at home. This suggests that a good proportion of learners who are engaged in CLIL learning at school engage in multilingual practices at home. Moreover, these practices could potentially come in the form of extramural English development through digital tools and practices. In the context of CA21114, this also supports the idea that for over 700 participants, the development of bi/multilingual disciplinary literacies is perhaps a reality of their learning.



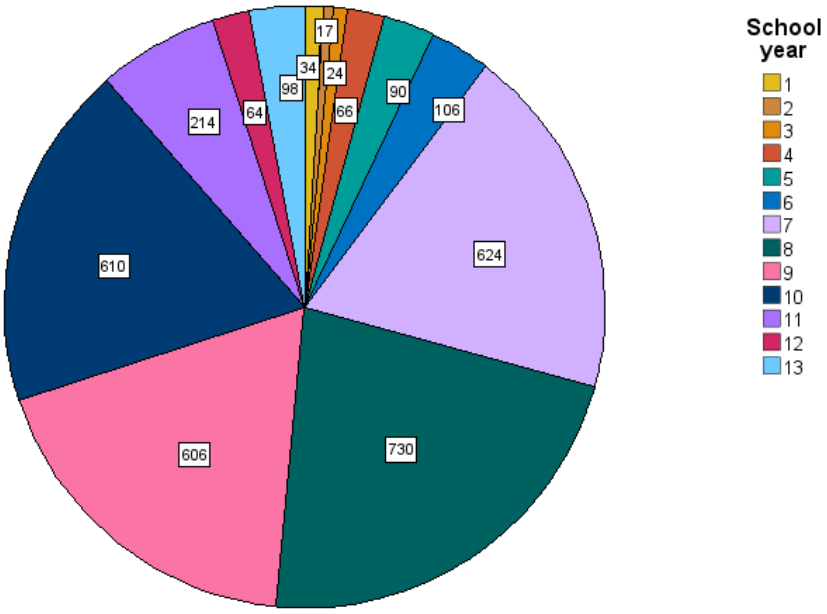
It's also unsurprising that the most cited **main language of schooling** is Romanian. However, in comparison with the languages used at home, it is interesting to see that English does not feature so highly here, reinforcing the idea of the importance of English extramurally.



As indicated above, the majority of participants come from the years of **upper secondary school** with a very small proportion coming from **late primary/early secondary**. This is also confirmed by -.588 as a measure of skewness.

Descriptives

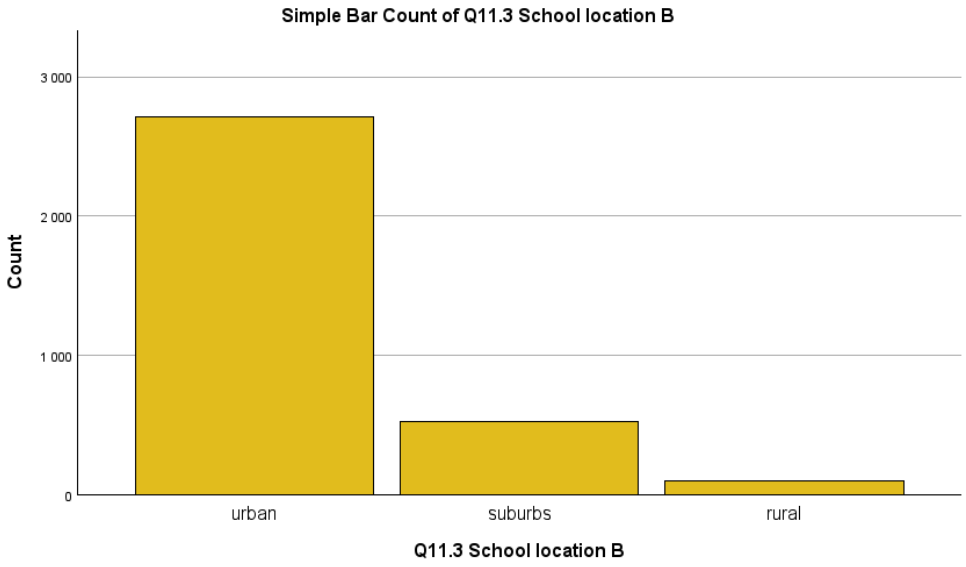
			Statistic	Std. Error
Q11.1 School year	Mean		8,42	,036
	95% Confidence Interval for Mean	Lower Bound	8,35	
		Upper Bound	8,49	
	5% Trimmed Mean		8,48	
	Median		8,00	
	Variance		4,160	
	Std. Deviation		2,040	
	Minimum		1	
	Maximum		13	
	Range		12	
	Interquartile Range		3	
	Skewness		-,588	,043
	Kurtosis		1,643	,085



The majority of participants come from urban areas (64.1%), with a smaller proportion coming from suburban environments (15%) and very few from rural areas (3%). A large proportion of participants (21%) did not indicate the **location of their school**. This should be important when understanding the data, given that it may be difficult to say whether there are significant differences between those that are educated rurally in comparison to those that are educated in more urban environments.

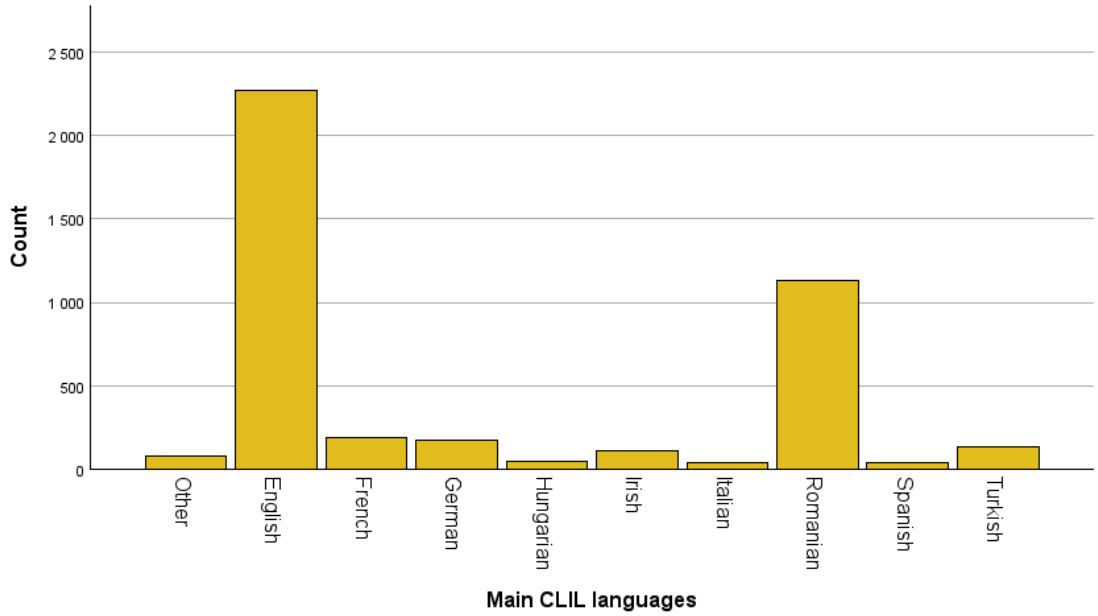
Q11.3 School location B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	urban	2709	64,1	81,1	81,1
	suburbs	529	12,5	15,8	97,0
	rural	101	2,4	3,0	100,0
	Total	3339	79,0	100,0	
Missing	System	890	21,0		
Total		4229	100,0		



3.4. Participants' CLIL learning experience

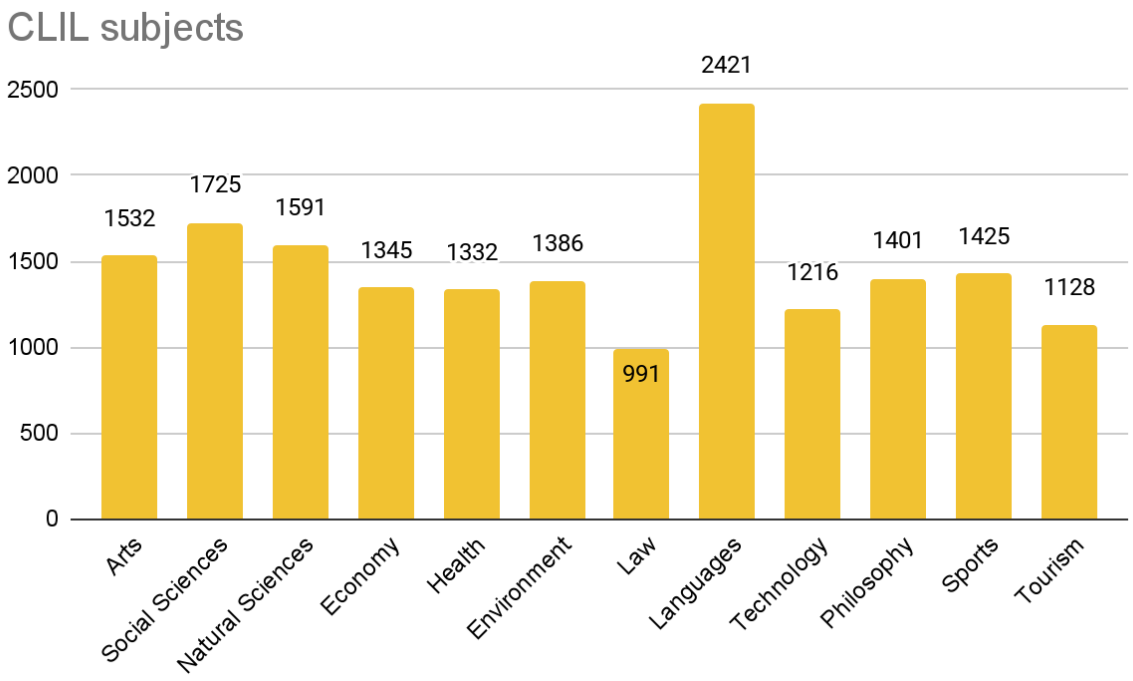
Given the prevalence of CLIL in English in Europe, it is unsurprising that this features as the most **prominent CLIL language**. French and German also feature here as common CLIL languages. Irish also features here as one of the more prominent CLIL languages, which is a valuable addition given its minorized status in comparison to French, German, and English. There are also some anomalies here which include Romanian, Turkish, and Albanian as CLIL languages. However, this could be as a result of education policy in Romania that allows learners to undertake their schooling in a heritage language or L1. Equally, it could be due to participants misunderstanding the question.



Q3.2 Main CLIL language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Albanian	34	,8	,8	,8
	Arabic	4	,1	,1	,9
	Basque	4	,1	,1	1,0
	Bulgarian	2	,0	,0	1,0
	Catalan	17	,4	,4	1,4
	Croatian	2	,0	,0	1,5
	Czech	2	,0	,0	1,5
	Danish	2	,0	,0	1,6
	Dutch	2	,0	,0	1,6
	English	2265	53,6	53,6	55,2
	Estonian	1	,0	,0	55,2
	Finnish	2	,0	,0	55,3
	French	192	4,5	4,5	59,8
	German	177	4,2	4,2	64,0
	Greek	1	,0	,0	64,0
	Hungarian	51	1,2	1,2	65,2
	Irish	109	2,6	2,6	67,8
	Italian	38	,9	,9	68,7
	Latvian	1	,0	,0	68,7
	Lithuanian	1	,0	,0	68,7
	Portuguese	1	,0	,0	68,8
	Romanian	1131	26,7	26,7	95,5
	Russian	1	,0	,0	95,5
	Serbian	2	,0	,0	95,6
	Slovak	1	,0	,0	95,6
	Spanish	42	1,0	1,0	96,6
	Swedish	5	,1	,1	96,7
	Turkish	138	3,3	3,3	100,0
	Welsh	1	,0	,0	100,0
	Total	4229	100,0	100,0	

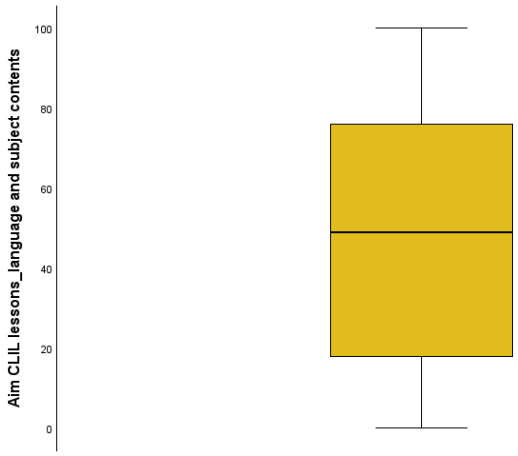
The most common **subject area** in which participants study CLIL is in Languages (58%). However, this label perhaps does not necessarily describe subject areas where learners learn literature or linguistics. For example, some participants may learn English Literature through English. What is interesting here is that the vast majority of participants who experience CLIL are in Arts and Humanities related disciplines rather than Science and Mathematics.



When it comes to the participants' **self-reported perceptions of the objectives of CLIL lessons**, there were a variety of responses. In this question, participants were presented with a scale where '0' meant that the focus of CLIL lessons was entirely language-related and '10' meant entirely content-related. Although the mean (46.98) and median (48) suggest that generally participants felt that there was a balance between language and content objectives with a slight level of skewness towards language, the standard deviation (32.728) and large interquartile range (58) suggest that there were mixed views on this matter.

Descriptives

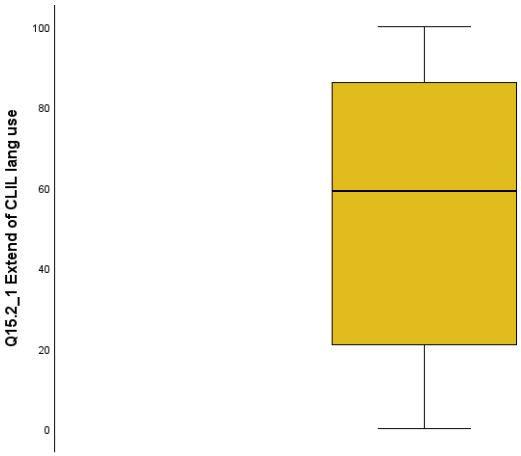
		Statistic	Std. Error
Mean		46,98	,591
95% Confidence Interval for Mean	Lower Bound	45,82	
	Upper Bound	48,14	
5% Trimmed Mean		46,65	
Median		48,00	
Variance		1071,147	
Std. Deviation		32,728	
Minimum		0	
Maximum		100	
Range		100	
Interquartile Range		58	
Skewness		,096	,044
Kurtosis		-1,251	,088



Participants were asked about the **use of the CLIL language in their CLIL lessons**, using a scale where '0' represented that the CLIL language was rarely used and '100' represented that it was mainly used. The mean (53.42) and the median (58) again suggest that there is generally a balance, but slightly skewed towards the CLIL language being mainly used. However, the standard deviation (34.094) and interquartile range (63) suggest that participants' responses were very varied.

Descriptives

		Statistic	Std. Error
Mean		53,42	,631
95% Confidence Interval for Mean	Lower Bound	52,18	
	Upper Bound	54,66	
5% Trimmed Mean		53,80	
Median		58,00	
Variance		1162,410	
Std. Deviation		34,094	
Minimum		0	
Maximum		100	
Range		100	
Interquartile Range		63	
Skewness		-,152	,045
Kurtosis		-1,363	,091

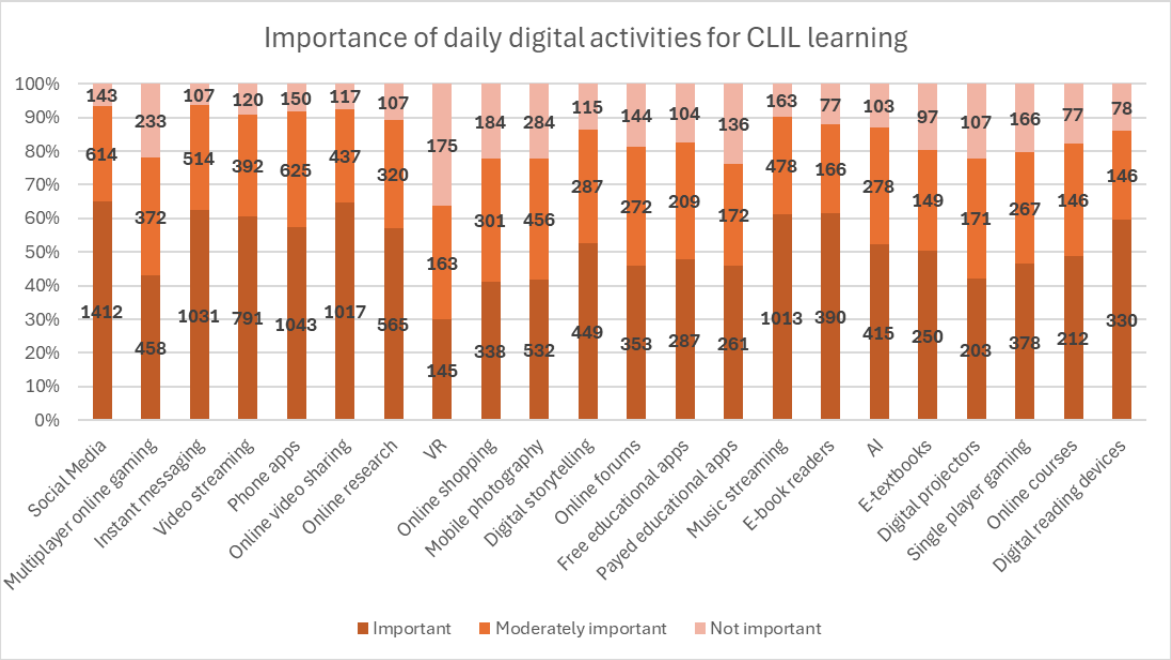


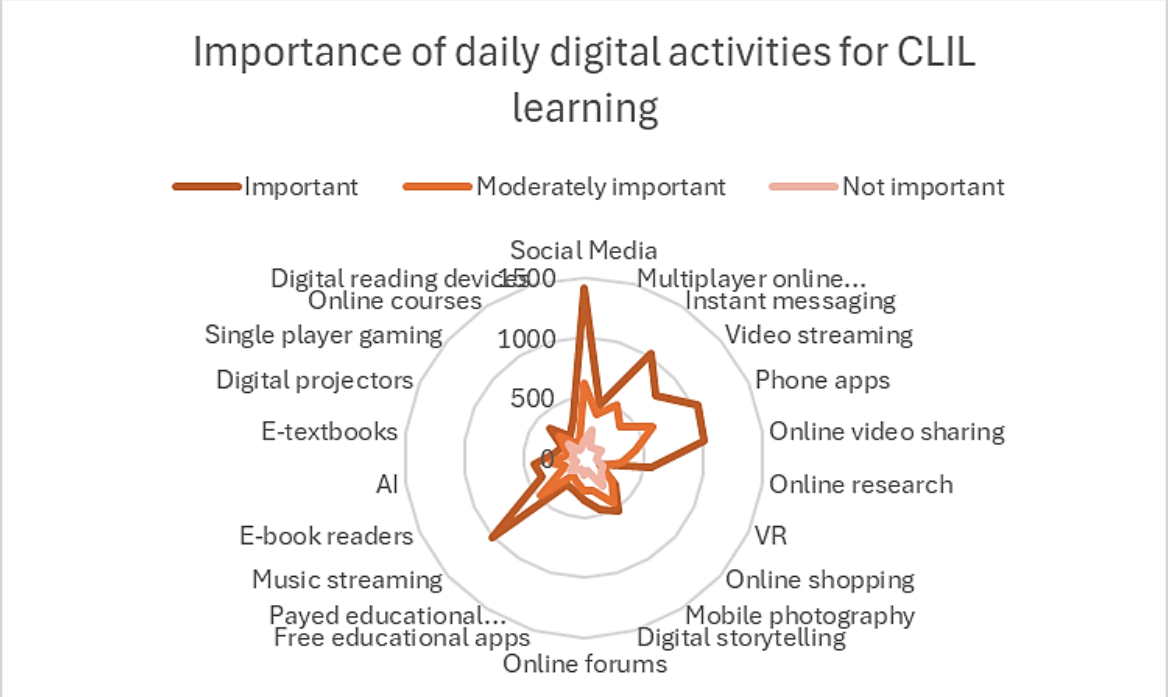
3.5. Focus on spare time

In terms of the **digital activities and practices** that learners participate in and their general **importance** for supporting their CLIL learning, those that play the most important role are not dissimilar to those that have been reported elsewhere (e.g., Peters, 2018; Schwarz, 2020).

In this case, they include social media, phone apps, instant messaging, online video sharing, and video streaming. Social media also play a moderately important role along with instant messaging, phone applications, and video streaming. However, multiplayer online gaming does also play a moderately important role. Those practices and technologies that are not important include VR, which is unsurprising given that it is an emerging technology. Digital storytelling is perhaps also equally unsurprising as it is a relatively new type of creative output. What is interesting is that mobile photography has not played a particularly significant role, despite the fact that other multimodal formats do. A key difference, however, between mobile photography and digital storytelling perhaps is that the former are often user-created rather than user-received. Another interesting observation is that single gaming plays less of a role than multiplayer online gaming. Given the importance of interaction as a part of language acquisition, it is interesting that games involving less interaction are those that are perceived as not being important.

