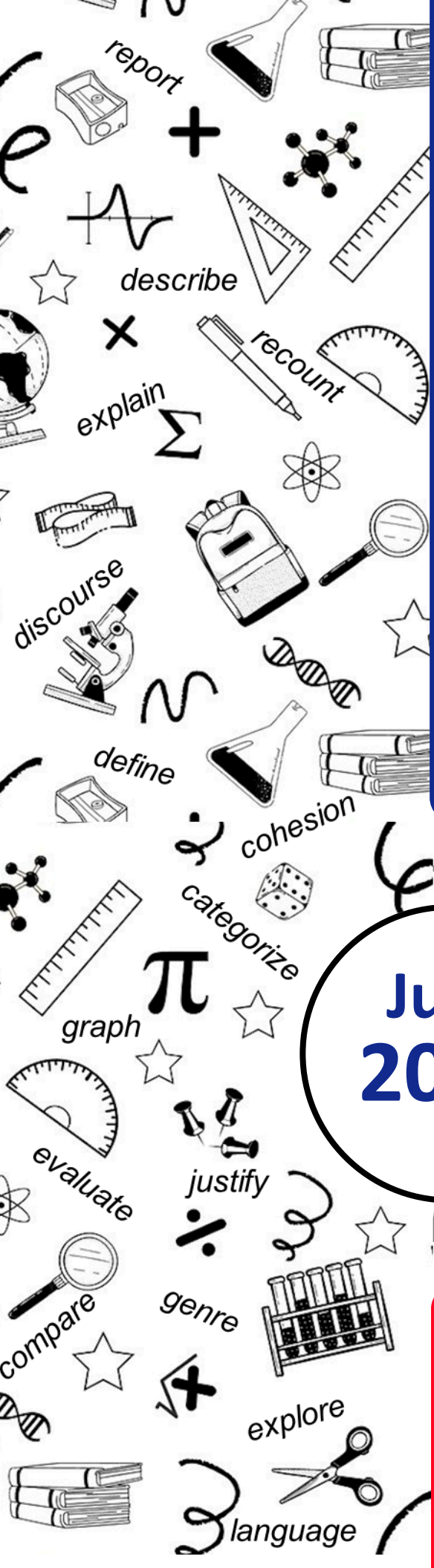

OVERVIEW OF CURRICULAR DEMANDS OF DISCIPLINARY LITERACIES

An Exploratory Survey

A Report by CLILNetLE Working Group 3 Deliverable 7

July 2024

CLILNetLE

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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ACKNOWLEDGEMENTS & CITATIONS

We have attempted to recognize all WG3 Members who have contributed to the immense amount of work behind this Deliverable and also the process of organising for, developing and writing this document.

To start, WG3 Members in Table 1 not only took part in at least one, if not both tasks of this exploratory survey, they also authored specific "Chapters" within two "Sections" of this Deliverable:

- In Section 2.4, all members who had participated in TASK-1 co-authored their respective "National/Regional Reports": please note these authors when citing their chapter.
- In Section 3.4, individual WG3 Researchers who undertook TASK-2 authored chapters to report on the disciplinary literacy/ies that teachers expect from their students.

Yavuz Kurt (TR) is credited with not only maintaining and supervising the complex database generated through this two-part survey, but also extracting the meaningful graphs and dataset tables found in both "Data at a Glance" Sections (2.3 and 3.3).

With regard to the three Research Tools developed through this COST Action, authorship behind each tool is clearly indicated and should be cited accordingly.

For all other Sections of this document, Christiane Dalton-Puffer (AT), Silvia Rieder-Marschallinger (AT) and Teresa Ting (IT) are credited with organizing and writing much of this Deliverable: we wish to thank Silvia Minardi (IT) and Merita Hoxha (AL) for their careful reading and invaluable suggestions.

We thank Sarah Wirnsperger for designing the cover: T. Ting takes responsibility for adapting the royalty-free image of "school disciplines" created by "marchane sima (simabella703)", found on Pixabay (https://pixabay.com/illustrations/pattern-template-school-bag-6870967/).

Finally, we would like to also acknowledge the many WG3 Members who had started on the tasks, participated in numerous insightful exchanges, but did not manage to complete their contributions on time for this Deliverable. We have therefore organized the page-numbering of this document so that it is ready to welcome these promising complementary surveys.

CDP, SRM, TT (July 2024)

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EXECUTIVE SUMMARY

Can students truly understand complex concepts accurately if they are not equipped with the language needed to precisely organize those concepts, cognitively? If students cannot use language well to express their understanding of a given topic precisely, can we be sure that they have indeed learnt well? Can we allow young adolescents to complete compulsory education and leave school with limited ability to use language to express complex ideas in ways which are appropriate for their age and suitable for the profession they wish to pursue?

COST Action 21114 "CLILNetLE: CLIL Network for Languages in Education" recognizes that the explicit teaching of academic language and discipline-specific discourse is crucial for successful learning. Indeed, as we leave compulsory education and move forward professionally, many of us will often need to deal with "topics" which belong to school subjects which may not be an intricate part of our professional livelihood. Thus, school leavers need to be multi-literate i.e. sufficiently literate in all school subjects to make informed decisions, or at least know the limitations of their knowledge and thus seek out additional information before making decisions. While this objective of "informed citizenship" is elegant but elusive, objectives such as "raising teachers' awareness to the importance of language in education" and "delineating the type of language teachers want their students to master", are concrete and executable ways to achieve *literacy*.

This Report represents Deliverable 7 (D7) of **COST Action 21114** and is an exploratory survey which makes a first step in the abovementioned, more concrete direction. The explicit objective of this Deliverable is to "overview curricular demands regarding bi/multilingual disciplinary literacies in CLIL across educational levels, for Key Subjects" (Memorandum of Understanding (MoU), p. 18), surveying "at least three ITC countries and three Non-ITC countries" (MoU, p. 20). The results reported here reflect the work of 33 Researchers from 19 Universities, a teacher-training institution and a high school, located in six ITC Countries and five non-ITC Countries (Table 1). Together, these researchers performed two parallel but complementary TASKS to survey and overview curricular demands of disciplinary literacies from two angles:

- In TASK-1, researchers used a well-defined codebook and survey template to pore through and survey their respective National or Regional Curricular Documents for instances of *explicit mention* of the need for students to show their understandings through *productive displays of disciplinary literacy/ies*.
- In TASK-2, researchers used a well-defined protocol to elicit from teachers themselves, written texts which they feel demonstrate the quality of disciplinary discourse which they expect from their students (spoken text in the case of primary-level students). Such teacher-generated samples serve as a proxy for "curricular demands of disciplinary literacies". These texts, which reveal teachers' expectations, were subsequently analysed using a coding protocol which allowed researchers to delineate the language features teachers expect from students when displaying learning.

Results of this two-part exploratory survey indicate that official curricular documents often list very explicit cognitive learning objectives by way of "understand, appreciate, know, etc." but rarely make explicit mention of the need to prompt students for *productive demonstrations of knowledge*. For example, by simply adding a few words, information stored within the head of learners through verbs such as "understand, know, appreciate" can be drawn out through verbs which call for *productive displays of knowledge* such as "*explain* how they have understood that…; *write* an essay to show their appreciation of…; *list* information which shows that they know…". A concrete next step might be to revisit or "rehaul" (in the words of the AT Team) official curricular documents so to make more explicit the quality of language students should use when displaying their learning, knowledge and age-appropriate cognitive maturity. This is complemented by the corpus of texts collected through TASK-2 whereby teachers themselves made explicit the discourse features they would like to see in their students' written texts, i.e. students' productive discourse. This information can now be used to design instructional tasks and materials to help both content and language teachers build their students' academic and discipline-specific language skills without requiring content teachers to become language teachers or language teachers to start teaching content.

The process of implementing this two-part exploratory survey led to the creation of two corpora of texts and the development of three research tools & protocols, all of which can be adapted into tools for teacher-training towards disciplinary literacy/ies:

1. A collection of national curricula translated into English: Since only the Finnish curriculum was already available in English, it was necessary for WG3 Researchers from the seven other countries (Albania, Austria, Italy, Lithuania, The Netherlands, Poland and the Madrid-Region of Spain) to first translate parts and sometimes entire national/regional curricular documents for the survey. As such, this Deliverable encompasses a corpus of English translations of curricular documents, some of which were originally written in languages that popular translation platforms such as Google Translate, DeepL and ChatGPT are not yet well-trained in (e.g. Albanian, Lithuanian, Polish). The fact that these EN translations of curricular documents have been cross-checked by experienced academics, many of whom are English-language instructors, makes this corpus of more than 378,500 words a potentially invaluable resource for others who may wish to access the national curricula of these ITC and non-ITC countries.