Most important	Moderately important	Not important
• **Social media**: 1412 • **Phone apps**: 1043 • **Instant messaging**: 1031 • **Online video sharing**: 1017 • **Video streaming**: 791	• **Social media**: 614 • **Multiplayer online gaming**: 514 • **Instant messaging**: 514 • **Phone apps**: 437 • **Video streaming**: 392	• **VR**: 532 • **Digital storytelling**: 456 • **Mobile photography**: 338 • **Single player gaming**: 330 • **Digital reading devices**: 330





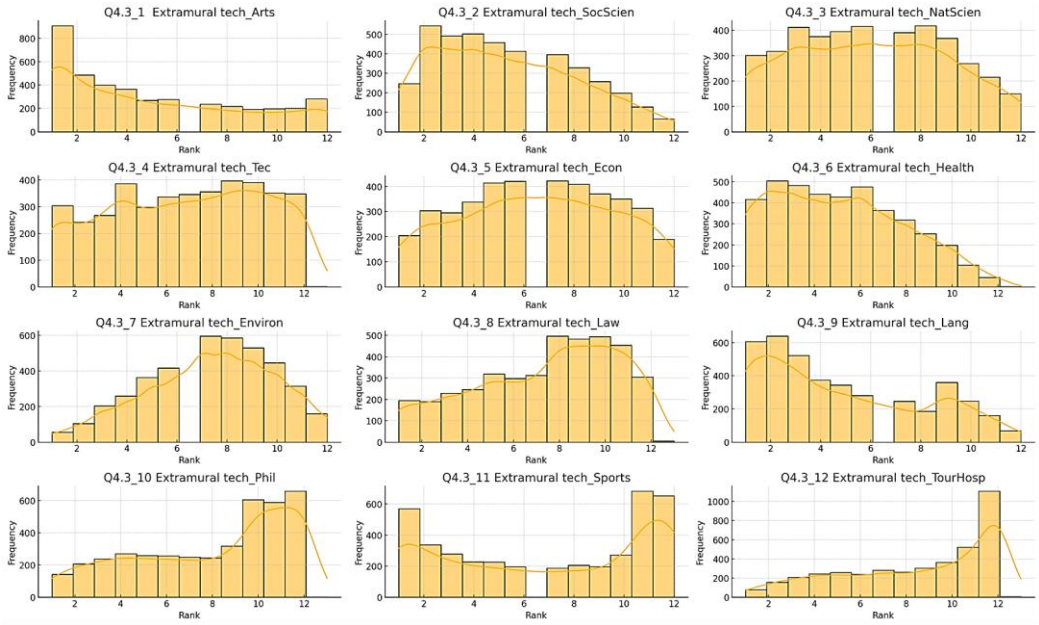
When looking at students' **use of digital activities in relation to the three main CLIL languages**, English, French and German, key differences emerge. For all three languages, high value is placed on music streaming, which is understandable given the role that music plays in supporting language learning (e.g., Fonseca-Mora& Herrero Machacoses, 2016; Ludke & Morgan, 2022). Moreover, previous studies have shown that students engage in music streaming in foreign languages just out of interest regardless of the learning potential as well (e.g., Schwarz, 2020). Also, instant messaging plays an important role. This is perhaps due to the international exchange relationship that these students have established to practise their language skills.

However, for French, digital reading devices, phone apps, and mobile photography are important. For German CLIL learners, video streaming, single player games, and digital storytelling are important as well as online research. In contrast to extramural English, user productive technologies such as photography, messaging, and digital storytelling are more important in extramural French and German. Therefore, producing language is more important or maybe motivated by the fact that receptive input is not as commonplace.

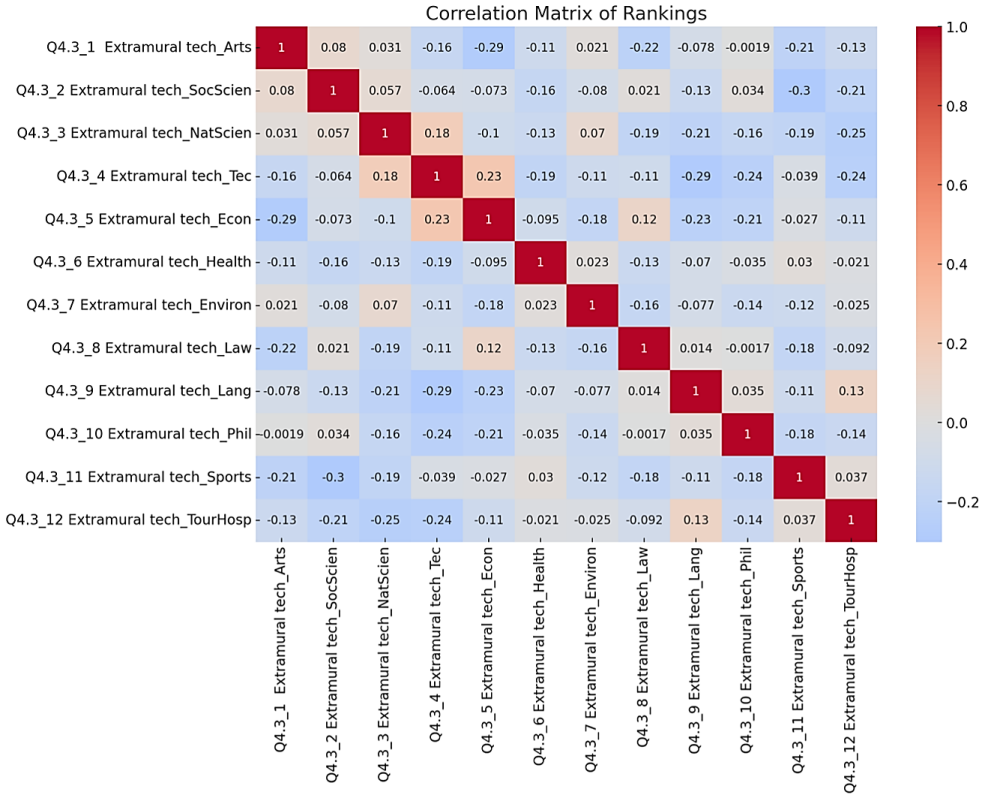
CLIL language	**French**	**English**	**German**
Top 5 most important digital activities	1. Music streaming 2. Digital reading devices 3. Phone apps 4. Instant messaging 5. Mobile photography	1. Social media 2. Online video sharing 3. Music streaming 4. Phone apps 5. Video streaming	1. Instant messaging 2. Video streaming 3. Music streaming, single player games & digital storytelling 4. Social media 5. Online research

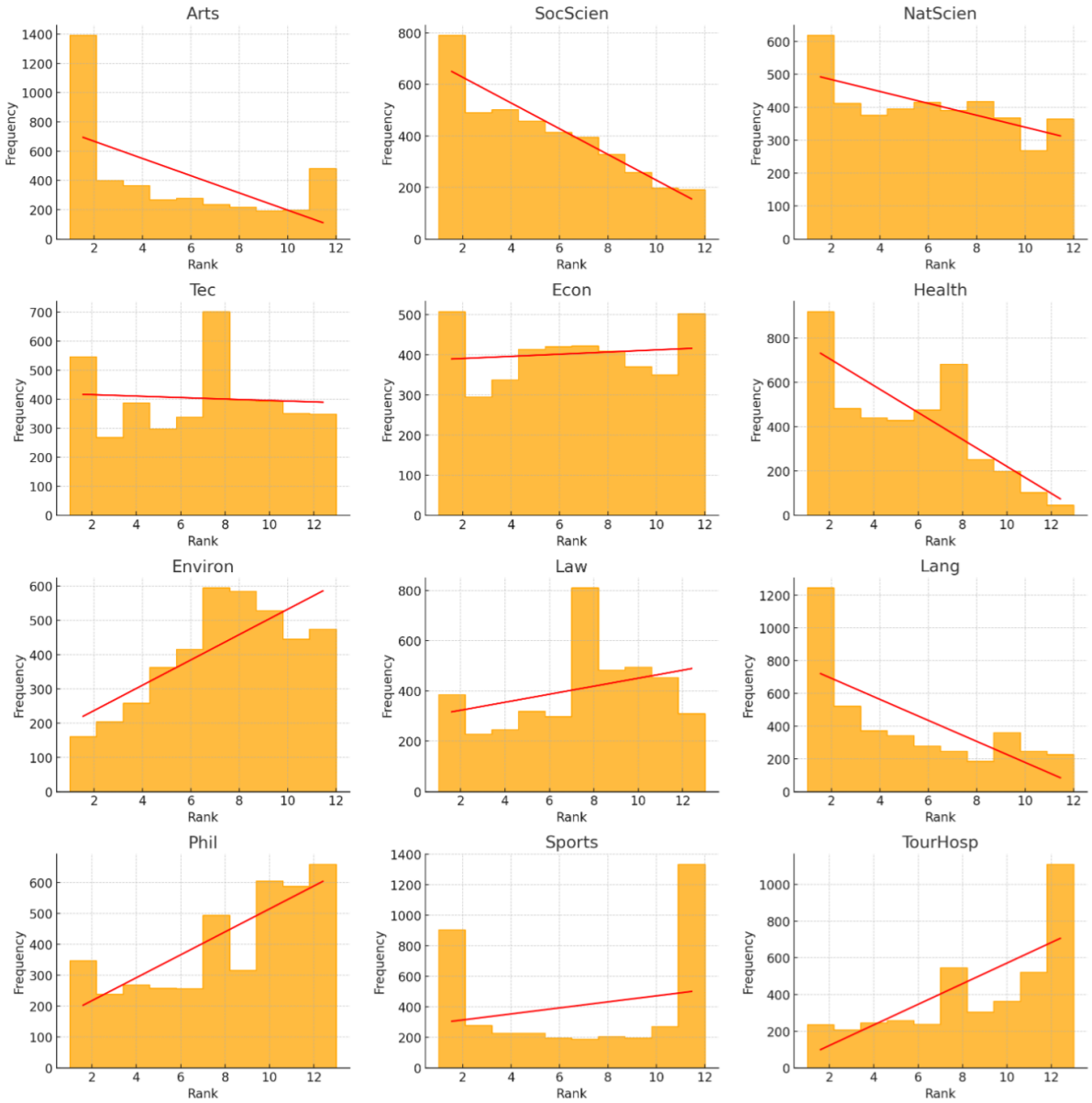
In the following survey question, learner participants were required to rank their interest in 13 different **content areas** from '1' being their most favourite to '13' being their least favourite. The following distribution charts of rankings plot how each content area was placed from '1' to '13'.

For most participants, the most popular content areas were Arts, Languages, Technology, Health, and the Social Sciences. This would clearly align also with the main content areas studied by students. Those that divided opinion were Sports and Languages to a degree. Those that were not popular were Tourism and Hospitality, and Philosophy.



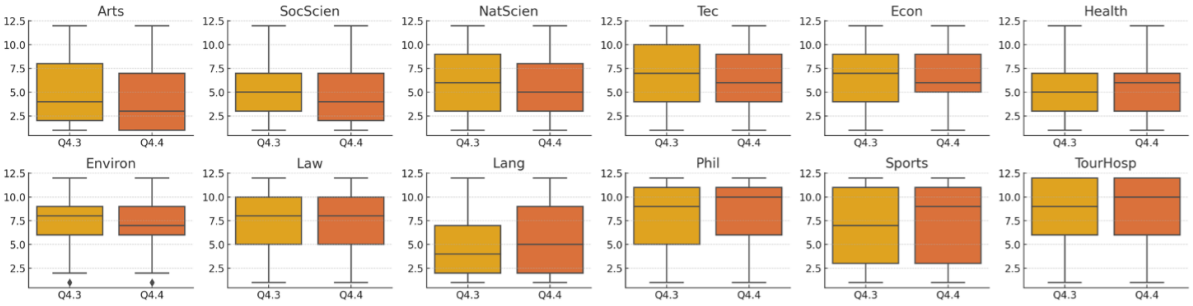
The following correlation matrix shows the relationship between different **content areas** in terms of their similar **rankings by students**. For example, a strong correlation towards '1' indicates that students value these similarly. A strong correlation towards '-1' indicates that students value these inversely. Therefore, Technology and Sciences are viewed similarly as well Economics and Technology. Tourism and Language and Law and Economics also have stronger correlations.





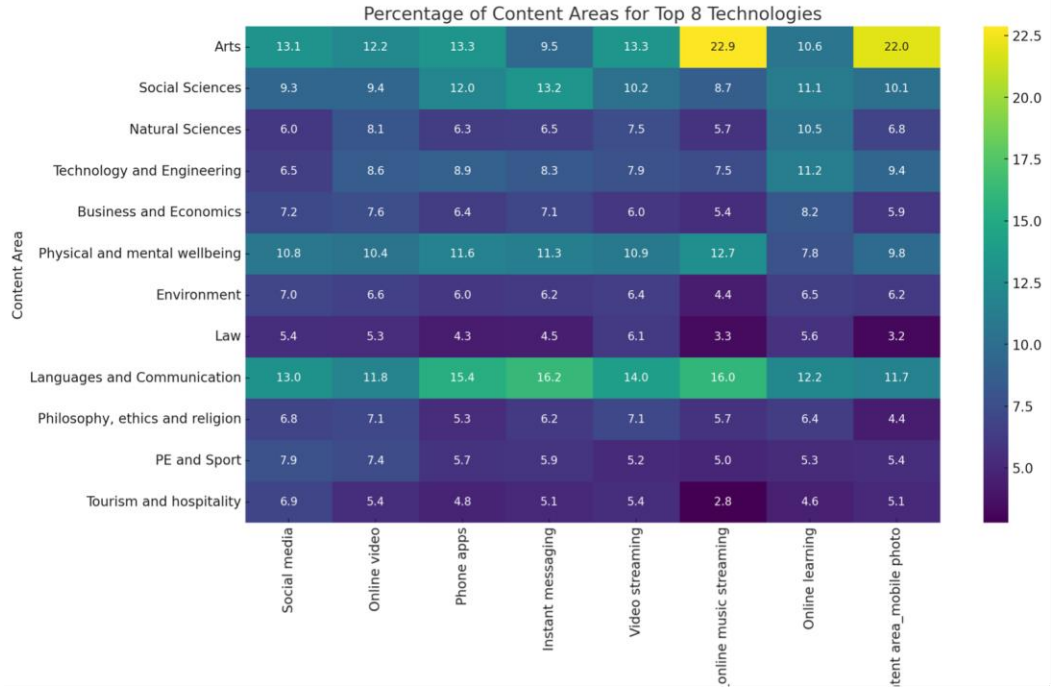
To compare the rankings that participants made of the subjects that they find the most interesting generally versus the CLIL subjects they find the most interesting, a sample paired t-test was performed. This showed that there were significant differences in most content areas between those that learners engage with generally and those that they engage with in their CLIL language (p-value < 0.05) The only area where there was no significant difference was in the content area of Environment.

1. **Significant Differences**: Most content areas show statistically significant differences between the rankings in ‘Q4.3’ and ‘Q4.4’ variables, indicated by p-values less than 0.05.
2. **No Significant Difference**: The content area of Environment has a p-value greater than 0.05, suggesting no significant difference between the rankings in ‘Q4.3’ and ‘Q4.4’. This suggests that similar levels of interest are observed.



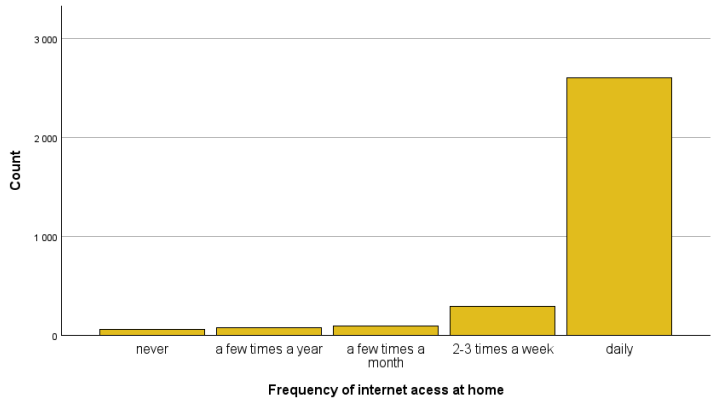
The following heatmap aligns the most often selected **digital practices/technologies** with each of the **content areas**. Here are the highest correlations:

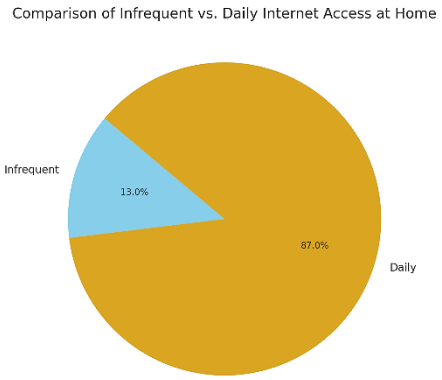
- Arts correlates with Online music streaming and Mobile photography.
- Social Sciences correlates with Instant messaging.
- Natural Sciences correlates with Online learning.
- Technology and Engineering correlates with Online learning.
- Business and Economics correlates with Online learning
- Physical and Mental Wellbeing correlates with Online music streaming.
- Environment correlates with Social Media.
- Law correlates with Video streaming.
- Languages and Communication correlates with Instant messaging and Music streaming.
- Philosophy, Ethics and Religion correlates with Video streaming.
- PE and Sport correlates with Social media.
- Tourism and Hospitality correlates with Social media.

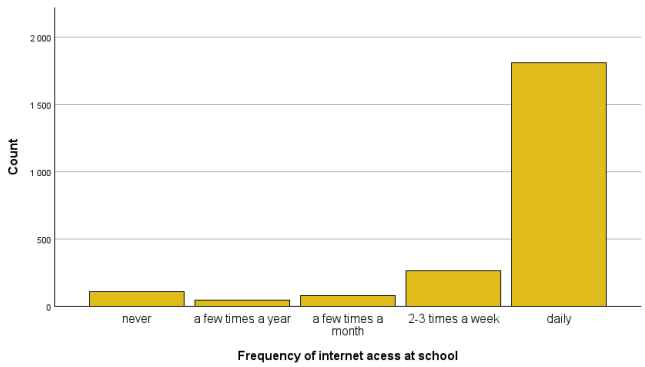


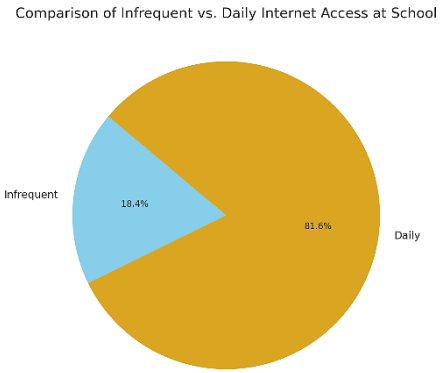
3.6. Access to digital devices in and out of school

For the vast majority of participants, accessing the internet at **home** and at **school** is a daily occurrence. There appears to be a slightly greater likelihood among those participants who access the internet 2-3 times per week that they are more likely to access it at home rather than at school. When those that access the internet at home **daily** are compared with those that **do not** ('never', 'a few times a year', 'a few times a month', '2-3 times a week'), we find that around 3 in 20 do not have access to the internet on a daily basis. In school, this ratio rises to 4.5 in 20. According to Eurostat data (Eurostat, 2023a), 14% of 16-74 year-olds do not access the internet daily, which matches that of **home use** in this case but not **school use.** Given that the European data encompasses a greater age range, it would perhaps be expected that the number accessing the internet at home would be less for the younger age range in the case of our data, but more investigation is perhaps required.









In relation to the **extramural use** of digital devices by student participants, the top five most frequently used devices are:

- **Mobile phone**: 2492 daily users.
- **E-Book reader**: 2274 daily users.
- **Smart watch**: 2223 daily users.
- **Smart TV**: 1176 daily users.
- **Laptop**: 1056 daily users.

Some interesting observations of these figures are that there is clearly a preference for portable technologies (e.g., mobile phone, e-book reader, smart watch, laptop). Equally, lots of participants suggest that the use of an e-book reader is a device that they have access to daily.

However, when participants were asked about which **digital activities supported their CLIL learning**, the use of digital reading devices was not highly valued. This could point to the current transition occurring in schools that has been motivated by online learning during the pandemic. For example, in the USA, there has been a marked increase in students using digital e-books for learning (Ofgang, 2021). Conversely, Singer and Alexander (2016) show in their study with undergraduates that, while students can read digital texts faster, their ability to understand key points in the text was better when reading in print. This might help to explain why learners use such devices but attach less importance to them as a part of their learning.