2. Researchers undertaking TASK-2 generated a corpus of more than 25,250 words which teachers have produced to show their demands/expectations of disciplinary discourse. This corpus of teacher-generated text represents a complementary resource to more common corpora of student-generated texts.

3. A *Curricular Document Codebook & Survey Template* was developed to help researchers systematically survey their Curricular Documents. Details of this Survey Tool can be found in the Appendix, TOOL-1.

4. To elicit written texts from teachers, a *Teachers' Expectation Text Elicitation Protocol* was developed, providing researchers a means to gain insight into the type of language that teachers themselves expect from their own students. Details of this Text-Elicitation Protocol can be found in the Appendix, TOOL-2.

5. A *Cognitive Discourse Function (CDF)-Based Coding & Analysis Guide* was developed to delineate the discourse features present in the teachers' expectation texts. Details of this Survey Tool can be found in the Appendix, TOOL-3.

Results of this two-part exploratory survey from six ITC countries and five non-ITC countries are reported here, alongside links to the corpus of resources created and the three research tools & protocols developed. **The stipulation of the MoU to obtain analyses from 3 ITC and 3 non-ITC countries has thus been more than fulfilled.**

Table 1. Overview of countries and researchers involved

WG3 Researchers in ITC (*) and non-ITC countries undertook either TASK-1, TASK-2, or both. Countries are listed in alphabetical order and researchers from the same country are listed in alphabetical order of surname.

Country & Affiliation		TASK(s)
Albania*		
Jonida Cungu	*University of Elbasan "Aleksandër Xhuvani"*	2
Merita Hoxha	*University of Elbasan "Aleksandër Xhuvani"*	1 & 2
Gerda Sula	*University of Tirana*	1
Austria		
Tatjana Bacovsky-Novak	*University of Vienna*	1
Christiane Dalton-Puffer	*University of Vienna*	1
Ute Smit	*University of Vienna*	1
Silvia Rieder-Marschallinger	*Kirchliche Pädagogische Hochschule Wien-Krems*	1 & 2
Sarah Wirnsperger	*University of Vienna*	1
Finland		
Sami Lehesvuori	*University of Jyväskylä*	1
Tarja Nikula	*University of Jyväskylä*	1
Teemu Rainamaa	*University of Jyväskylä*	1
Sari Sulkunen	*University of Jyväskylä*	1
Anne Tiermas	*University of Helsinki*	1
Italy		
Francesca Costa	*Università Cattolica del Sacro Cuore*	1
Lucilla Lopriore	*Università degli Studi Roma Tre*	1 & 2
Silvia Minardi	*Liceo Statale 'S.Quasimodo', Magenta*	1 & 2
Valentina Morgana	*Università Cattolica del Sacro Cuore*	1
Teresa Ting	*University of Calabria*	1 & 2
Lithuania*		
Jolita Horbačauskienė	*Kaunas University of Technology*	1
Milda Ratkevičienė	*Kaunas University of Technology*	1
The Netherlands		
Rick de Graaff	*Utrecht University*	1
Gerald van Dijk	*Amsterdam University of Applied Sciences*	1
Jannet van Drie	*University of Amsterdam*	1
Tessa Mearns	*Leiden University*	1
Poland*		
Agnieszka Borowiak	*University of Humanities and Economics in Lodz*	1
Joanna Leek	*University of Lodz*	1
Barbara Muszyńska	*University of Lower Silesia*	1
Slovakia*		
Jaroslava Štefková	*Technical University in Zvolen*	2

Serbia*		
Nataša Bakić-Mirić	*The University of Priština – Kosovska Mitrovica*	2
Spain - Madrid		
Ana Llinares	*Universidad Autónoma de Madrid*	1
Tom Morton	*Universidad Autónoma de Madrid*	1
Turkey*		
Emine Adadan	*Bogazici University*	2
Yavuz Kurt	*Marmara Unversity*	2

INTRODUCTION

> Disciplinary literacies encompass discipline-specific textual-discourse and semiotics that have been normalised by experts of disciplinary communities of practice for the process of producing knowledge. Schooling serves as context for recontextualising knowledge, re-presenting disciplinary-knowledge as pedagogic-subjects for the purpose of providing school-leavers with the level of disciplinary knowledge they will need to navigate information and actively participate as democratically informed citizens.
>
> (Nikula et al., 2024, p. 1-2)

> Academic language is no-one's mother tongue.
>
> (Bourdieu and Passeron 1994, p. 8)

> Disciplinary literacy is […] more than the basic language skills – reading, writing, speaking, listening – in their own right. The key is the embeddedness of these skills in the context of disciplinary cultures and school subjects […] highlighting the role of learners as "doing" the subjects rather than as mere recipients of knowledge.
>
> (Dalton-Puffer, Hüttner, Nikula 2024, p. 2)

At the foundation of this COST Action is the realization that, for students to comprehend subject-specific notions presented through Content-instruction, it is necessary to build learners' subject-specific literacy skills. As succinctly stated in the first quote above, such subject-specific literacy is far and beyond simply "knowing how to read and write" but recognizes that each disciplinary community of practice has a distinct discipline-specific way of "seeing" the world and thus *languaging about* the phenomena and events around us (Schleppegrell, 2004; Hüttner & Dalton-Puffer, 2024; see also QR-Code-1 and QR-Code-2). That each community of disciplinary subjects, such as chemistry, history and maths, uses language in very discipline-specific ways (Shanahan & Shanahan, 2008) reflects the need of community experts to codify shared understandings in ways which reduce potential misunderstandings but also provide shortcuts when community experts further expand and develop their shared discipline-specific knowledge repertoire. We would indeed hope that the engineer and her team tasked with constructing the new municipality kindergarten share a codified way of "*languaging about"* their work.

QR-Code-1 **QR-Code-**

Indeed, the closer we come to the reality of applying school-learning to a profession, the more precise our discipline-specific understandings should become and thus the more precise the language we need to use to "language about" these discipline-specific notions. What this means for schooling is illustrated in Figure 1: As learners progress from primary to secondary-level schooling and beyond, discipline-specific concepts mature epistemologically, become increasingly more complex and abstract, as does the language within which those complex discipline-specific concepts are embedded.

Figure 1. Example of maturing discipline-specific discourse

As learners mature and progress through schooling, their understanding of discipline-specific concepts should also mature epistemologically, which in turn requires more mature and complex discipline-specific discourse (from Ting, 2024).

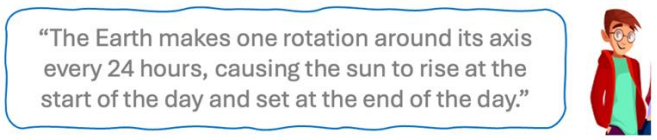

Figure 2. Example of limited subject literacy

An18-year-old who generates an output that mashes together the two discourses in Figure 1 calls into question whether this student has achieved a level of subject-literacy that is epistemologically age-appropriate.

Saying that the sun "rises and sets" is what we might call "spontaneous, unschooled, informal, everyday" ways of seeing and languaging about the world (Martin, 1993; Wellington & Osborne, 2001), perfectly acceptable at primary-level education and appropriate with the level of cognitive abstractions children at this age are capable of. However, as learners mature chronologically and cognitively, and progress through school, we expect that their understanding of the world also matures epistemologically. Vygotsky (1986) calls un-schooled ways of making sense of tangible observations via concrete conceptualizations, *spontaneous knowledge* (e.g. "the sun rises and sets"). In contrast, *scientific knowledge* provides the correct understandings of not only the observable, but also the invisible, using explanations which are often abstract and intangible (e.g. "the Earth rotates around its axis, completing one rotation every 24 hours"). Clearly, even if a well-schooled astronomer understands that "the sun rising and setting" is not scientifically accurate, it is important that our "freedom of languaging" for purposes of facilitated situation-appropriate communication (e.g. enjoying a beachfront social dinner) or artistic creativity (e.g. poetry and songwriting) should nonetheless be founded on scientifically solid and sound understandings. Vygotsky thus valued schooling as a context in which knowledgeable mentors (teachers), prompt us to think in complex ways about abstract notions which we probably would not encounter if not for schooling.