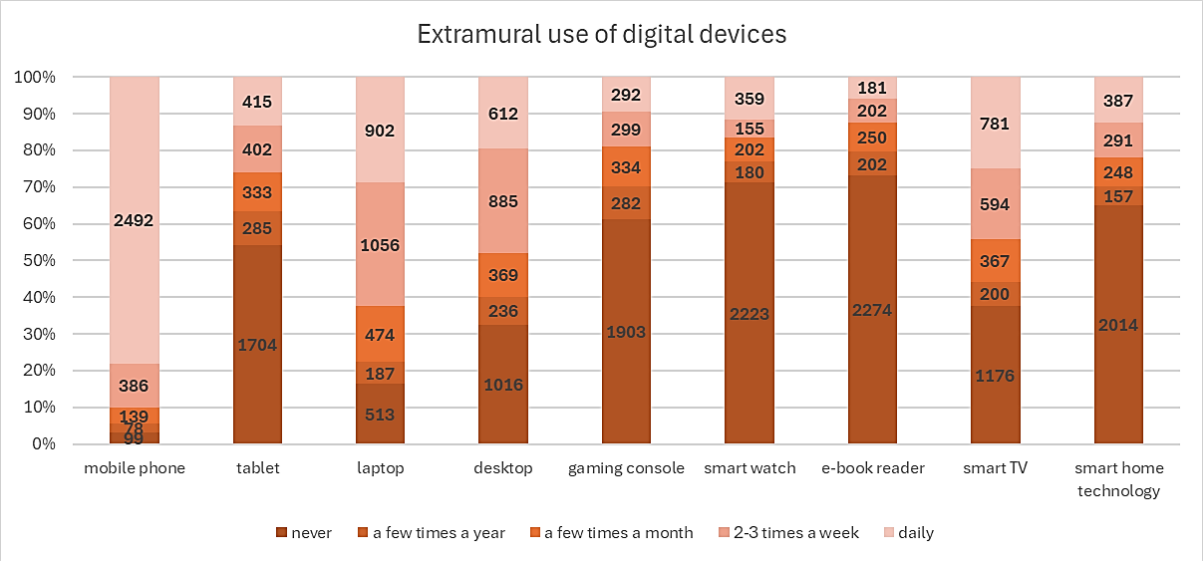
The technologies that are 'never' used extramurally include the following:

- **E-book reader**: 2274 users.
- **Smart watch**: 2223 users.
- **Smart home technology**: 2014 users.
- **Gaming console**: 1903 users.
- **Tablet**: 1704 users.

Among these devices there are two less portable devices (gaming console and smart home technology) as opposed to those in the most frequently used list above. It is interesting to note, however, that the gaming console, although attached to high importance for their CLIL learning, is actually one of the least used extramurally. It is also possible that there was a misunderstanding when answering the question, as some learners may have continued to think about its use in the context of their CLIL learning.

Also, tablets are some of the least used technologies extramurally rather than one of the most frequently used. Instead, participants appear to prefer computer-based technologies (e.g., with a mouse and keyboard) rather than tablet-based technologies.

Finally, smart home technologies and smart watches are not only some of the most frequently used, but also fall into the same category as those that are never used. This aligns with wider European data on the use of different technologies to access the internet (Eurostat, 2023b). Equally, this could point to a potential digital divide between those that have access to necessary technology such as laptops as opposed to those that also have smart speakers, smart TVs and smart watches, the use of which is limited to general entertainment and leisure (i.e., listening to music, radio, checking messages, etc.)



Conversely, the **use of digital devices in school** differs. The 5 most frequently used ('daily') devices are:

- **Mobile phone**: 1869 daily users.
- **Laptop**: 738 daily users.
- **Desktop**: 738 daily users.
- **Tablet**: 361 daily users.
- **Smart TV**: 271 daily users.

The use of the mobile phone in school is unsurprising given the fact that 90% of Europeans own a mobile phone (Eurostat, 2023b). The use of a laptop and desktop is more prevalent than the use of tablets in schools perhaps due to the fact that tablets traditionally do not have the same advanced/academic functions that are often required for learning in school. They are also less ergonomic and do not often have a keyboard. The high proportion of those students using a smart TV may refer to those that use digital whiteboards in schools rather than smart TVs that are connected to the internet and used for watching live broadcast or streamed digital/analogue content.

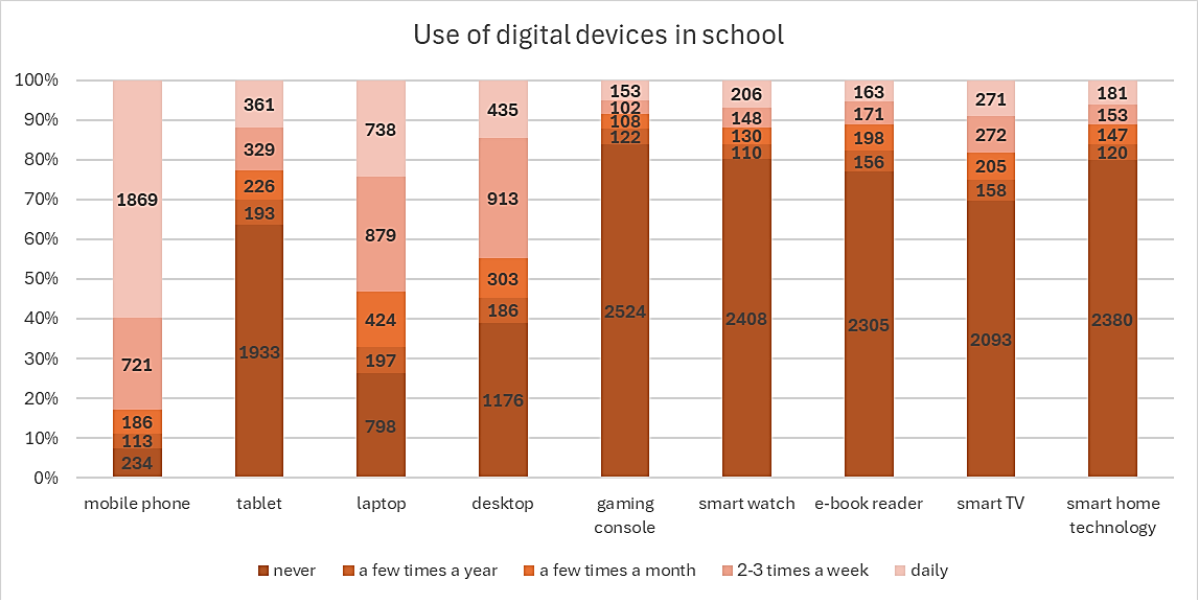
The devices that are 'never' used in schools are:

- **Gaming console**: 2524 users.
- **Smart home technology**: 2380 users.
- **E-book reader**: 2305 users.
- **Smart TV**: 2093 users.
- **Tablet**: 1933 users.

Again, it is unsurprising that smart home technologies are not used at all in schools, given that these are often associated with leisure activities rather than learning activities. Equally, this also points to the fact that these types of devices have not yet crossed the home-school divide. Some might argue that the presence of mobile phones in schools is something that has

crossed this divide significantly in the last 20 years. It is also interesting to note the relatively little use of tablet-based technologies.

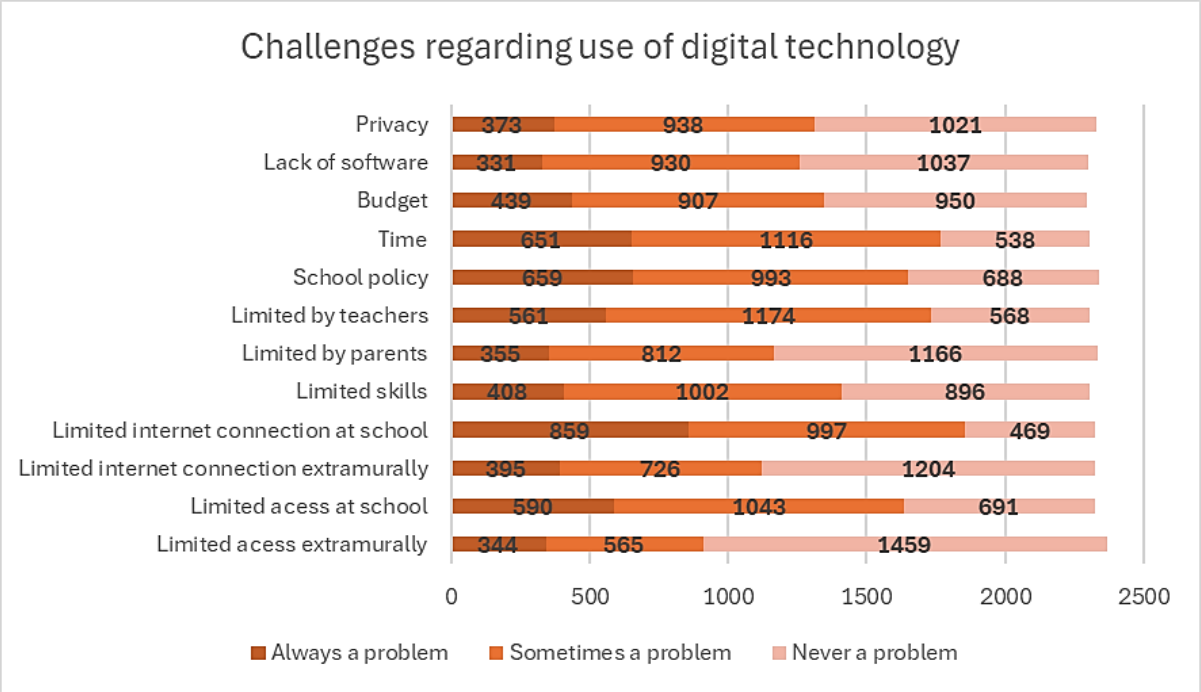
Overall, one stark piece of evidence regarding the different uses of digital devices extramurally and in schools is that, in this survey, students are more likely to use technology outside of school daily than they are in school. The only really significant exception to the rule is the use of the mobile phone which is similar in both contexts. However, for the rest of the cases, it is clear that learners are developing digital competences extramurally that they are then unable to use at school.



3.7. Challenges when using digital technologies

Of the **challenges** facing participants regarding the use of digital technologies, limited internet connection is either ‘always’ or ‘sometimes’ a problem. Given that many learners appear to use mobile technologies, access to the internet would be paramount to their functionality. Therefore, it is understandable that a lack of internet access is considered a challenge.

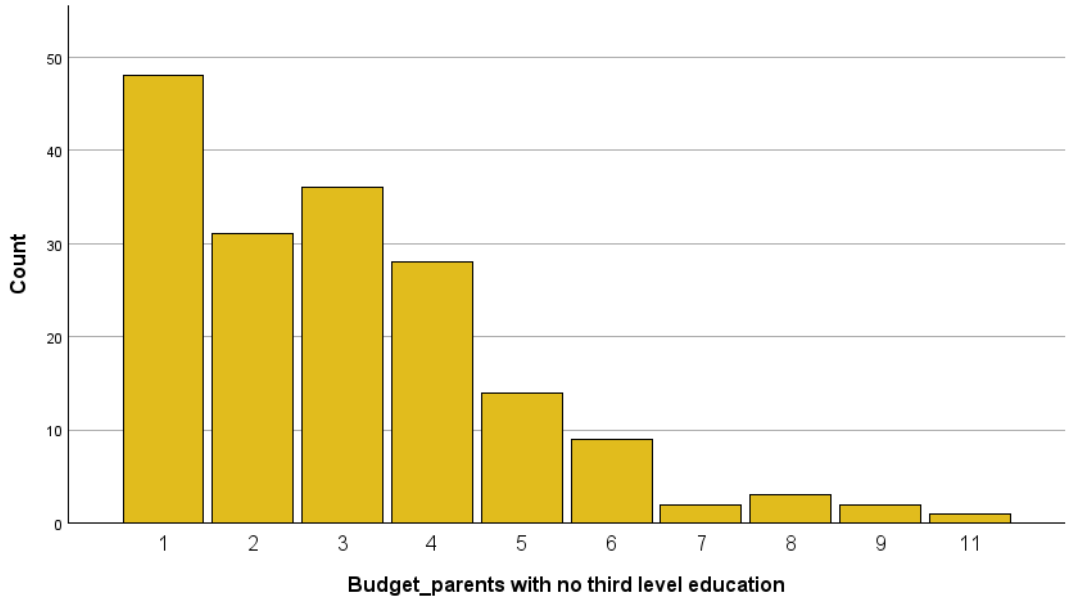
Also, ‘school policy’ is considered to be ‘always’ or ‘sometimes’ a problem. Although we have not considered this issue in any further detail, the lack of use of technology in schools could be hindered perhaps by school policy (i.e., banning the use of mobile phones in school). This is supported by the fact that teachers are often seen as being a limiting factor in their access to using digital technologies. Finally, ‘time’ also appears to be a limiting factor in school when it comes to accessing digital technologies.

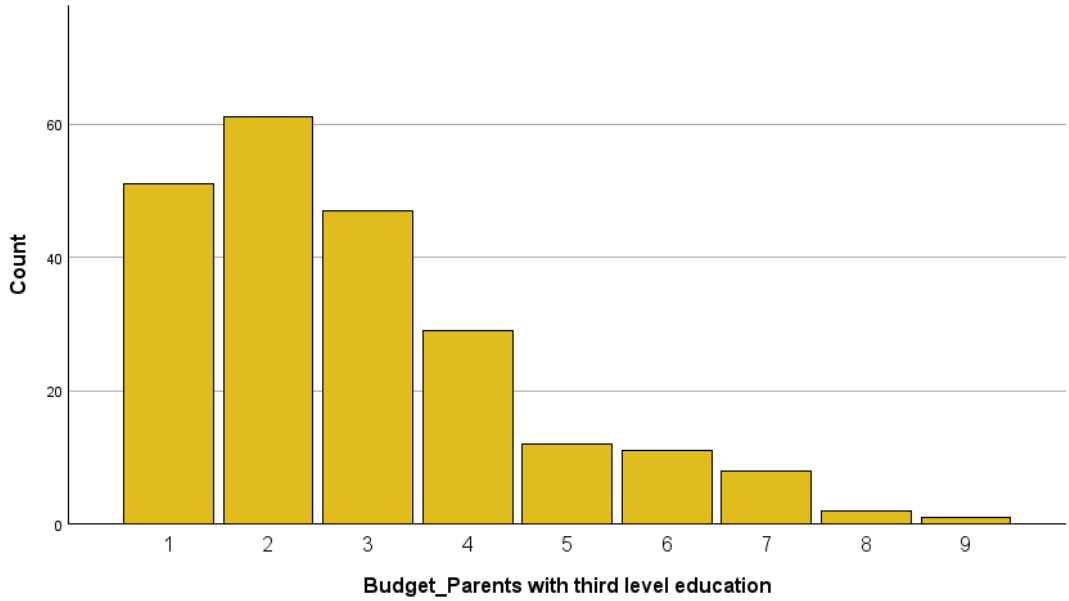


Those **challenges** that are **never an issue** relate mainly to learners' access to technology outside of school that appears to be more prevalent and more stable. Participants were also much less concerned about privacy never being a problem despite the fact that internet-related identity fraud is on the rise with 1 in 5 Europeans having suffered identity theft (Finanso, 2024).

Two other interesting issues that are never a challenge for learners are the lack of software and budget. Given that the vast majority of participants surveyed have parents/carers that have university degrees, there is an assumption that these parents/carers would not consider budget and access to software as being an issue. However, when parents with secondary only education and tertiary education are compared there is no difference either.

Top 5 'Always a Problem'	Top 5 'Sometimes a Problem'	Top 5 'Never a Problem'
1. **Limited internet connection at school**: 859 2. **School policy**: 659 3. **Time**: 651 4. **Limited by teachers**: 561 5. **Limited access at school**: 590	1. **Limited by teachers**: 1174 2. **Limited skills**: 1002 3. **School policy**: 993 4. **Limited internet connection at school**: 997 5. **Time**: 1116	1. **Limited access extramurally**: 1459 2. **Limited internet connection extramurally**: 1204 3. **Privacy**: 1021 4. **Lack of software**: 1037 5. **Budget**: 950


Count
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
11
Budget_parents with no third level education


Count
60
40
20
0
1
2
3
4
5
6
7
8
9
Budget_Parents with third level education

4. Digital Literacies Teacher Survey (DLTS): Pan-European report

4.1. Introduction

The DLTS questionnaire was administered between **March and May 2024** by a team of administrators working in several COST association countries. Figure 1 displays the different areas from where participants completed the questionnaire. In total, 1159 participants entered the questionnaire online but only 889 proceeded to the first question focused on consent. Of the 889, 857 gave consent to proceed with the questionnaire (Figure 2).

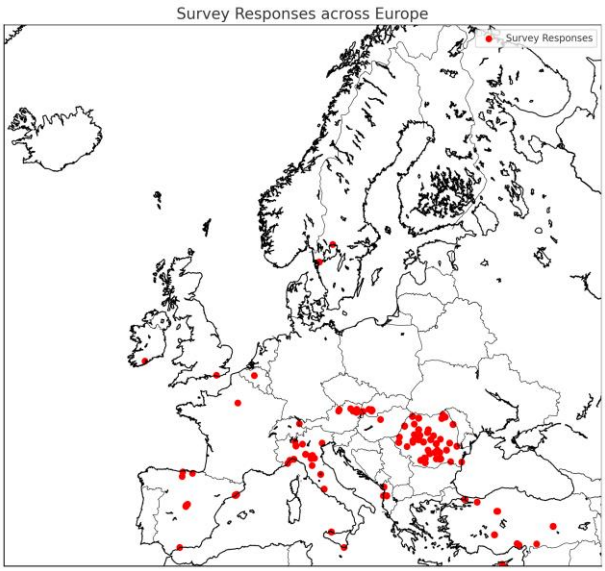


Figure 1. Locations of DLTS participants

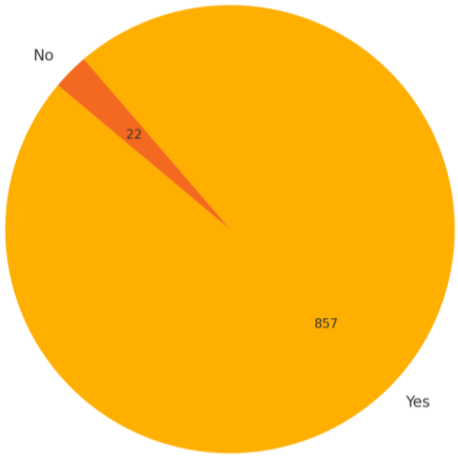


Figure 2. Consent figures

After data cleaning, 557 valid data entries were left for analysis.

The questionnaire was administered via a team of administrators based in the following eleven countries who also were members of Working Group 4 of CA21114:

- Albania (ITC)
- Austria (non-ITC)
- Slovakia (ITC)
- Sweden (non-ITC)
- Romania (ITC)
- Italy (non-ITC)
- Ireland (non-ITC)
- Spain (non-ITC)
- Portugal (ITC)
- Türkiye (ITC)
- Cyprus (ITC)

Questionnaires were distributed via different networks in each of the target countries. For more information about how this took place, please refer to the individual country reports. Prior to cleaning, the most common means of accessing the survey was through anonymous links either distributed via email or via a specific online network (*N*=1106). A small number of participants entered the questionnaire via a QR code (*N*=18).

The target group for the DLTS survey were teachers of CLIL working with learners between the ages of 11 and 21. The main challenge for this questionnaire was ensuring that participants had a common understanding of what CLIL is, given that it exists in different forms in different countries. This was provided to participants early in the survey.

As we can see from Figure 3, the amount of time that participants took to respond to the survey ranged considerably. Once extreme outliers are discarded, the median completion time was 23.47 minutes with the 1st quartile being 17.26 minutes, and 3rd quartile being 33.26 minutes. The average completion rate was 27.15 minutes. In this analysis, we discounted extreme outliers as these participants possibly left their survey open in the browser and did not complete it in one sitting.

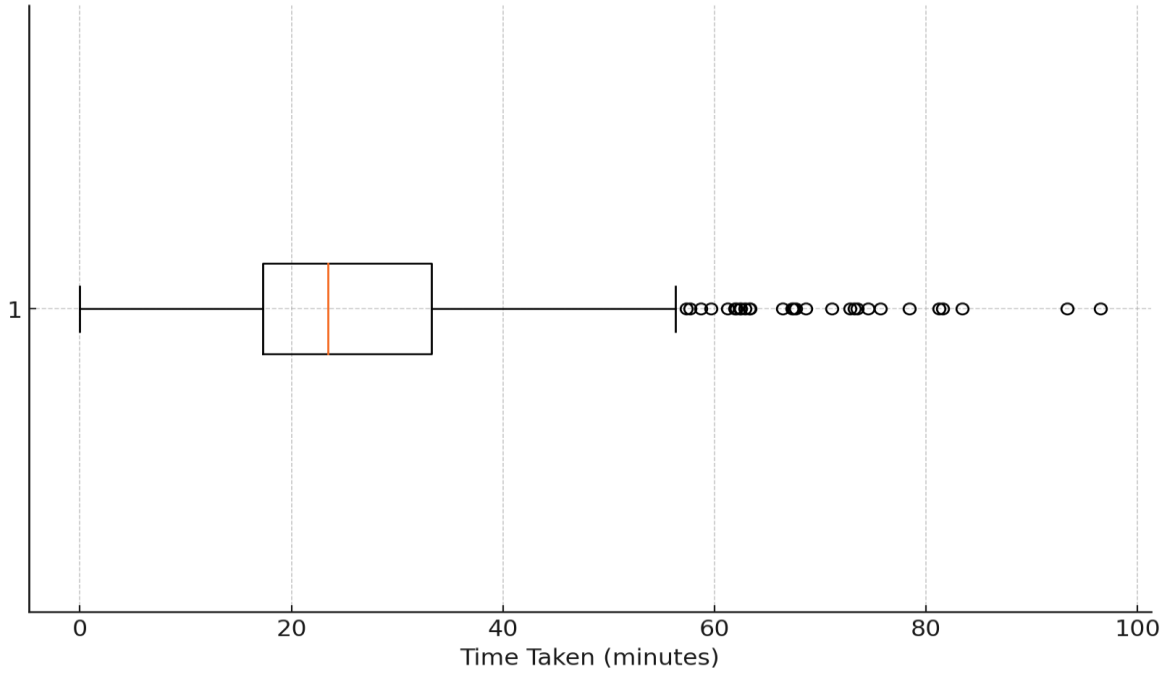


Figure 3. Time to complete the questionnaire

As visualised in Figure 4, 497 participants completed the questionnaire fully and the vast majority completed, at least, 50%. The small fallout rate suggests that the survey was well constructed for its participant audience.

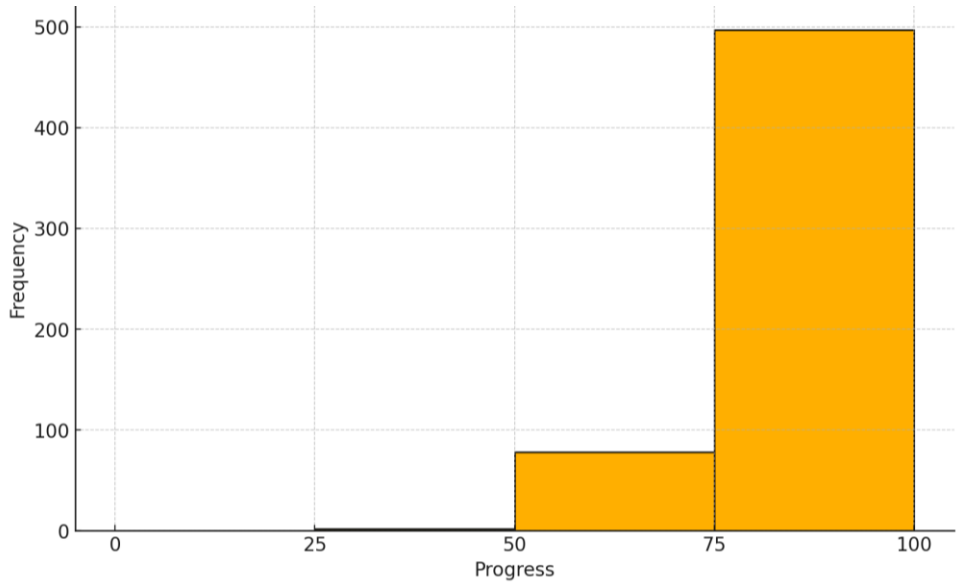


Figure 4. Progress (%) completing the questionnaire

The questionnaire was compiled and distributed through the Qualtrics platform and, therefore, could also be distributed multilingually. The survey was translated into 11 languages, and the vast majority of responses were in Romanian (see Figure 5). Given the number of responses from Romania, this is understandable. However, a large number of responses were also given in English, suggesting that some participants did not respond in their L1 (Figure 5).

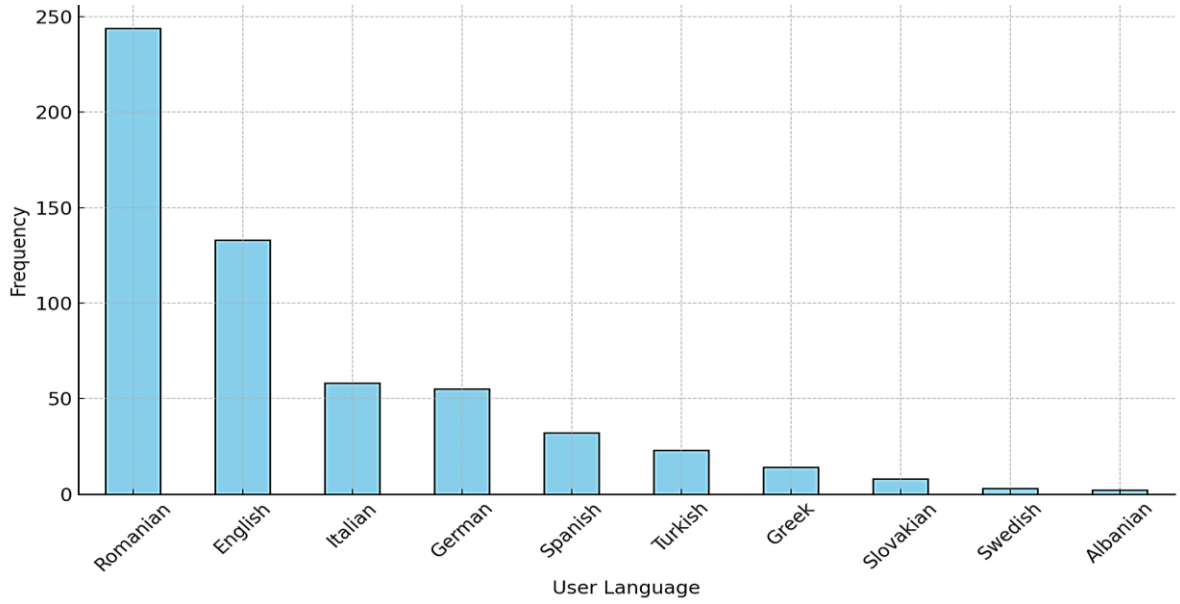


Figure 5. User Languages of Participants in questionnaire

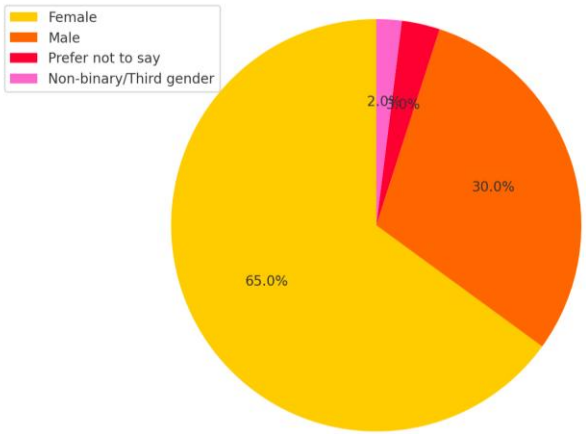
4.2. Summary of main findings

- The DLTS survey received 557 valid responses from CLIL teachers across multiple European countries.
- Most participants (82%) were female, with a significant proportion being bilingual or multilingual.
- The main languages of schooling reported were Romanian and English, with English being the most common CLIL language.
- Around a quarter of CLIL teachers were bi/multilingual. There is a high likelihood, statistically based on this cohort, that if they are bi/multilingual, English is one of their L1s.
- The second most prominent language of schooling was English suggesting that many CLIL teachers work in immersion schools rather than schools where only some subjects are taught through a different L2s.
- The average number of years of teaching experience of participants was just under 20 years, which is according to European averages.
- The most frequently taught subjects in CLIL contexts were Languages, followed by Arts and Humanities.
- Over half the participants teach Languages and Communication which suggests that they also teach languages as an L2. Around 17% teach Languages and Communication plus another subject, and around 32% teach other subjects apart from Languages and Communication. This means that language teachers outnumber those that are purely 'content' teachers.
- Despite the fact that a quarter of participants declare that they are bi/multilingual and that numbers of their students are similar, the focus of CLIL lessons is predominantly on the CLIL language. Therefore, there is a greater propensity for a monolingual approach to CLIL rather than a multilingual approach.
- Teachers reported using many digital devices at home but rarely in school, with smart TVs, smart watches, and gaming consoles being more common at home.
- Mobile phones, tablets, and laptops were frequently used both at home and in school, though overall, technology use was higher at home.
- Digital projectors and whiteboards were the only technologies consistently used in every lesson, highlighting their role in presenting information.
- Teachers spent an average of 18-20 minutes using digital technologies in CLIL lessons, with a slight tendency towards more frequent use.
- Nearly three-quarters of teachers also taught non-CLIL subjects, primarily within the discipline of Languages and Communication.
- There was a general agreement among teachers that incorporating technology into CLIL improves students' disciplinary literacy skills and encourages multilingualism.
- Teachers believe that students are more motivated to use integrated language and content when digital tools are required for tasks.
- A significant majority of teachers (71%) considered it important to understand students' extramural use of technology for effective lesson planning.

- Most teachers perceived technology as more beneficial for developing disciplinary literacies than just language skills, with a mean score of 63.38 out of 100.
- Teachers reported average self-perceived digital competence, indicating a need for further training and development in digital skills.
- The top challenges in using digital technologies for CLIL teaching included time constraints, limited access to devices for students and teachers, inadequate infrastructure, and budget constraints.
- Despite recognizing the importance of digital technologies, many teachers did not frequently use them in CLIL teaching.
- Critical Digital Literacies (CDLs) were not widely known among teachers, though those aware often incorporated them into their teaching practices.
- Teachers reported that students' use of technology outside of school was generally not in their CLIL language, with exceptions for newer technologies like VR.
- There was moderate variability in teachers' opinions on the use of technology in CLIL, with more consensus on its positive impact on multilingualism and motivation.
- Teachers' perceptions of their digital competence were consistently rated as average across various aspects of digital tool usage.
- Teachers expressed a need for better infrastructure and access to digital devices to effectively integrate technology into CLIL teaching.
- The survey highlighted a gap between teachers' beliefs about the importance of technology in CLIL and their actual use of it in classrooms.
- Teachers' self-reported knowledge of digital tools for feedback was generally average, indicating room for improvement in digital assessment practices.

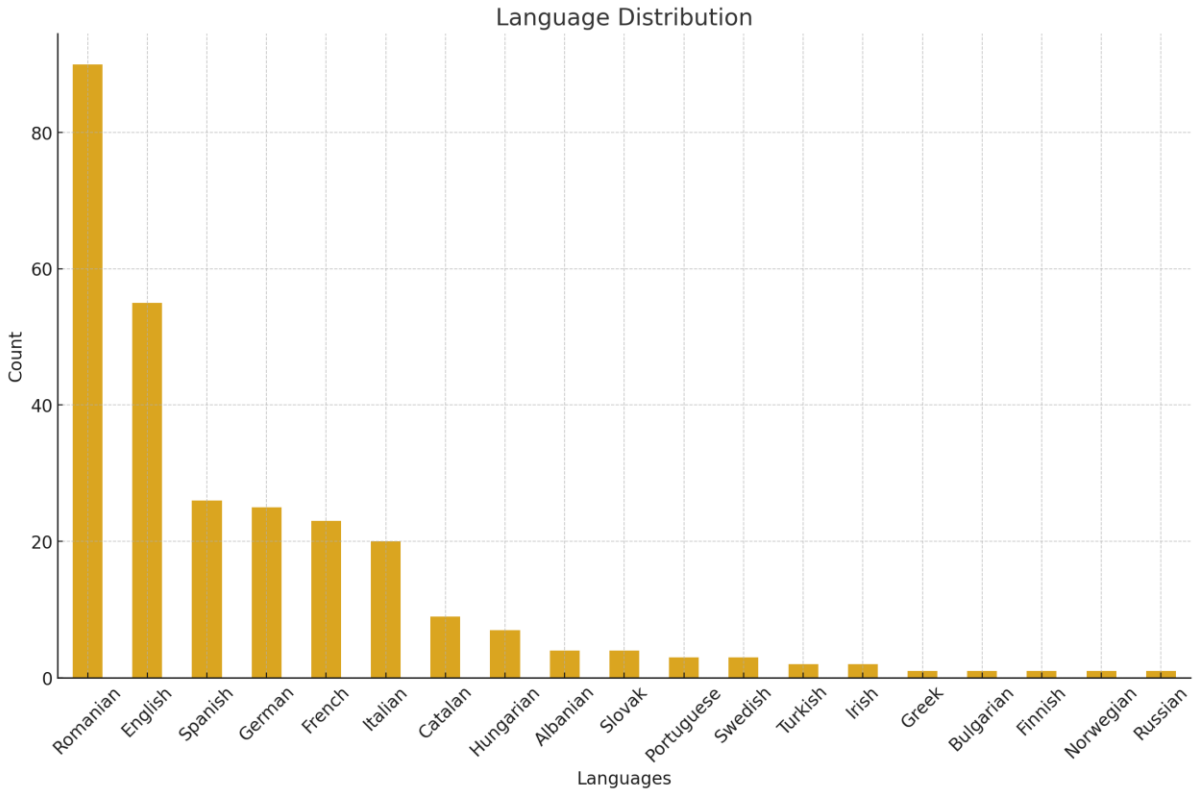
4.3. Participant background

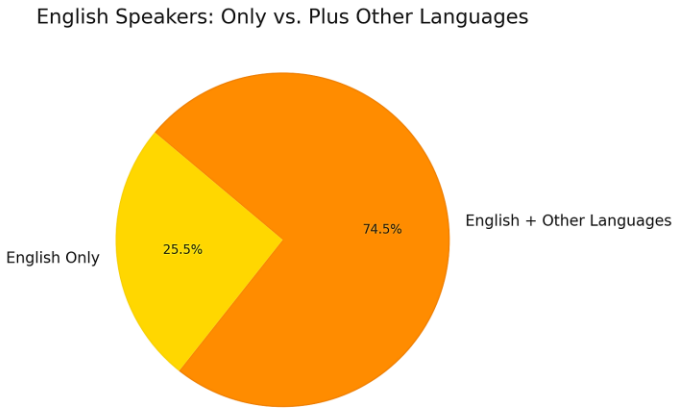
As is evidenced by the following visualisation of the **gender** breakdown, the vast majority of participants who responded to the survey (79%) were female. According to Eurostat (2024), these figures are very much in line with the gender distribution across Europe.

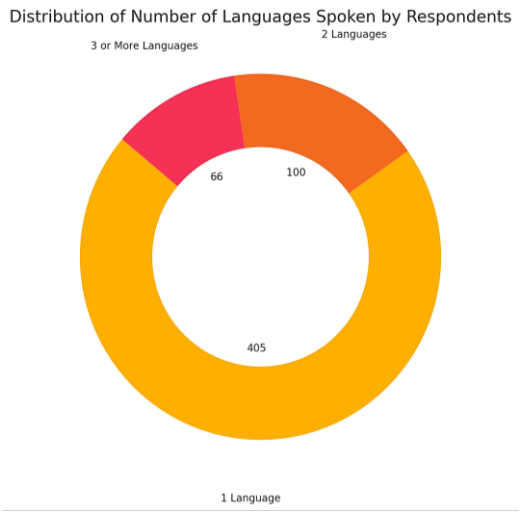


Gender	Frequency
Female	455
Male	109
Prefer not to say	7
Non-binary/Third gender	3

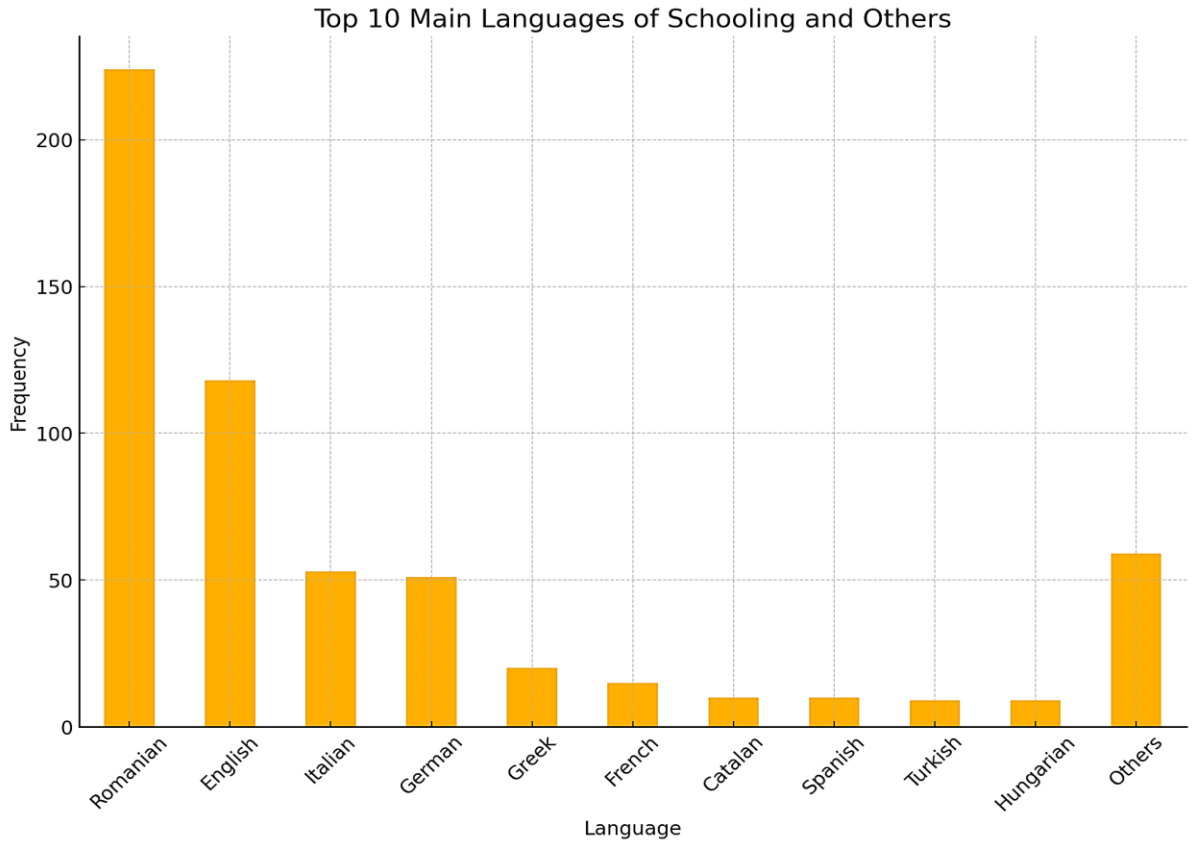
Given that the vast majority of participants come from Romania, it is understandable that the most selected **L1** is Romanian. Second to this is English; however, when the number of participants who selected English as their L1 is analysed further, 25.5% only selected only English and 74.5% of the participants selected English plus one or more other languages. This suggests that a large proportion of CLIL teachers in this cohort are bi/multilingual. When we explore this level of multilingualism in more detail, we actually see that 70% of participants are monolingual, 30% speak 2 or more languages. This leads us to the conclusion that teachers of CLIL are more likely to be monolingual than bilingual, but if they are bi/multilingual it is statistically more likely that English is one of those bilingual languages (*p*.=0.0000179).



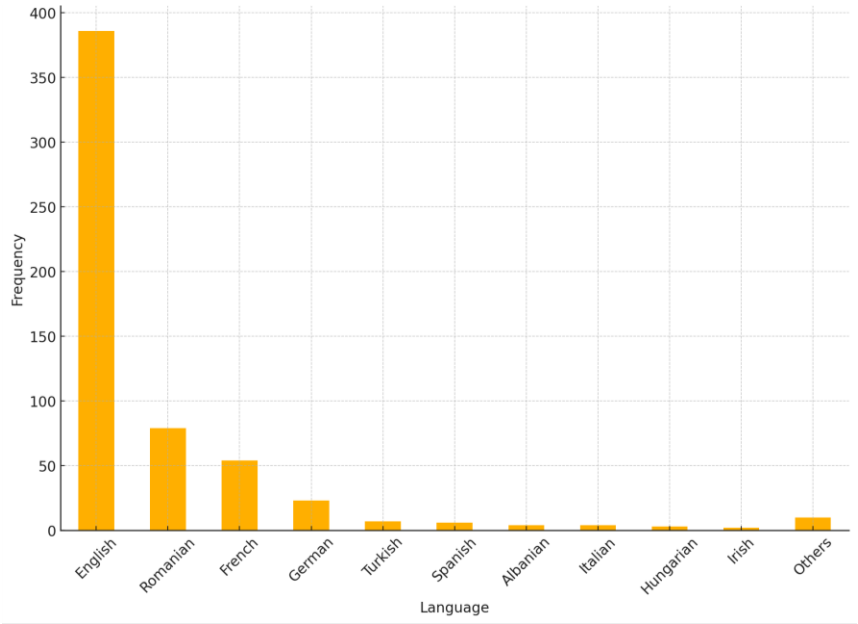




In terms of the **main languages of schooling** of this cohort of participants, Romanian, English, and Italian are featured in the top 3. It is interesting that English appears in second place, suggesting that around 120 teachers in this cohort potentially teach in immersion contexts.

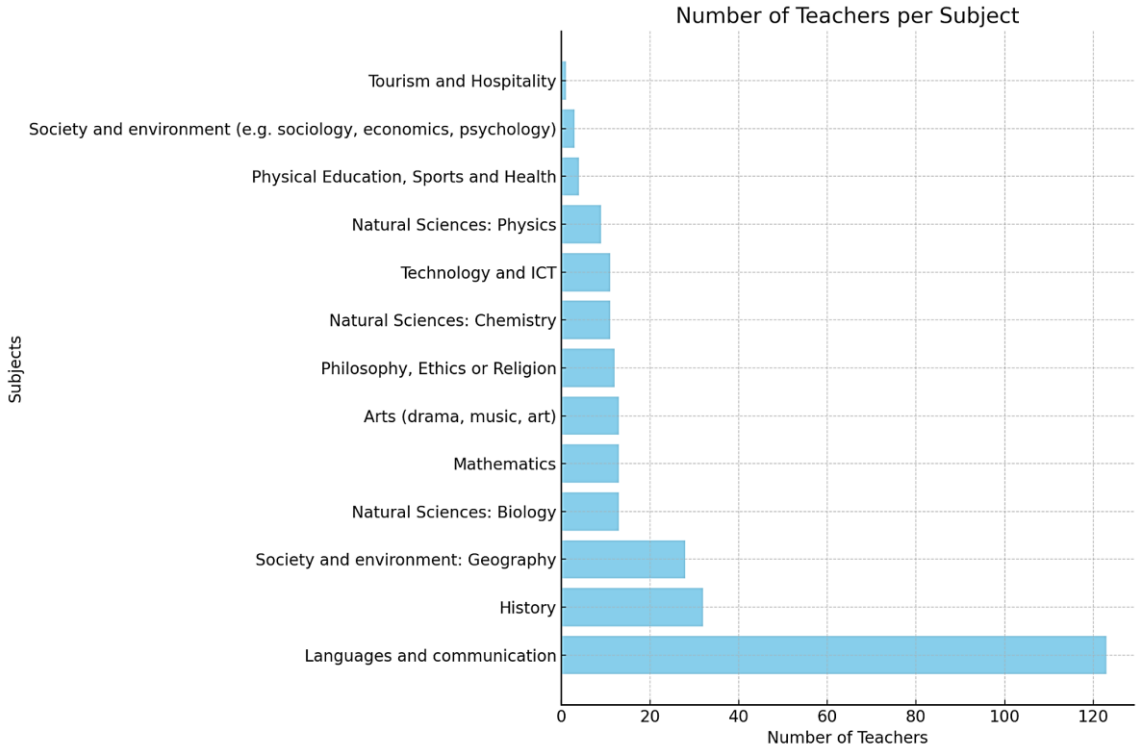


The **main CLIL language** of this cohort is English followed by Romanian, French, and German. Excluding Romanian, English is 2.11 times more likely to be a CLIL language than Spanish, 2.20 than German, and 2.39 than French. Romanian is an interesting case given that only 1 country of those that participated in the survey uses the language. This means that there is a good proportion of learners in Romania who learn Romanian in CLIL contexts who do not have Romanian as their L1.