Therefore, as we progress through school, our discipline-specific understandings must "mature epistemologically", becoming more like that needed to participate in professional interactions linked to those school-subjects. This is necessary for two reasons. Firstly, this prepares school-leavers for entry into a professional workforce of their choice and/or further education, both of which require age-appropriate disciplinary knowledge. Secondly, the

purpose of mandatory schooling is the democratization of knowledge, i.e. providing all school-leavers, regardless of the profession they embark on, enough knowledge and understanding of each school-discipline so to become active citizens who can at least evaluate the verity of certain claims and, when unsure, acknowledge the limits of their own understandings and thus the need to investigate further before making decisions. Referring to science education, UNESCO highlights the importance of "being subject literate":

> "Science […] provides the basis for informed decision-making and effective impact assessments" (UNESCO 2015, p. 9).
>
> "The Covid-19 pandemic has emphasized the importance of scientific literacy both in the wider population and among decision-makers…Scientifically literate government leaders have been quick to understand the value of a science-based approach to tackling the pandemic" (UNESCO 2021, p.18).

Therefore, while "science literacy" regards the application of scientific knowledge to pursue STEM-professions, "'scientific literacy', on the other hand, targets the wider population. It seeks to impart scientific ways of thinking to equip people to approach problems from an analytical perspective" (*ibid*). The mandate for pre-tertiary education, even in L1, is to enable all students to comprehend complex content, assimilate associated subject-specific-literacies […] so that school-leavers, regardless of the profession they pursue, are nonetheless "multi-literate" citizens: The preparation of *multi-literate citizens* must, therefore, be the objective of compulsory education (Ting, 2024).

While subject-teachers might encourage students to use various modalities to show their level of "subject-literacy" (e.g. drawing and designing an infographic; setting up and carrying out experiments; collecting and analysing data; etc.), the most straightforward way to verify if learners have achieved age-appropriate subject-literacy is through the language they generate to communicate the knowledge they have gained. Indeed, the text that students produce, be it spoken or written, is a window into their thinking. For example, if an 18-year-old were to mash together the two discourses in Figure 1and state "Since the Earth makes one rotation around its axis every 24 hours, the sun rises at the start of the day and sets at the end of the day" (Figure 2), we, as teachers, would be left wondering if this learner has fully understood that the Sun, being the enormous immobile star at the centre of our Solar System, does no "rising and setting". An 18-year-old producing such a mashed-text would show us that s/he has not yet achieved an epistemologically mature level of disciplinary comprehension that is appropriate for an 18-year-old. What the "mashed text" (Figure 2) also illustrates is that simply sprinkling communications with more advanced discipline-relevant technical words such as "rotation" and "axis" alongside sophisticated linguistic structures like participle clauses (e.g. "causing the sun to…") does not automatically achieve the type of epistemologically mature *disciplinary discourse* which shows that students have achieved age-appropriate disciplinary understandings.

That is the challenge of *disciplinary* discourse: It goes far beyond "technical words" and "advanced grammar patterns" but involves a way of using language that is *easily identified yet non-easy (and uneasy) to read and challenging to produce*. For example, in the first paragraph of their seminal work *Writing Science,* Halliday and Martin (1993) write: "Adults may choose to deny it, but children in school know very well that there is a 'language of science'. They may not be able to say how they know it; but when they are faced with a

wording such as “One model said that when a substance dissolves, the attraction between its particles becomes weaker”, they have no problem in recognizing it as the language of a chemistry book. And they tend to feel rather put off by it…” (p. 2). Cummins’ (1984) work with immigrants found that while it took only two years to master informal everyday language, what he categorized as Basic Interpersonal Communication Skills (BICS), it took immigrant learners up to seven years to attain Cognitive Academic Language Proficiency (CALP), i.e. the register needed to achieve academic and professional success. While learners need to master CALP to succeed academically, Bourdieu and Passeron (1994, p. 8) remind us that “academic language is no-one’s mother tongue”. Indeed, others have equated the language of chemistry to a foreign language (Brown & Ryoo, 2008). If academic language and discipline-specific discourse is no one’s mother tongue and akin to a foreign language, then it becomes obvious that it must be taught explicitly, alongside the complex discipline-specific concepts which are shaped through such discourse.