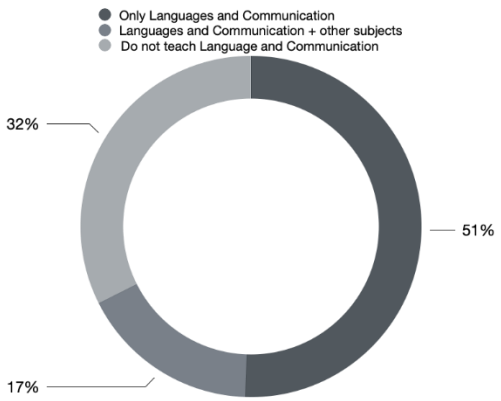


The **teaching subjects** of the participants were quite varied, however, the most taught subject by a considerable margin was Language and communication. This is understandable given that our assumption would be that a number of CLIL teachers are also likely to be language teachers.

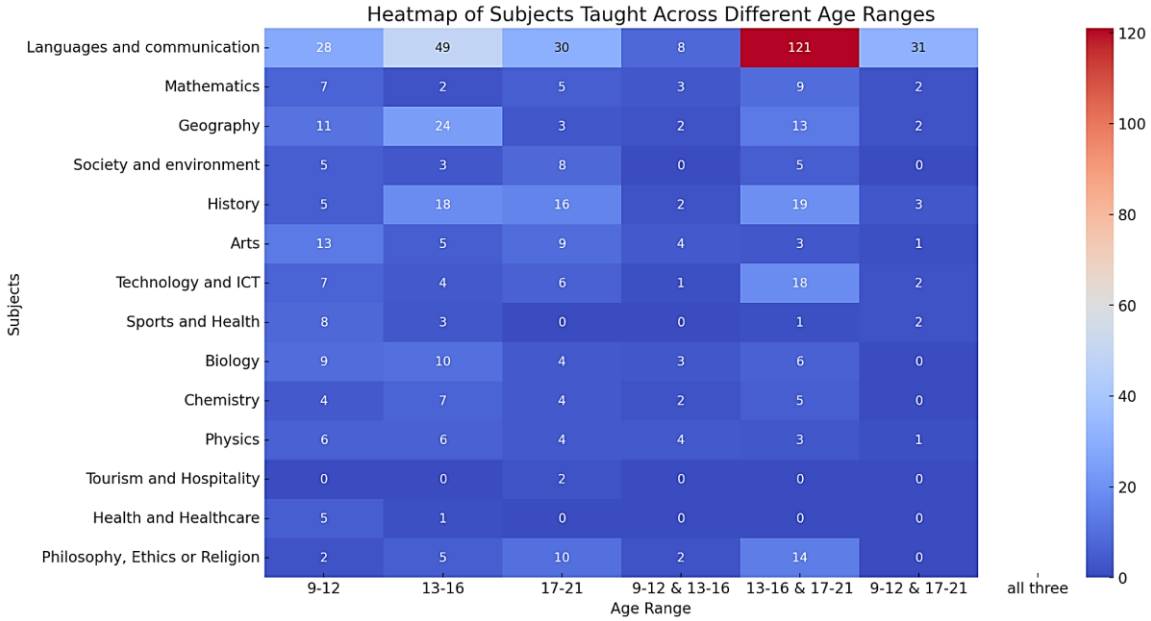
However, in relation to the questionnaire item where they were explicitly asked if they taught foreign languages, nearly two thirds said that they did not (as discussed below). In fact, 57% of teachers teach this subject across the whole cohort. When teachers of Languages and Communication are analysed in more detail, we find that 50.55% only teach Languages and Communication, 17.03% teach Languages and Communication plus another subject, and 32.42% do not teach languages. This means that just under a third of the cohort are purely content teachers. Overall, the main subjects taught through CLIL are more likely to be Arts and Humanities subjects rather than Science or Technology subjects.



Gender	Raw data	Percentage
Only Languages and Communication	92	50.55
Languages and Communication + other subjects	31	17.03
Do not teach Language and communication	59	32.42



The **age range** taught by participants varied considerably. However, a large proportion of those that responded teach in the 13-16 age range. There are also a number of teachers that teach across the 13-16 to 17-21 age range, particularly for Languages and Communication. Apart from Languages and Communication, Geography was the most taught subject for 13-16 year olds through CLIL, followed by Arts for 9-12 year olds, and History for 17-21 year olds. This is interesting and perhaps reflects that the language/disciplinary literacies associated with those subjects as Arts may be less linguistically challenging than History that requires, for example, extended analytical writing.



The mean **years of teaching experience** was 19.62 years. The standard deviation of 8.957 suggests that the data is quite spread. The negative skewness figures also indicate that there are a few teachers with significantly fewer years of experience compared to the majority, which have more years of experience.

There is no official European-wide data that can tell us the average number of years of teaching experience of teachers across Europe. However, there is the survey undertaken by Mullis et al. (2020) that identifies 19.49 years as average teaching experience amongst their participating teachers of Mathematics in Grade 8 (13.5 years) across the whole of Europe. Comparing this finding with our study thus suggests that CLIL teachers do not have more teaching experience than those that do not teach through CLIL. However, more research and analysis are required.

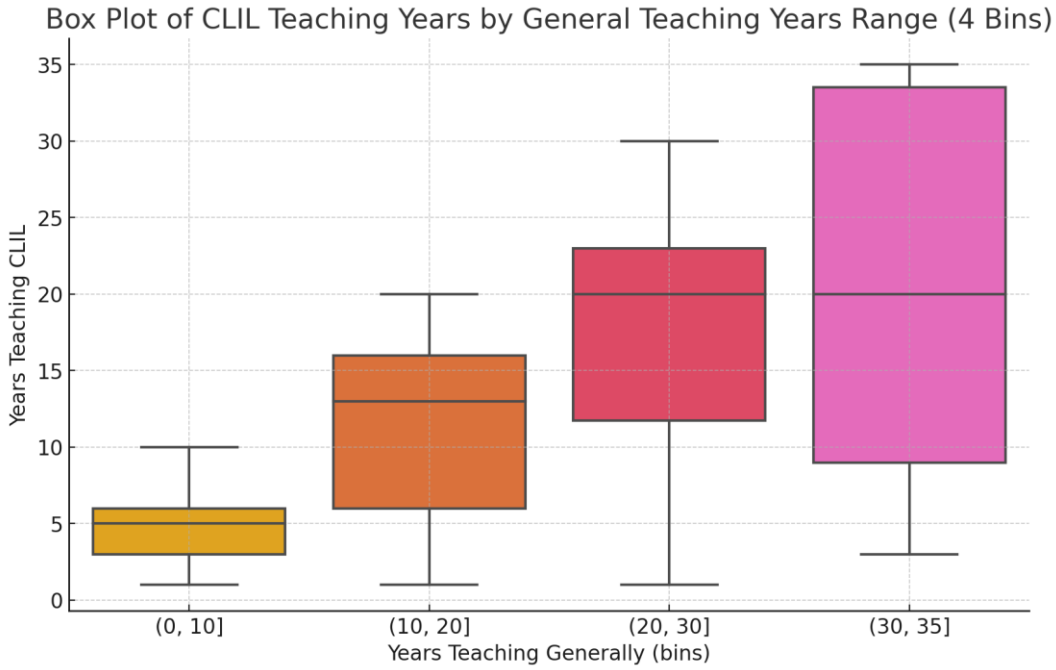
Statistics

Q3.16_Years_Tg

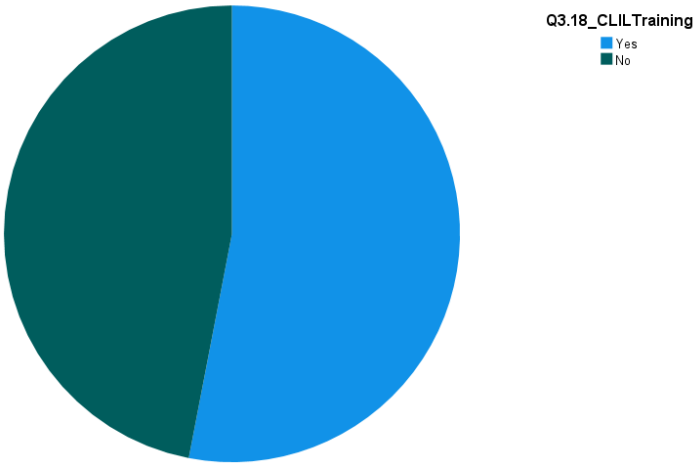
N	Valid	566
	Missing	12
Mean		19.62
Median		20.00
Mode		20
Std. Deviation		8.957
Variance		80.229
Skewness		-.251
Std. Error of Skewness		.103
Kurtosis		-.677
Std. Error of Kurtosis		.205
Range		34
Minimum		1
Maximum		35
Percentiles	25	14.00
	50	20.00
	75	25.00

The number of years that participants have been **teaching through CLIL** on average is 12.3, which is less than the participants' years of teaching experience overall. This suggests that CLIL is an approach that many teachers come to later in their careers generally, rather than something that they start with. However, the standard deviation of 8.82 suggests that this level of experience can vary considerably. Additionally, the positive skewness value (0.685) indicates that there are more participants generally with more experience than less.

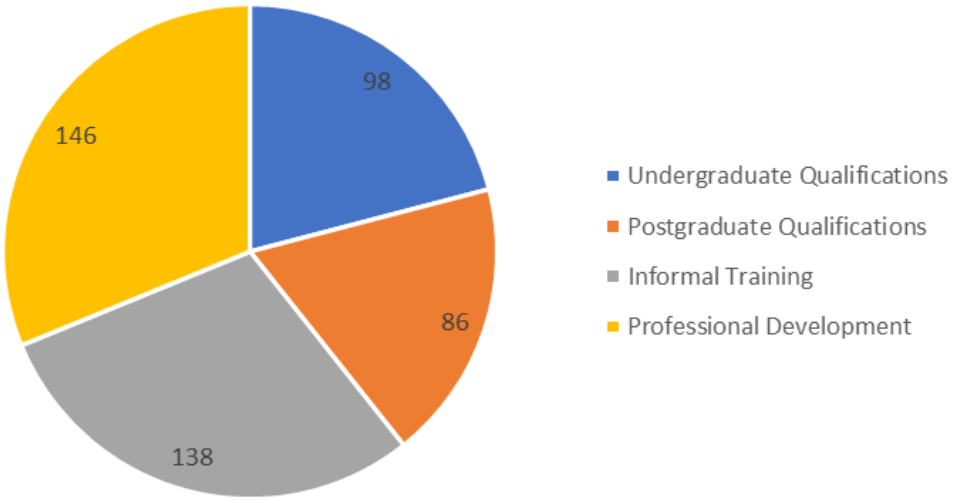
When an ANOVA test is conducted on the means of **teaching experience vs. CLIL teaching experience**, results suggests that the number of years teaching generally does have a significant impact on the number of years teaching CLIL, confirming that teachers with more years of general teaching experience tend to have more years of CLIL teaching experience as well ($p.=1.07\times10^{-13}$). Although this might seem logical, only 11% of participants ($N=64$) have equal numbers of years of teaching experience generally and CLIL, meaning that the vast majority of teachers come to CLIL later.



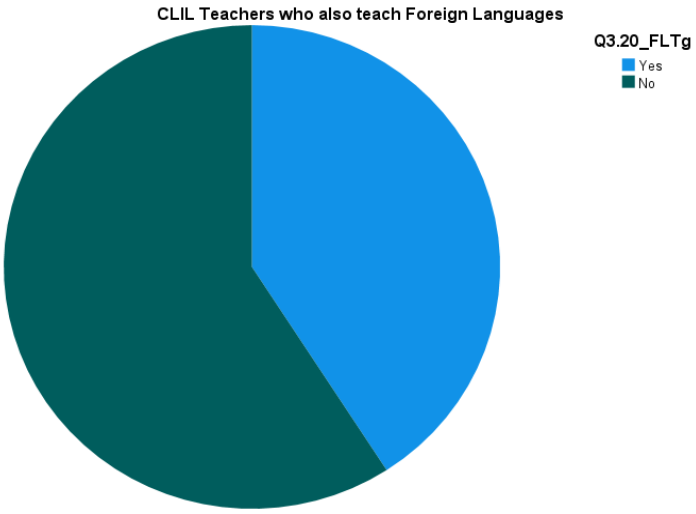
When it comes to the number of participants who have received **CLIL training** versus those who have not, just over half of the participants mentioned that they had received, or they had pursued, some sort of training. When the number of years of general teaching is correlated with whether participants have any CLIL training, the correlation coefficient (-0.096) indicates a very weak negative correlation between the two variables, which points to a very slight probability that those with more teaching experience are less likely to have undertaken CLIL training. The higher p-value (0.198) suggests that the correlation is not statistically significant, therefore, more evidence is needed to confirm confidently whether this correlation is true.



In terms of the **type of CLIL training**, 58% of participants have undertaken training formally or informally as part of their professional work (i.e. professional development), and around 42% have received training as part of a degree programme.



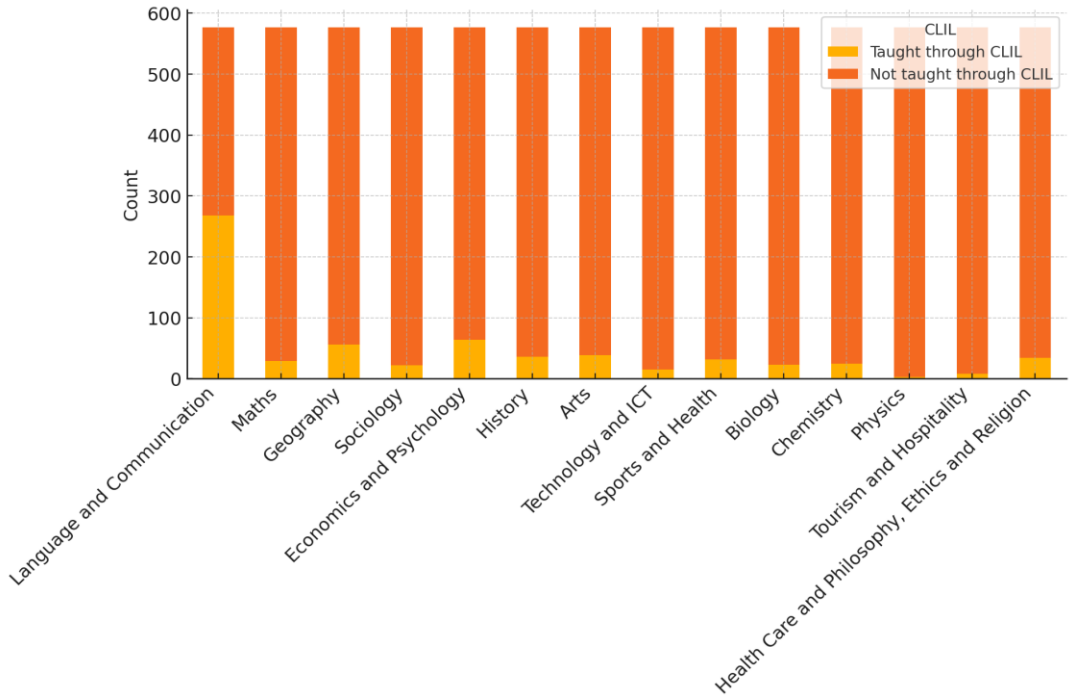
Nearly two thirds of participants said that they do not **teach foreign languages**. This aligns with the data presented previously where 32% of participants said that they only teach content subjects. Evidently, the most common foreign language was English, followed by French, and German.



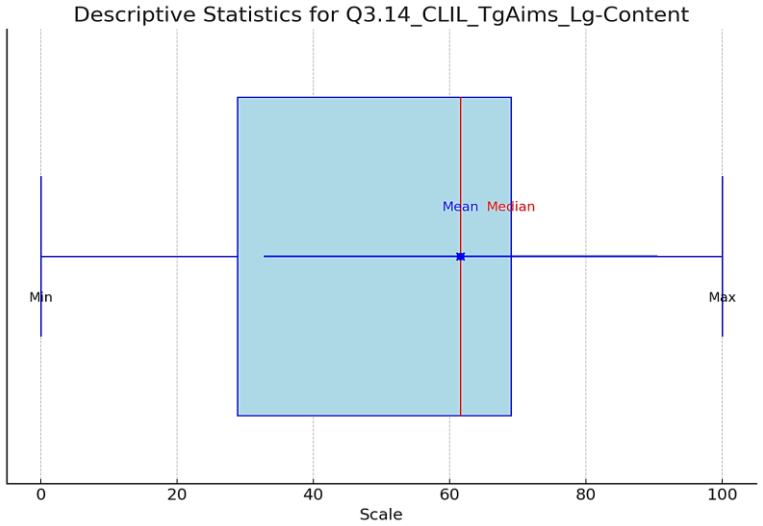
Language	Frequency
English	185
French	26
German	11
Albanian	5
Italian	4
Macedonian	3
Catalan	2
Arabic	1
Greek	1
Lithuanian	1
Maltese	1
Norwegian	1
Turkish	1
Ukrainian	1
Welsh	1

4.4. Participants' CLIL teaching experience

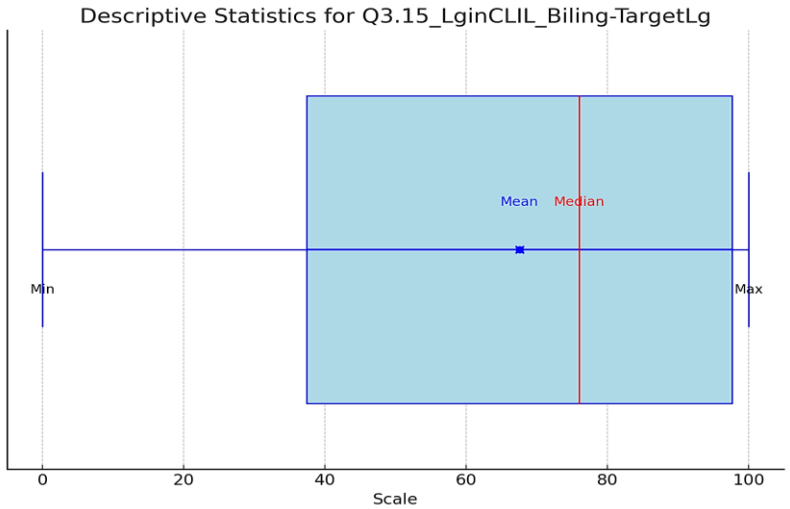
When participants' **teaching subjects in CLIL and non-CLIL** classrooms are compared, it is clear that CLIL forms the minority of many teachers' teachings in schools. Language and communication is the only subject where there is some parity between the subjects taught through CLIL and not taught through CLIL.



Participants were asked about the **objectives of their CLIL lessons** and whether they were more focused towards language (‘1’) or more focused towards content (‘100’). They were asked to give an indication of the balance on a rating scale from ‘1’ to ‘100’. The mean rating of 61.60 suggests that CLIL learning and teaching objectives are orientated more towards content than language. However, there was a wide range of variability (*SD*=28.88), large interquartile range (40) and a large number of outliers, which indicates that objectives do range considerably.