The importance of “mastering disciplinary discourse” cannot be overlooked. Students need disciplinary discourse at both the input and output end of instruction: When presented with new and complex discipline-specific concepts at the “input end of instruction”, students need to be taught how to use disciplinary discourse correctly, to organize and structure information into precise discipline-specific ways of reasoning about disciplinary knowledge. Subsequently, at the “output end of instruction”, be it when students are being examined in school or when they are aspiring employees at job interviews, they are expected to communicate discipline-specific knowledge through discipline-sanctioned language, i.e. disciplinary discourse.

Thus this COST Action. At the foundation of this COST Action is the belief that discipline-specific discourse is *sin qua non* of subject-instruction at two levels.

- Firstly, discipline-specific discourse is essential for properly organizing and thus learning and comprehending discipline-specific notions accurately.
- Secondly, since discipline-specific discourse is the preferred way subject-experts “language about” shared understandings, for school-leavers to enter and advance within their chosen professions, they need to master this way of communicating knowledge (Martin, 1993). Productive disciplinary-discourse must therefore be part and parcel of subject-instruction.

While some aforementioned discipline-pertinent literacies which are not based on textual production, such as drawing and designing an infographic, setting up and carrying out experiments, collecting and analysing data, etc., are also essential to “doing a discipline”, few would deny that the process of understanding how to achieve these non-textual outputs is nonetheless based on notions which are shaped and conceptualized through disciplinary discourse, i.e. “language and text”.

And who is best positioned to show students how to use disciplinary discourse to properly organize new discipline-specific information if not the subject-teacher? And who can teach students how to speak and write using chemistry-sanctioned language if not their chemistry teacher? Since such discipline-specific academic ways of using language is akin to a foreign language, much like learning a foreign language, we would do well to start sensitizing learners and teachers to this “language of schooling” (Schleppegrell, 2004; Lin, 2016) as soon as possible.

SECTION 1. GENERAL OBJECTIVES & REFINED SPECIFICATIONS

1.1. GENERAL OBJECTIVES

The question is, therefore, whether subject-teachers, across all age-groups, explicitly build students' academic and disciplinary language in ways which support learners' ability to organize information and subsequently communicate knowledge using age-appropriate academic and discipline-specific discourse. Work Group 3 (WG3) of this COST Action has consequently been tasked with delineating the "development of bi-and multilingual disciplinary literacies across educational levels". In particular:

> *"WG3 addresses developmental trajectories of learner groups, focusing on the transition across educational levels (primary-secondary-tertiary education). Especially the transition from primary to secondary school is a key moment in children's initiation into the abstract language of the disciplines. The issues arising in this transition may be even more acute if it involves changes in the language(s) of instruction. In addition to a lack of overview of existing data on learner production and the general paucity of longitudinal data, there is an absence of a shared meta-language for presenting learner production data." (MoU p. 18).*

To achieve this, the task of WG3 was to "[o]verview curricular demands regarding bi/multilingual disciplinary literacies in CLIL across educational levels (grades 4, 6, 10, 12) for Key Subjects" (MoU, p. 18), which are the subjects of History, Mathematics and Science (MoU, p. 9). More specifically, as "Detailed Survey 2" this Deliverable seeks to "[s]urvey curricular demands regarding bi/multilingual disciplinary literacies at diverse levels of education [by sampling] at least 3 ITC, 3 Non-ITC)" (MoU, p. 20). This objective is summarized in Table 2.

Table 2. Information expected from "Overview of curricular demands"

	ITC Countries			Non-ITC Countries		
	1	2	3	1	2	3
History						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						
Maths						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						
Science						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						

As will be explained in more detail below, we sought to gain an "overview of curricular demands regarding disciplinary literacies" from two complementary angles, i.e. a two-part survey. Part-1 of this two-part exploratory survey is a "survey of official curricular documents

for mentions of productive disciplinary literacies", while Part-2 is a "survey of teachers' expectations of students' productive disciplinary discourse". This Report represents Deliverable 7 of this Cost Action and presents the findings of both exploratory surveys which together answer the question: "What are the curricular demands of disciplinary literacies, longitudinally along different levels of schooling in both ITC and non-ITC countries, and across key school subjects?"

Once the COST Action launched, these General Objectives where further refined and specified in three ways through online as well as in-person meetings and collaborations, as described below.

1.2. REFINING SPECIFICATIONS

Specification 1. Two Survey Angles & Methods

Prior to the Action Launch meeting in Vienna (March 03-04, 2023), online meetings were held during which WG3 Members evaluated different strategies for achieving the objectives of WG3, i.e. delineating the curricular demands of DL along the educational grades and key subjects in at least three ITC countries and three non-ITC countries, as specified in the MoU. Through this bottom-up decisional process, WG3 Members agreed on two investigative survey methods to "overview curricular demands of bi/multilingual disciplinary literacies".

The first investigation would survey of how official curricular documents published by national or regional education boards delineated such "demands", i.e. *what do these official documents state regarding how schools and teachers might proceed to build their students' disciplinary literacy awareness and competency*.

- To answer this question, it was therefore necessary to develop a protocol for surveying curricular demands of disciplinary literacies. This "**Protocol for Surveying Curricular Demands of Disciplinary Literacy/ies**" is presented in Section 2 and Chapter 4.1 of the Appendix.
- Part-1 of the Survey was organized as "Task 1 of WG3" and represents the main survey that was undertaken by almost all members of WG3.
- Christiane Dalton-Puffer (AT) and Teresa Ting (IT) co-led WG3-TASK-1, with input from Rick de Graaf (NL).

A second method identified to "overview curricular demands of disciplinary literacies" was to simply ask teachers from the Key Subjects about the disciplinary literacy they themselves "demand and expect" from their students, considering their students' age and educational level. For those who have experience teaching subject-specific content, especially complex post-primary level subjects, the issue of "language" is often not of immediate and conscious concern for subject-specialists (Wellington & Osborne, 2001; Smit & Dafouz, 2012), let alone the notion of "disciplinary literacies". In fact, since "disciplinary discourse" is not well-understood by the general public and was actually being delineated by WG1 and due well after WG3 should start its survey, directly asking subject-teachers questions about "disciplinary literacies" risked the collection of responses, data and thus information which would not be founded upon a solid understanding of the notion being queried.

- As a consequence, it was necessary to develop a second survey protocol which, without asking teachers direct questions about their expectations of disciplinary literacies, would nonetheless make it possible to reveal the type of disciplinary literacy/ies subject specialists expect from their students. This "**Protocol for Surveying Teachers' Expectations of Disciplinary Literacy/ies"** is presented in Part 3 and Chapter 4.2 of the Appendix.
- Part-2 of the Survey was organized as "TASK-2 of WG3", and although it was not the main survey, it revealed interesting implications for teacher training that prepares teachers for building their students' academic and disciplinary literacy/ies.
- To understand teachers' "curricular demands and expectations" of disciplinary literacy/ies from their students, a guide was developed to code and analyse these teachers' texts for features of cognitive discourse functions (CDF). This "CDF-Based Coding & Analysis Guide" is also discussed in Part 3 and detailed in Chapter 4.3 of the Appendix.
- Silvia Minardi (IT) and Silvia Rieder-Marschallinger (AT) co-led WG3-TASK-2

Specification 2. Expanding the traditional definition of "CLIL"

During the first online meeting and subsequently at the in-person Action Launch Meeting in Vienna, it became apparent that the proposed objective which specifically regards "CLIL", i.e. to "overview curricular demands regarding bi/multilingual disciplinary literacies in CLIL across educational levels… for Key Subjects" (MoU, p. 18), needed to be reconsidered more deeply and expanded for two reasons.