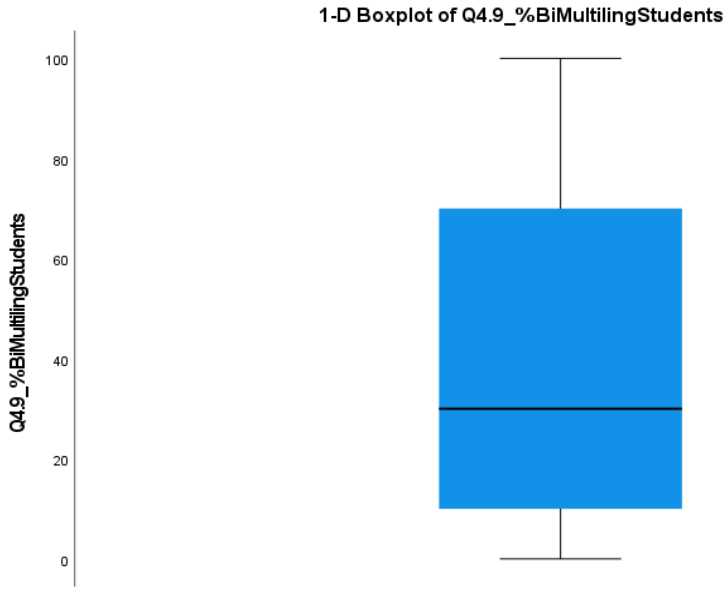
In order to assess the **multilingual nature of participants’ CLIL classrooms**, they were also asked to rate on a scale whether their classrooms were multilingual (‘1’) or solely focused on the CLIL language (‘100’). Again, the mean response here (67.54) shows that they are orientated towards the CLIL Language but there was a wide range of variability (*SD*=30.119). However, the interquartile range is skewed to the right suggesting that, while there is a large amount of variability, it skewed more towards the CLIL language. This suggests that classrooms are more inherently monolingual and focused on the CLIL language, than multilingual.



N	Valid	505
	Missing	73
Mean		67.54
Median		76.00
Std. Deviation		30.119
Range		100
Minimum		0
Maximum		100

4.5. Participants' school environment

Regarding the percentage of **bi/multilingual students**, participants were invited to describe how multilingual their students were on a scale of not multilingual ('0') to highly multilingual ('100'). Despite the fact that the CLIL classrooms of the participants are not multilingual in nature and focused mainly on the CLIL language, the mean rating was 40.2. While the standard deviation was high (33.003) indicating high levels of variability in response, the interquartile range is skewed positively towards being more multilingual than monolingual. Overall, therefore, teachers believe that their learners are generally multilingual.



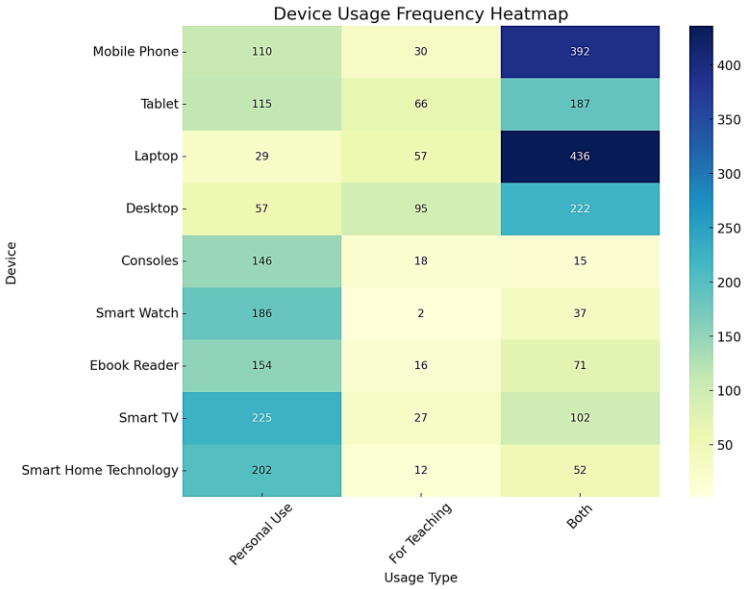
Statistics

Q4.9_%BiMultilingStudents

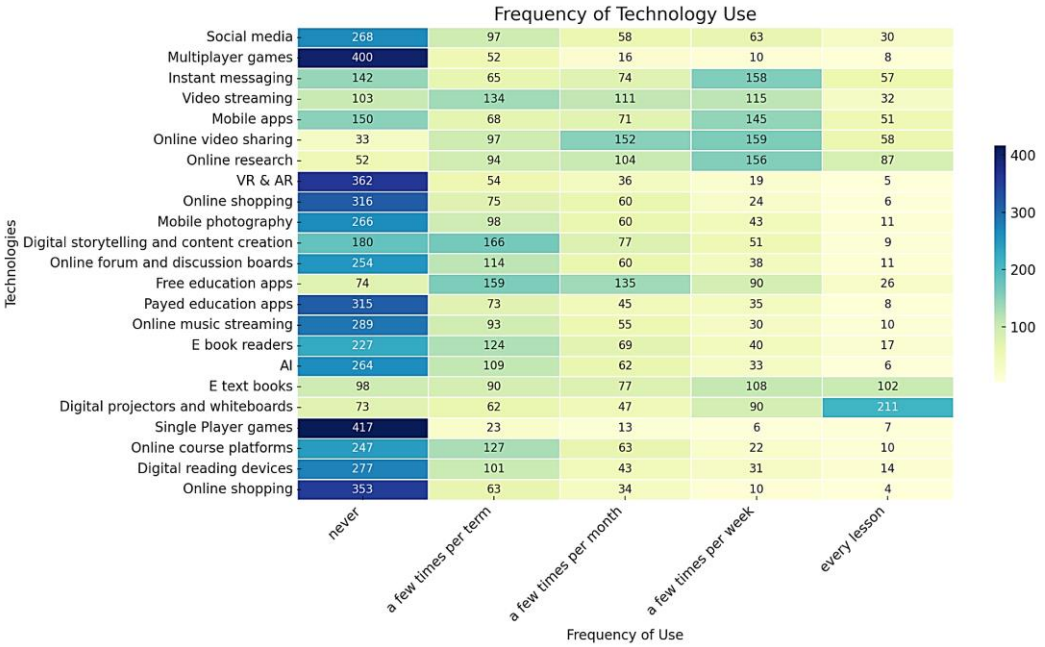
N	Valid	464
	Missing	114
Mean		40.20
Median		30.00
Std. Deviation		33.003
Range		100
Minimum		0
Maximum		100

4.6. Use of digital tools in CLIL

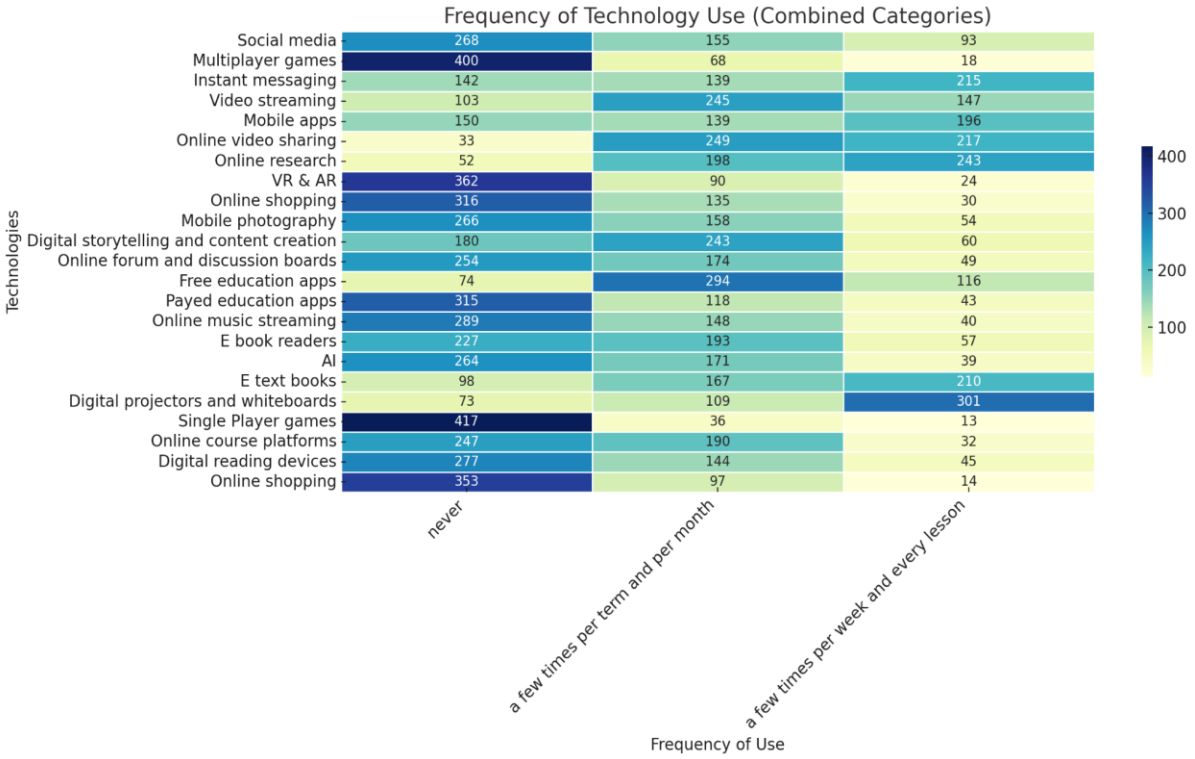
In terms of teacher participants' **use of devices for personal and school-based usage**, it is clear that teachers use many home-based technologies at home for personal use, but rarely use these at school (e.g. smart TV, smart watch, consoles). Interestingly, however, their interaction with these technologies actually outweighs their use of user input computer-based technologies (e.g., mobile phones, tablets, laptops) at home. It will be interesting to see what impact these types of technologies might have on learning in school in the future or whether they will ever have a role in the future. However, the use of user input computer-based technologies (e.g., mobile phones, tablets, laptops) and their use at home and at school is similar. What is clear is that teachers' use of technology in school is generally less than their interaction with technology at home.



One of the clear observations regarding teachers' **use of technology in their main CLIL language and classrooms** is that there are lots of different technologies that they never use. For example, social media, gaming, online shopping, photography, forums and discussion boards, music streaming, and AI. This could be due to many of these technologies being new or perhaps more unpredictable in the classroom than others. The technologies that are used a few times per week include instant messaging, video streaming, mobile apps, video sharing, and online research, as well as E-textbooks, digital projectors and whiteboards. Interestingly, the only technology that is used in every lesson is digital projectors and whiteboards suggesting that technology is mainly used as a way of presenting information or lesson content rather than learners actually interacting with it on a daily basis. This data aligns with other data here suggesting that the use of technology in school is much less frequent than it is at home.



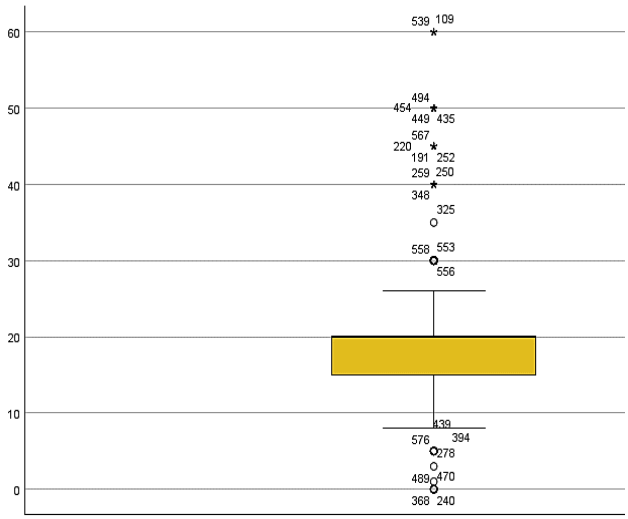
When the categories in the above diagram are combined into ‘never’, ‘a few times per term or month’ and ‘a few times a week and every lesson’, it becomes clearer which technologies participants are more likely to come into contact with through teaching and learning. This analysis shows us that digital whiteboards, online research, and instant messaging have a relatively common presence in teaching and learning in the main CLIL languages throughout a typical academic year. It also tells us that video streaming is less common. Furthermore, digital storytelling, content creation, and free educational apps are used sporadically over larger stretches of time. This may point to the fact that these tools are not ones that can be used frequently, especially those that require content creation because learners would be engaging with such tasks over a longer period of time, or that they are less useful, especially in the case of apps, for classroom learning.



In terms of the **time** (minutes) **spent on digital technologies in CLIL lessons**, the mean is just under 20 minutes. When the lowest and highest 5% of values are removed this mean drops to around 18.5 minutes. The confidence interval (95%) for the mean also suggests that the upper range is around 20 minutes so we can reasonably say that teachers spend between 18 and 20 minutes using digital technologies in the CLIL classroom. This is also reinforced by the small interquartile range of 5 minutes. There is considerable variation in the data, however, with a number of outliers reaching approximately 9 minutes, but there is a slight skew to the right suggesting that teachers generally spend more time using digital technologies than less.

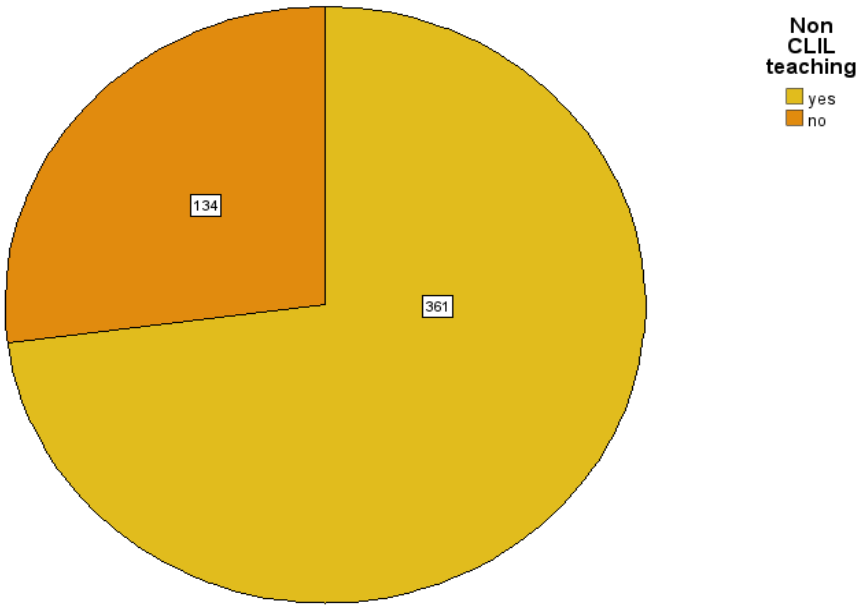
Descriptives

		Statistic	Std. Error
Mean		19,29	,425
95% Confidence Interval for Mean	Lower Bound	18,46	
	Upper Bound	20,12	
5% Trimmed Mean		18,51	
Median		20,00	
Variance		88,987	
Std. Deviation		9,433	
Minimum		0	
Maximum		60	
Range		60	
Interquartile Range		5	
Skewness		1,408	,110
Kurtosis		3,213	,220



Time spent on digital technologies in a CLIL lesson

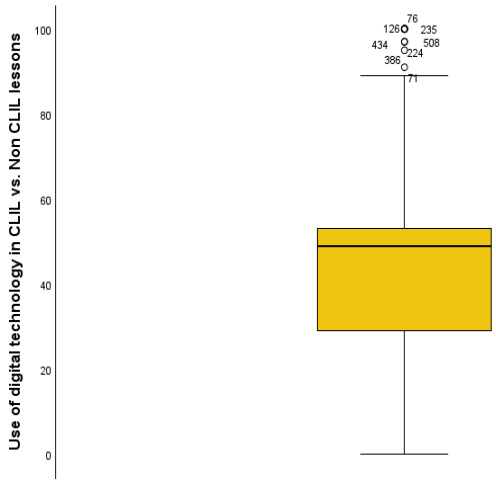
In relation to the **professional profiles** of the participants, nearly three quarters of all teachers also do non-CLIL teaching. Given the high prevalence of respondents who also teach within the discipline of Languages and Communication, it is highly likely that this is the disciplinary area in which they teach their non-CLIL lessons. Therefore, we can assume that many of our participating CLIL teachers are also language teachers.



Participants were asked whether their **use of technology in CLIL and non-CLIL lessons** was substantially different. In this case, '0%' meant that there was no difference and '100%' was that there was a substantial difference. Here the mean result was 43.48%. However, measures of variance (582.019), standard deviation (24.146), and the large interquartile range (24) show that the data is widely spread. Also, when looking at the bar and whisker chart below it is clear that there are also more outliers on the side of there being a substantial difference. This suggests generally that CLIL lessons use more technology than non-CLIL lessons.

Descriptives

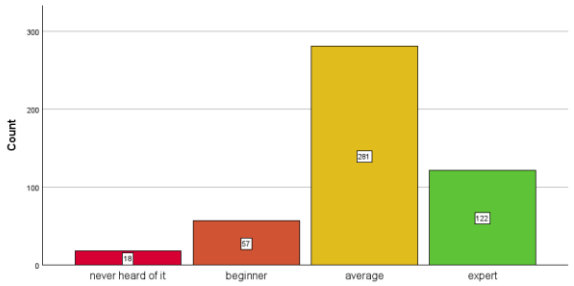
		Statistic	Std. Error
Mean		43,48	1,565
95% Confidence Interval for Mean	Lower Bound	40,40	
	Upper Bound	46,56	
5% Trimmed Mean		42,84	
Median		49,00	
Variance		583,019	
Std. Deviation		24,146	
Minimum		0	
Maximum		100	
Range		100	
Interquartile Range		24	
Skewness		,009	,158
Kurtosis		,102	,314



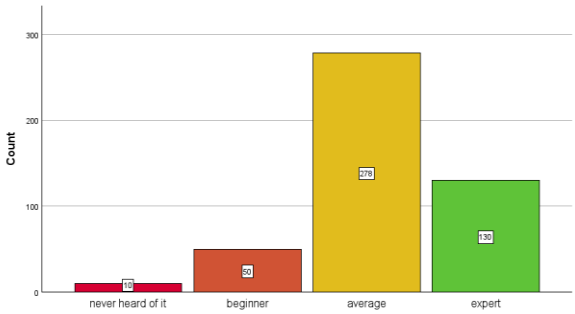
4.7. Teachers' competences and challenges

When considering teachers' **self-reported digital competence for teaching and learning**, it is clear that, in every question asked, teachers report their competence as being 'average'. This result is consistent with other research in which teachers are asked to rate their competence, which may be due to subjectivity biases (Myyry et al., 2022) or cultural or institutional factors.

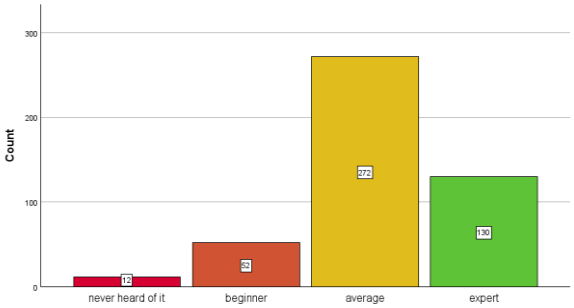
Nonetheless, if we combine their self-reported competence from 'average' and 'expert', we find that generally most teachers have some knowledge of how to include videos, images, and interactive elements into their lessons, how to select digital tools and align them to objectives appropriately, how to apply these for assessment purposes, how to be inclusive with digital tools, and how to assess their strengths and weaknesses.



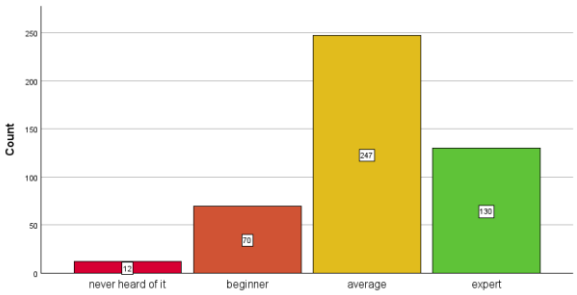
I integrate technology into my teaching and learning including videos, images, interactive elements



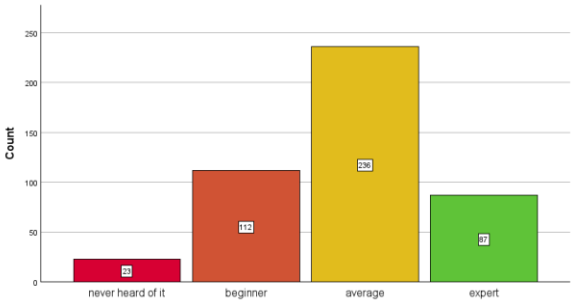
I select digital resources tools or platforms appropriately



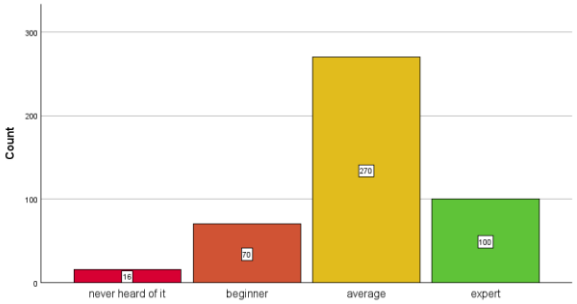
I align my use of digital tools and resources with specific learning objectives



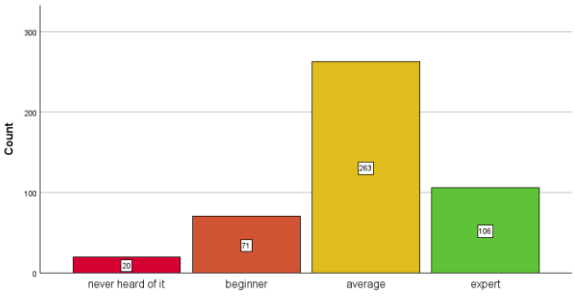
I encourage and facilitate communication and collaboration between students using digital technologies



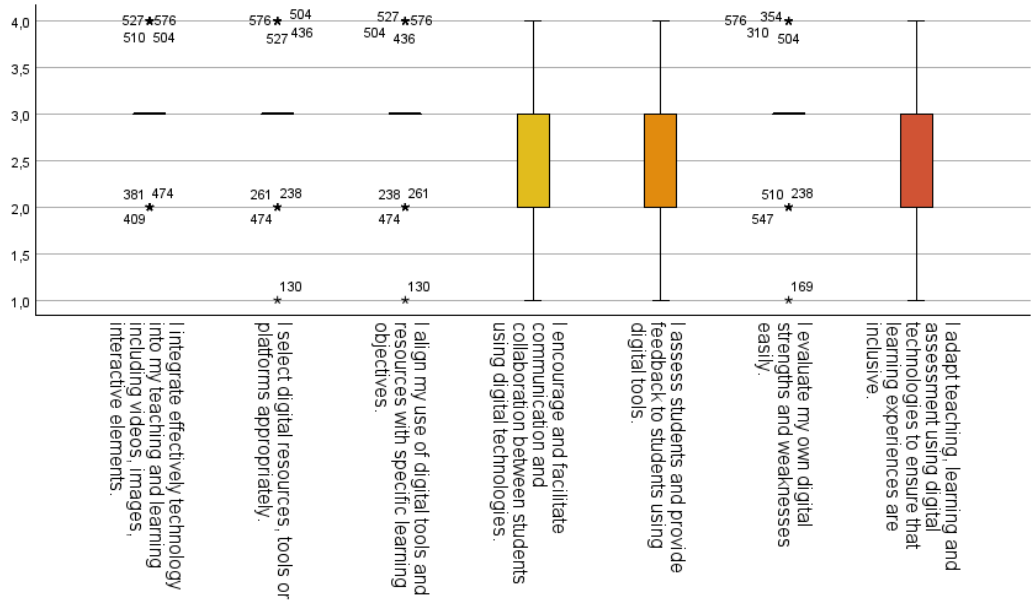
I assess students and provide feedback using digital tools



I evaluate my own strengths and weaknesses easily

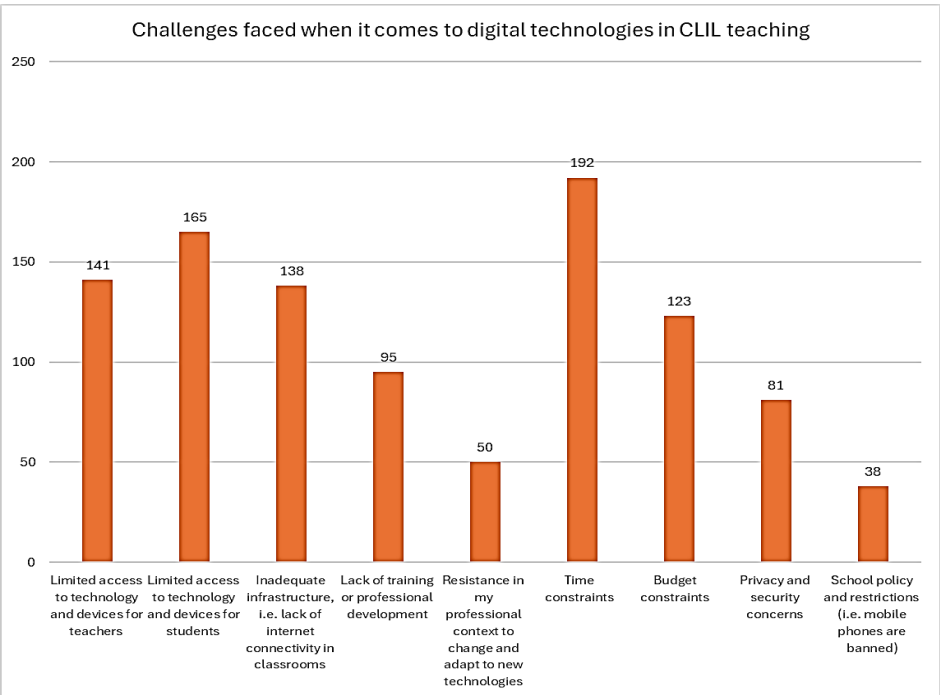


I adapt teaching, learning, and assessment using digital technologies to ensure that learning experiences are inclusive

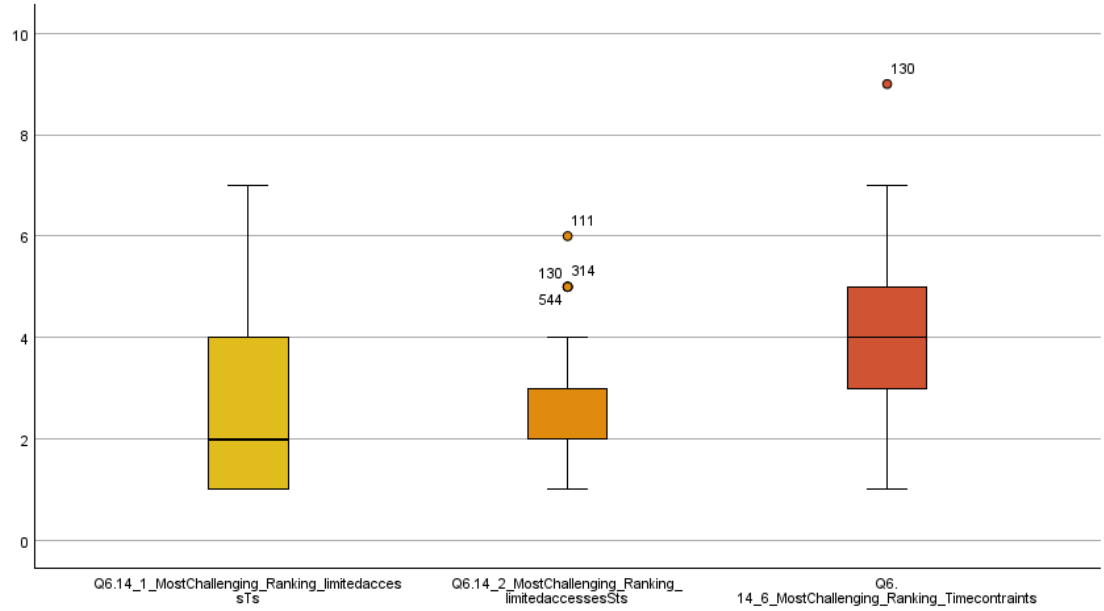


The top **5 main challenges** that teachers face when using digital technologies for their CLIL teaching are:

- **Time constraints**: 192.
- **Limited access to technology devices for students**:165.
- **Limited access to technology devices for teachers**: 141.
- **Inadequate infrastructure**: 165.
- **Budget constraints**: 123.



Within the top three challenges mentioned, limited access of teachers to technology and devices was reported to be the most prominent problem (*MD*=2, *IQR*=3), followed by unavailability of technology and devices for students (*MD*=3, *IQR*=2), and only last was time constraints in connection with use of digital technology (*MD*=4, *IQR*=2). However, as the interquartile range shows there is a relatively broad heterogeneity concerning the ranking of all of the problems.



4.8. Teachers' perceptions of digital technologies in CLIL

For the next item in the survey, teachers were asked to give their opinion on the following statements regarding their **perceptions of the use of digital technologies in CLIL**:

1. Students' disciplinary literacy skills improve when incorporating technology into CLIL learning.
2. Using technology encourages students to be more multilingual in their learning.
3. Students are inherently more motivated to use language and content in an integrated way (i.e., project work) when a digital tool or technology is required to complete it.

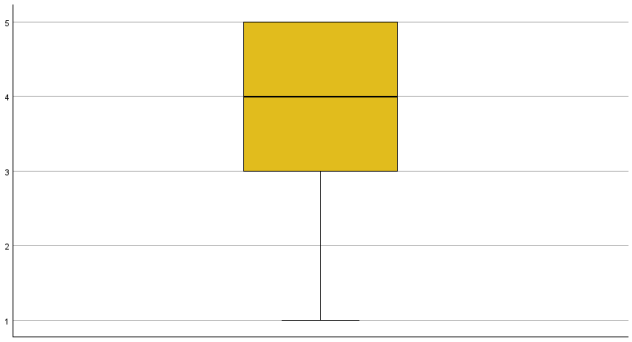
Participants responded according to a 5-point likert scale where 1='strongly disagree', 2='somewhat disagree', 3='neutral', 4 = 'somewhat agree', and 5='strongly agree'.

For **Statement 1**, the data indicates a general agreement among teacher participants that incorporating technology into CLIL learning improves students' disciplinary literacy skills, as indicated by the mean (3.93) and median (4) being similar. The negative skewness implies that there are more responses towards agreement, and the confidence interval confirms this trend. The standard deviation (1.103) and interquartile range (2) suggest moderate variability

in the responses, indicating some level of differing opinions but with a general trend towards agreement that disciplinary literacies improve when incorporating technology.

Descriptives

		Statistic	Std. Error
Mean		3,93	,051
95% Confidence Interval for Mean	Lower Bound	3,83	
	Upper Bound	4,03	
5% Trimmed Mean		4,04	
Median		4,00	
Variance		1,217	
Std. Deviation		1,103	
Minimum		1	
Maximum		5	
Range		4	
Interquartile Range		2	
Skewness		-1,124	,112
Kurtosis		,750	,223

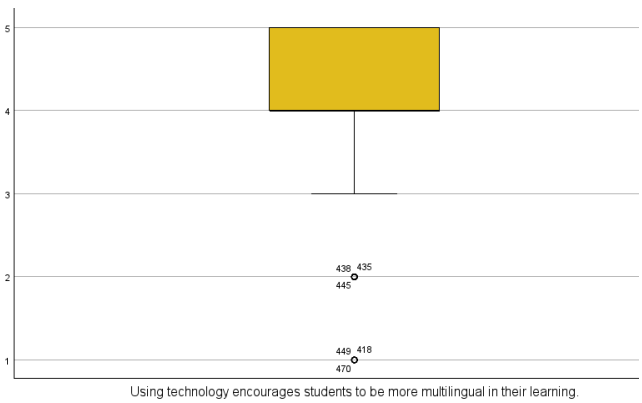


Students' disciplinary literacy skills improve when incorporates technology into CLIL learning.

For **Statement 2**, the data indicates a strong agreement among respondents that using technology encourages students to be more multilingual in their learning. The mean (4.15) and median (4) are similar, which lies between 'somewhat agree' to 'strongly agree' on the scale. The negative skewness implies that there are more responses in the higher range (towards strong agreement), and the confidence interval confirms this trend. The standard deviation (0.988) and interquartile range (1) suggest moderate to low variability in the responses, indicating a significant level of consensus among respondents. The high kurtosis value indicates a peaked distribution, suggesting that most responses are clustered around the higher end of the scale. Therefore, from the perspective of teachers, technology does encourage learners to be multilingual and is perhaps the nexus through which bi/multilingual disciplinary literacies or pluriliteracies might be learnt and developed best (see Coyle & Meyer, 2021).

Descriptives

		Statistic	Std. Error
Mean		4,16	,049
95% Confidence Interval for Mean	Lower Bound	4,07	
	Upper Bound	4,26	
5% Trimmed Mean		4,28	
Median		4,00	
Variance		,975	
Std. Deviation		,988	
Minimum		1	
Maximum		5	
Range		4	
Interquartile Range		1	
Skewness		-1,425	,120
Kurtosis		1,934	,239



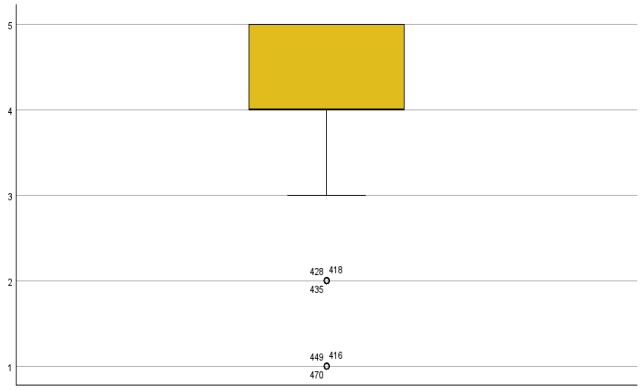
Using technology encourages students to be more multilingual in their learning.

Finally, for **Statement 3**, the data indicates a strong agreement among participants that students are inherently more motivated to use language and content in an integrated way

when a digital tool or technology is required. The mean (4.28) and median (4) are similar, and to the trimmed mean (4.39) suggesting that participants 'somewhat agree' to 'strongly agree' that technology plays a key facilitatory role in integrating language and content. The negative skewness (-1.65) implies that there are more responses in the higher range (towards strong agreement). The small standard deviation (0.9) and interquartile range (1) show that there is moderate to low variability in the responses, indicating a significant level of consensus among participants. The high kurtosis value indicates a peaked distribution, suggesting that most responses are clustered around the higher end of the scale.

Descriptives

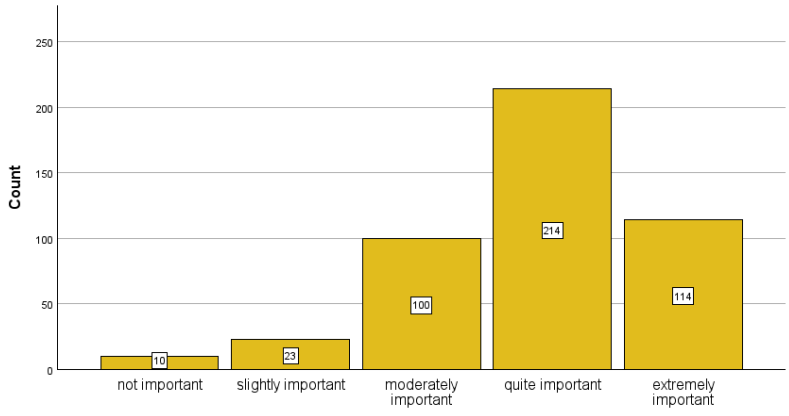
		Statistic	Std. Error
Mean		4,28	,044
95% Confidence Interval for Mean	Lower Bound	4,19	
	Upper Bound	4,37	
5% Trimmed Mean		4,39	
Median		4,00	
Variance		,809	
Std. Deviation		,900	
Minimum		1	
Maximum		5	
Range		4	
Interquartile Range		1	
Skewness		-1,654	,121
Kurtosis		3,155	,241



Students are inherently more motivated to use language and content in an integrated way (i.e., project work) when a digital tool or technology is required to complete it.

A very interesting observation here is that while teachers see technology as playing a really important role in CLIL, their use of technology in school to their teaching and learning of CLIL does not necessarily reflect this belief.

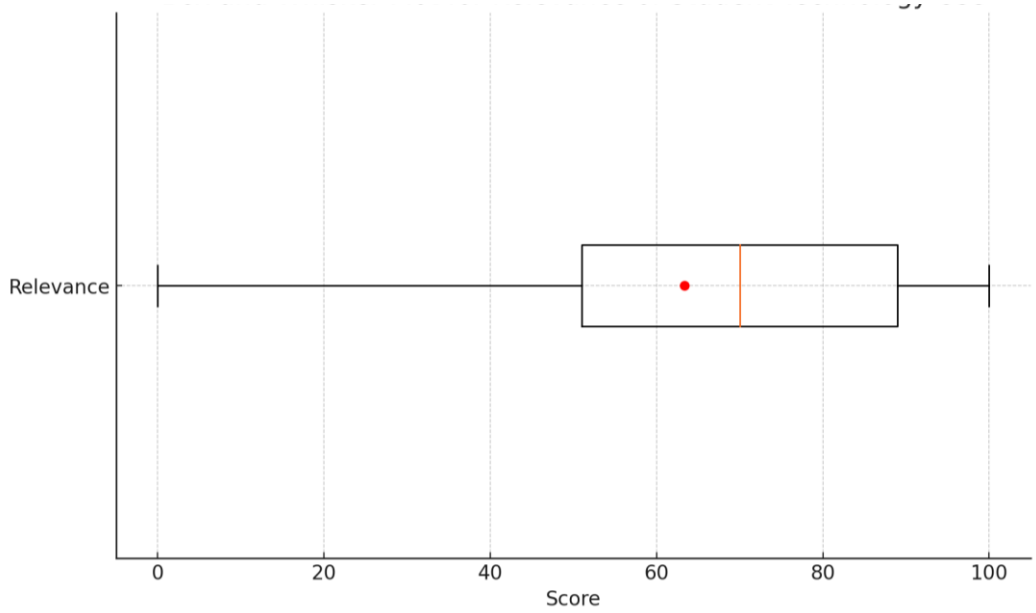
One of the key research questions that shaped the survey of teachers and students' use of digital technologies in CLIL for the development of their disciplinary literacies centres focused on the **understandings that teachers have of students' digital practices** and how these can then be incorporated into their learning through careful planning and preparation. In the case of the importance that teachers place on understanding students' use of technology extramurally, 71% believe it is either 'quite important' or 'extremely important' to take this into account.



Importance of students' technology use for CLIL lesson planning

The following questionnaire item explored whether teacher participants felt that the **use of technology was more important for developing language skills or bi/multilingual disciplinary literacies**. Participants were invited to express their views on a scale, where '1%' represented only language skill development and '100%' represented only disciplinary literacy development.

The data reveal that students' out-of-school technology use predominantly supports the development of disciplinary literacies (CDLs) over just language skills from the perspective of CLIL teachers, with a mean score of 63.38 and a median of 70. The high variability (*SD*=26.687) indicates, however, that opinions, although diverse, coalesce more towards the development of disciplinary literacies. This fact is also supported by the negative skewness (-0.598) and kurtosis (-0.589).

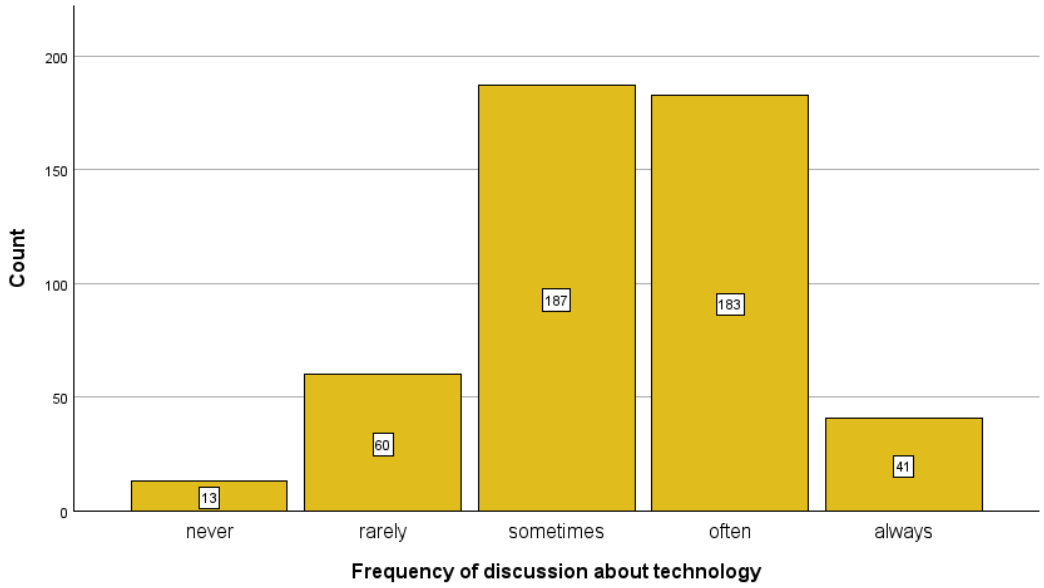


Descriptives

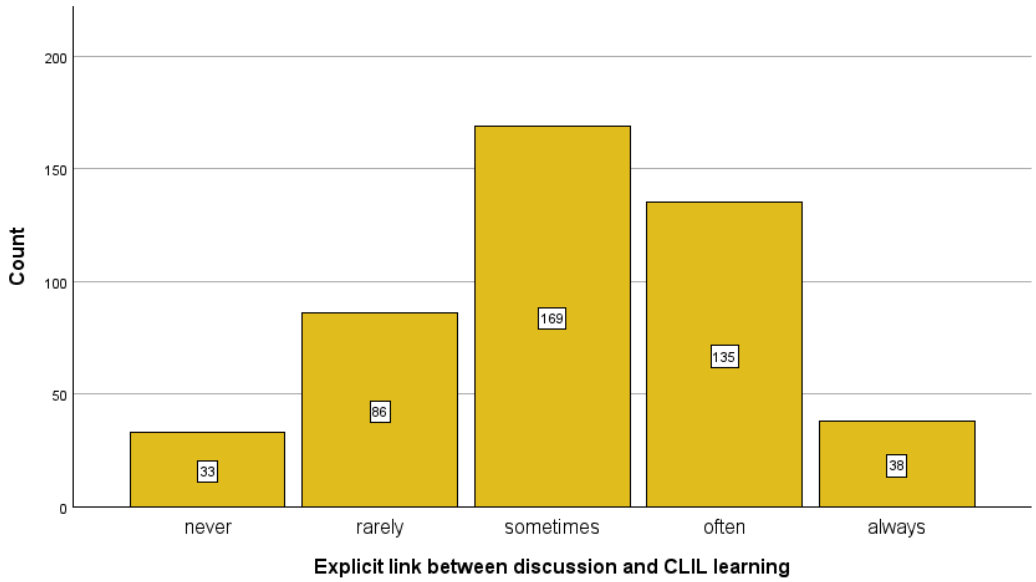
			Statistic	Std. Error
Relevance of student out of school technology use for either developing CDLs or language skills	Mean		63,38	1,395
	95% Confidence Interval for Mean	Lower Bound	60,63	
		Upper Bound	66,12	
	5% Trimmed Mean		64,57	
	Median		70,00	
	Variance		712,219	
	Std. Deviation		26,687	
	Minimum		0	
	Maximum		100	
	Range		100	
	Interquartile Range		38	
	Skewness		-,598	,128
	Kurtosis		-,589	,254

4.9. Students' digital competences: teachers' perceptions

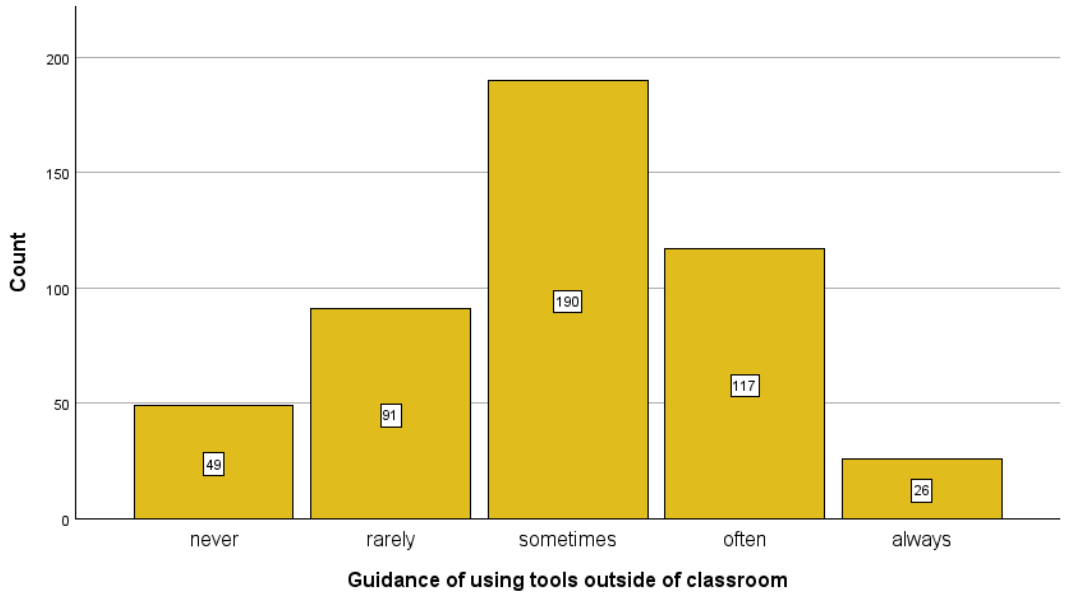
When it comes to the **frequency of discussions about technology** between teachers and students, it would appear that these discussions are 'sometimes' or 'often' likely to happen. This would also align with data here that shows that teachers only use technology for around 20 minutes of their CLIL lessons occasionally.



When teachers were asked whether discussions about technology are **linked specifically to their CLIL learning**, the visualisation below shows that they may 'sometimes' or 'often' take place, but it is less likely than having discussions more generally.



Similarly, when teachers are asked how frequently they **discuss the use of technological tools for use outside of the classroom**, again, participants said that this 'sometimes' happens in the vast majority of cases. However, this is nearly as likely to 'rarely' or 'never' happen (*N*=140) as it is to happen 'often' or 'always' (*N*=143)



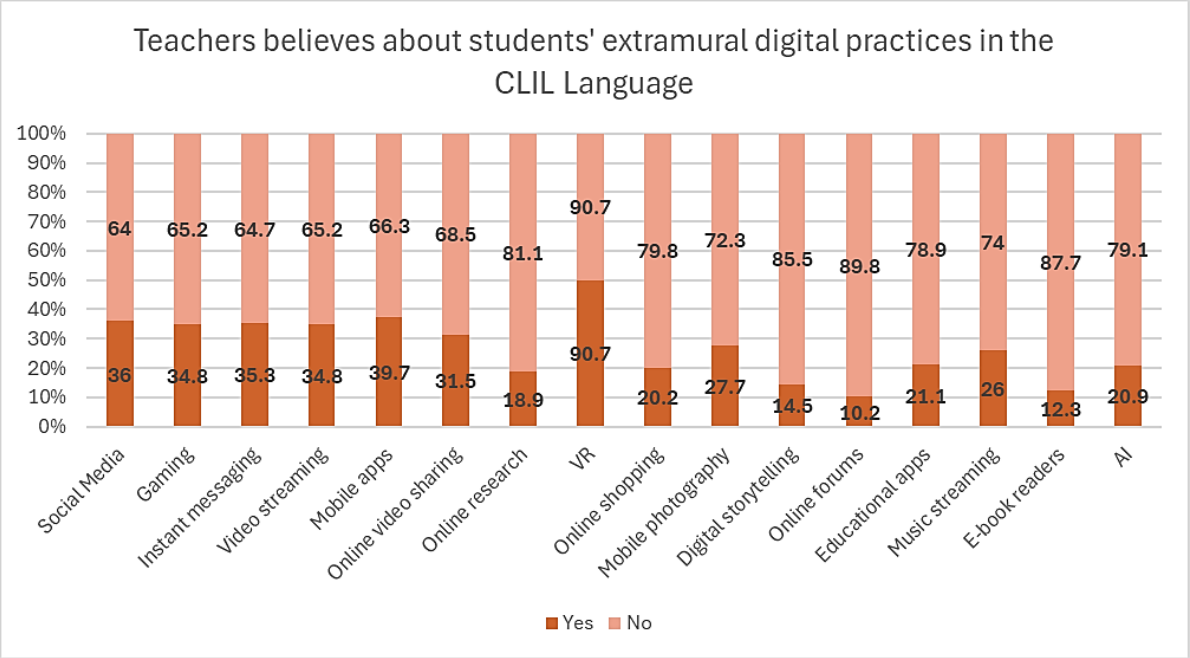
4.10. Students' extramural use of digital technologies: teachers' perceptions

There are a number of surprises when it comes to the beliefs that teachers have about the **extramural digital practices that learners undertake in their CLIL language**. Generally, across all digital activities and practices, teachers believe that their learners are more likely to perform these in a language other than their CLIL language. For example, for those learners who learn CLIL through English, many teachers believe that many learners do not listen to streamed music in English outside of school. Given the prevalence of English-language music around the world, it is hard to believe that this is actually the case. The more so as most extramural English (EE) studies underline that popularity of English-medium music for most teenagers (De Wilde, et al., 2020; Schurz & Sundqvist, 2022).

However, a further caveat that we should include here is that when teachers were asked to select what they believed, those that did not select anything can be interpreted as both 'no' and 'I don't know'. As a result, this could be over-inflating the negative responses. However, the fact that teachers may not know also shows that they have scant understanding of their students' digital practices and interests extramurally.

The only technology that attests a balance between using the CLIL language and using another language is virtual reality. However, this result may reflect the fact that VR is considered a new technology that perhaps only exists in English. Given the prevalence of

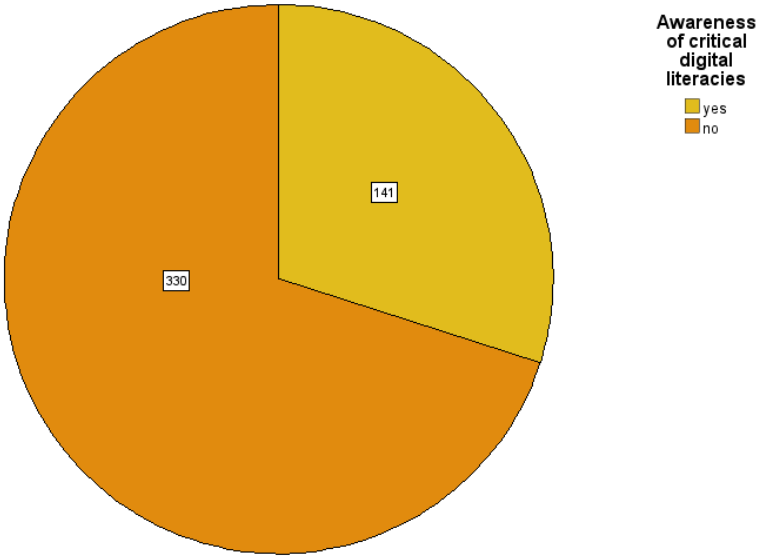
English as a CLIL language as attested here and the prevalence of English as the language of technology, it is reasonable to suggest that teachers may think that learners engage with this technology in English.



4.11. The teaching of Critical Digital Literacies in CLIL

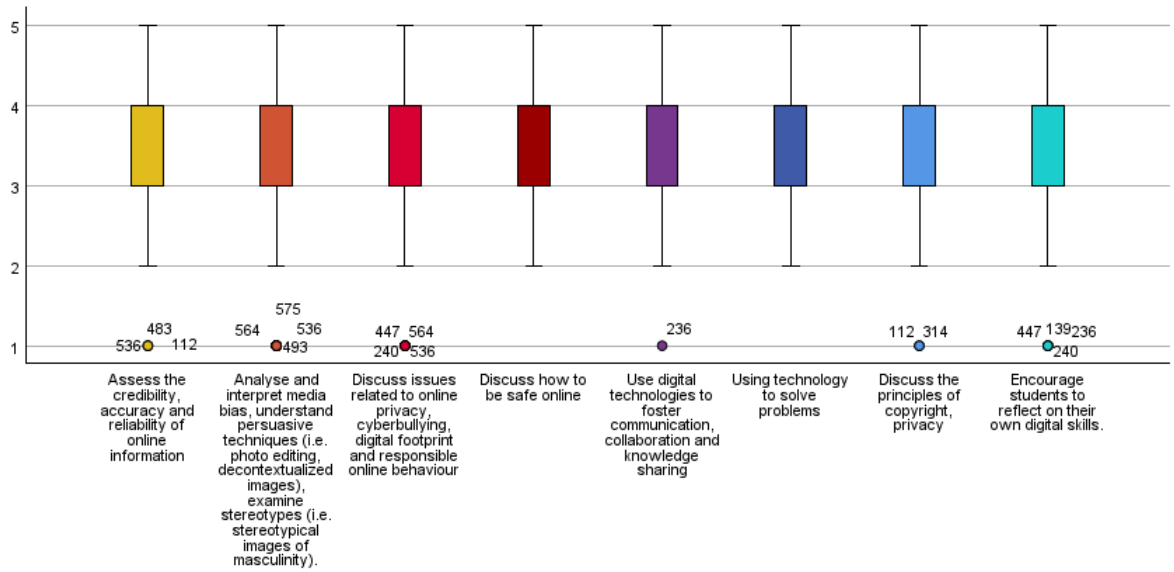
One of the most important aspects of using technology in the post-truth era is the development of **Critical Digital Literacies**. Critical Digital Literacies (CDLs) encompass the skills and abilities required to engage critically with digital media and technologies. This involves not only using digital tools effectively but also understanding and interrogating the power structures, ideologies, and cultural practices embedded within digital contexts. According to Ilomäki, et al. (2023), CDLs include dimensions such as e-safety, digital literacy, media literacy, and digital citizenship, among others. These literacies enable individuals to navigate the digital world responsibly and ethically, fostering both functional and critical thinking skills necessary for informed and participatory digital engagement.

In this questionnaire, **teachers' awareness of critical digital literacies** was interrogated through a simple, binary response ('yes' or 'no'). As the graphic below attests, over two thirds of teachers do not have an awareness of CDLs despite the fact that these have formed part of a number of recent policies and projects in Europe, e.g., European European Digital Competence Framework for Citizens (European Commission, 2021b), Digital Education Action Plan (European Commission, 2021a), DETECT (Developing Teachers' Critical Digital Literacies; Gouseti, et al., 2021). This suggests that these policies are yet to reach the national policy to inform teacher practice and to become a regular part of classroom teaching and learning.



Of those that respond ‘yes’ to having some awareness of CDLs, CLIL teaching practitioners on average report to use 7 out of the 8 CDLs mentioned ‘often’ in their daily teaching and learning practice. Only principles of copyright and privacy are discussed ‘sometimes’, which might indicate that teachers do feel the need for more external guidance in this area or do not see the immediate need to discuss copyright and privacy issues with their students in class.

Participants were asked to respond on a 5-point likert scale (‘never’, ‘rarely’, ‘sometimes’, ‘often’, ‘always’) as to how often they **embed CDLs into their teaching practice**. In nearly all cases, teachers report that they either ‘sometimes’ or ‘often’ incorporate each of the 7 CDLs into their teaching practice.



5. Comparison of findings on a Pan-European scale

5.1. Similarities

- **Preferred digital technologies:**
  Both students and teachers use a variety of digital tools and technologies, with a preference for mobile phones, laptops, and tablets.
- **Supporting disciplinary literacies:**
  Overall, there is a general agreement that digital technologies support the development of disciplinary literacies and multilingual skills.
- **Motivation and engagement:**
  Both groups perceive the importance of integrating technology into CLIL learning to enhance motivation and engagement.
- **Time constraints:**
  Teachers and students both reported time constraints as a significant challenge in using digital technologies effectively.
- **Internet access at home:**
  Internet access at home is common for both students and teachers, with frequent daily use.
- **Mobile technologies:**
  Mobile phones and laptops are prevalent devices used both at home and in school by students and teachers alike. This shows a clear move towards more mobile technologies as opposed to those that are fixed, e.g., desktop.
- **Technologies for supporting CLIL language:**
  Both groups recognize the role of social media, instant messaging, and video streaming in supporting language learning. However, there was some variability across countries or even between CLIL languages.
- **Link between extramurally used technology and classroom learning:**
  There is a consensus that understanding students' extramural use of technology is important for effective lesson planning.
- **Leisure-based technologies:**
  Students and teachers have high levels of access to leisure devices (e.g., smart TVs and smart watches) outside of school; however, neither group uses these technologies for teaching and learning purposes in school.

5.2. Differences

- **Students' actual use vs. teachers' perceptions:**
  Teachers believe students use digital technologies less frequently in their main CLIL language outside of school, while students report higher use in activities like music streaming and instant messaging. However, in their L1, teachers believe that students engage more in these practices.

- **Technology in classrooms:**
  Teachers hardly use any technologies in class on a daily basis, except for digital projectors and whiteboards, while students report more varied use of technologies in their spare time. However, teachers also report using technology for around 20 minutes per CLIL lesson. This may mean that they either teach CLIL lessons infrequently or they are referring to their own use of technology when they are actively teaching as opposed to students being active with technologies.

- **Challenges:**
  Students face limited internet access in schools. School policies are also a major issue, while teachers cite inadequate infrastructure and budget constraints. Nonetheless, we could argue that infrastructure and internet access pose similar challenges.

- **Frequency of use:**
  Teachers report using digital tools for an average of 18-20 minutes per lesson, whereas students' engagement with technology extramurally is far greater.

- **Digital competence:**
  Teachers self-report average digital competence, whereas students feel more confident in their use of digital tools.

- **Objective of technology use:**
  Teachers emphasise technology for content presentation, while students report using it more for interactive and collaborative activities.

- **Impact on learning:**
  Students report that technology significantly aids their CLIL learning, whereas teachers are more cautious about its overall impact.

- **School-based restrictions:**
  Students report having less restrictions placed on their use of technology extramurally as opposed to school-based environments where there are higher levels of restriction, mainly as a result of school policy.

6. Recommendations for teachers, teacher trainers, and policy makers

6.1. Recommendations for teachers

1. **Increase engagement with interactive technologies:**
   Incorporate more interactive and collaborative digital tools such as digital storytelling, multiplayer online games, and social media into lesson plans to align with students' extramural technology use and interests.

2. **Enhance critical digital competence:**
   Participate in professional development opportunities focused on enhancing digital competence, including the use of advanced digital tools and critical digital literacies (CDLs).

3. **Focus on critical digital literacies:**
   Integrate critical digital literacies into the curriculum by including lessons on digital citizenship, online safety, and media literacy to better prepare students for the digital world.

4. **Leverage students' extramural digital practices:**
   Learn from your students what they do digitally out of school so that you can use students' extramural digital practices to inform classroom activities, creating assignments that allow students to use the technologies they are already familiar with and enjoy.

5. **Optimize classroom technology use:**
   Plan for the efficient use of classroom technologies, particularly ones that can enhance interactivity and student engagement.

6.2. Recommendations for teacher trainers

1. **Emphasize practical technology use:**
   Develop training programs that provide hands-on experience with a variety of digital tools and platforms, ensuring that teachers can effectively integrate these technologies into their CLIL teaching.

2. **Focus on digital literacy skills:**
   Include comprehensive modules on digital literacy skills, emphasizing the importance of critical digital literacies (CDLs) and their application in teaching practices.

3. **Address technology integration challenges:**
   Provide strategies for overcoming common challenges such as limited access to technology, inadequate infrastructure, and time constraints, offering practical solutions that teachers can implement in their classrooms.

4. **Encourage continuous professional development:**
   Promote continuous learning and professional development opportunities related to digital technologies, ensuring that teachers stay updated with the latest tools and methods.

5. **Align training with student practices:**
   Align training programs with the digital practices of students, helping teachers understand how to leverage these practices to enhance learning outcomes.

6.3. Recommendations for policy makers

1. **Improve infrastructure and access:**
   Invest in improving digital infrastructure in schools, ensuring that both teachers and students have adequate access to high-quality digital tools and reliable internet connections.

2. **Support professional development:**
   Fund and support professional development initiatives that focus on enhancing teachers' digital competence and their ability to integrate technology into CLIL teaching.

3. **Promote critical digital literacies:**
   Implement policies that mandate the inclusion of critical digital literacies (CDLs) in the curriculum, ensuring that students develop essential digital skills.

4. **Encourage use of advanced technologies:**
   Create incentives for schools to adopt and experiment with advanced technologies such as virtual reality, digital storytelling, and collaborative online platforms to enhance the learning experience.

5. **Monitor and evaluate technology integration:**
   Establish monitoring and evaluation frameworks to assess the effectiveness of technology integration in schools, using the data to inform future policies and initiatives.

6. **Facilitate access to resources:**
   Ensure that schools, especially those in underfunded or rural areas, have access to the necessary resources and support to implement digital learning effectively.

7. Conclusion

This pan-European investigation set out to collect information from CLIL learners and teachers across Europe on their digital practices in and out of school, and how they perceive these practices to potentially support subject-related learning and bi/multilingual disciplinary literacies. Despite the many challenges of operationalising the basic notions, of developing the two questionnaires (DLSS and DLTS), and of collecting data in 11 different countries, the study has provided a rich array of findings that contribute to the fulfilment of the objectives and tasks set for WG4 of the COST Action CLILNetLE (MoU, 2022, p. 18).

In response to the task of surveying CLIL learners' digital practices in CLIL languages outside education (T4.1a), the DLSS showed that most of the 4229 participating learners engage in digital activities in their CLIL language(s) on a daily basis. They mainly do so on mobile devices and use different activities for different languages, both when contrasting main languages of schooling with the respective CLIL language, but also when comparing the three CLIL languages, English, French, and German, which, though, are all used for music streaming, instant messaging, and phone apps. Additionally, most learners focus on different knowledge areas depending on language, with Health, Languages, Philosophy, and Tourism and Hospitality being preferred topics for the CLIL language, while they are also engaged in Arts, Social Sciences, Natural Sciences, Technology, and Economics in their general languages of schooling. Although students and teachers agree on the prevalence of digital extramural practices for teenagers, the respective DLSS and DLTS findings disagree on the relative frequencies of engaging in digital activities in the CLIL language, with most of the 557 participating teachers allotting much less time to the CLIL language than learners reveal in their self-reported activities.

When turning to the digital practices and resources used in CLIL teaching (T4.1b), both participant groups identify some challenges accessing the internet at school, rather than at home, and also reveal that their digital practices at home are more frequent and varied than those at school. On average, teachers judge their use of digital technology to amount to roughly 20 minutes per CLIL lesson. At the same time, they specify the digital projector and whiteboard as the only regularly employed technologies, thus hinting at a preference for using technology to present information. Overall, the findings highlight a gap between teachers' beliefs about the importance of technology in CLIL and their actual use of it in classrooms.

On the caveat that the concept of BMDLs had to be operationalised and simplified especially in the DLSS, there are some findings from both surveys that contribute to evaluating the potential of digital practices (inside and outside of school) for bi/multilingual disciplinary literacies (T4.2). Reflecting their generally positive evaluation of the use of technology in CLIL teaching, most teachers believed that digital tools would enhance student motivation and engagement in CLIL learning, and that it would also be beneficial for learners' developing their disciplinary literacies. Furthermore, most teachers recognised that their CLIL lesson planning would gain in effectivity if they understood better their students' extramural use of technology. Indirectly, students agreed with this assumption, as they indicated a range of extramural activities as important for developing their skills in CLIL. Probably reflecting their personal

experience with CLIL in humanities and arts rather than STEM, the most important activities named in this connection were social media, phone apps, instant messaging, and online video sharing.

While, overall, the surveys provide answers to the research interests of WG4 and offer novel insights into CLIL learners' and teachers' digital practices and their potential for digital literacies, it is especially the findings summarised in the previous paragraph that trace the limits of a quantitative instrument. However carefully developed and widely administered, such surveys can only provide a baseline, starting from which further studies need to be designed that focus on the role and relevance of digital practices in and out of school for BMDLs. The next task of WG4 is to use this baseline to explore more qualitatively individual cases of practices in different CLIL settings that analyse the extramural and school-based digital practices of CLIL teachers and students across the same European landscape, offering not only further possibilities for further research studies, but also good examples of research-informed practice and approaches for teacher trainers, practitioners, and policy makers alike.

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