Firstly, while most Member Countries had official processes in place regarding offering "CLIL" or "bilingual instruction", none had *specific curricular documentation* detailing what teaching of content through a foreign language entails. As such, it would have been impossible to survey any official curricula for "curricular demands regarding bi/multilingual disciplinary literacies in *CLIL*…". However, as discussed briefly in the Introduction, the learning of any content requires the integration of *content-specific concepts* with *content-specific language*, meaning that the learning of any and all "content", even in L1, is "Content and Language Integrated Learning", i.e. "CLIL" (Hüttner & Dalton-Puffer, 2024). This is the second reason for a deeper reconsideration of the acronym "CLIL", recognizing that, even in L1, "discipline-specific discourse" is akin to a "foreign language" (Brown & Ryoo, 2008), generating a centrifugal force (Halliday & Martin, 1993) for those who are not yet members of the disciplinary community of practice, simply because "academic language is no one's mother tongue" (Bourdieu & Passeron, 1994). WG3 thus decided to expand the traditional definition of CLIL from "the teaching of content through a named foreign language" to include "the teaching of content through foreign as well as academic, subject-specific L1".

In addition, WG3 Members agreed that it might also be interesting to ask the question, "do curricular documents which explicitly regard language instruction, such as L1-language and a foreign language, make explicit mentions and "demands" on how schooling and teachers should cultivate students' productive academic language skills?". Therefore, in addition to the "Key Subjects" of History, Maths and Science already mentioned in the MoU, WG3 Members also agreed to survey for curricular demands of disciplinary/academic literacy in

curricular documents addressing “L1-as-subject” and “First-FL-as-subject”. This is in line with the core aims of this Action:

> *The Action will engage experts in CLIL, in subject education and in language education, all from diverse geographical and educational sectors. (MoU, p.8)*

Specification 3. Additional Considerations

Members agreed that the grade levels which were originally proposed could be compacted into three main categories, corresponding to age ranges which are often associated with epistemological changes in content-complexity in subject instruction: primary (6-10 years of age), lower secondary (11-13 years of age) and upper secondary (14-18 years of age).

In addition, Members also agreed that it would be interesting to survey the demands and expectation that first year university teachers might have regarding their students’ disciplinary discourse and literacy/ies, which would be highly relevant to one of the aims of this Action:

> *To disseminate information on how to support the development of bi/multilingual disciplinary literacies in CLIL classes, to stakeholders. These are primarily academic and educational, i.e. school communities (teachers, pupils, heads of school, parents), educational authorities (ministries of education, school boards, policy makers, curricular agencies),* ***teacher education and development organisations (teacher education at university/college****, national and international teacher networks, European Centre for Modern Languages (ECML).* ***Post-secondary Stakeholders (further/higher education,*** *workplace), relevant members of industry (national and international publishers of educational materials) and the general public will also be addressed. (MoU, p. 7, emphasis added)*

Since most university course documentations and curricula are not comparable to pre-tertiary-level “official national/regional curricula”, this tertiary-level survey was only realized using the survey protocol of Task-2, involving courses that were highly specialized within the general subject of Science.

Finally, once Members started poring through their official curricular documents, it became apparent that while some curricular documents were very brief and accessible only online (e.g. Poland), some were tomes containing very dense and interesting “General / Introductory Sections”, which were highly informative and were therefore analysed as well. Table 3 illustrates how the original “overview of curricular demands” delineated in the MoU were expanded to include a survey of more categories.

Table 3. Expanding the survey of "Overview of curricular demands"

The original expectations regarding an "overview of curricular demands" (left) were expanded to include education-levels (e.g. university-level science) as well as school subjects (e.g. L1-instruction, first foreign language (usually "English as a FL")). These additional categories are indicated with a (*). Grade levels were modified to reflect common categories in curricular documents with a shared understanding that each category corresponded to age-ranges (see "key") which reflect general changes in epistemology.

	ITC Countries			Non-ITC Countries		
	1	2	3	1	2	3
History						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						
Maths						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						
Science						
• Grade 4						
• Grade 6						
• Grade 10						
• Grade 12						

	ITC Countries			Non-ITC Countries		
	1	2	3	1	2	3
History						
• Primary						
• Secondary lower						
• Secondary upper						
Maths						
• Primary						
• Secondary lower						
• Secondary upper						
Science						
• Primary						
• Secondary lower						
• Secondary upper						
• University*						
L1-Instruction*						
• Primary*						
• Secondary lower*						
• Secondary upper*						
Fist FL-Instruction*						
• Primary*						
• Secondary lower*						
• Secondary upper*						

Key:

- *Primary*: age ca. 6-10
- *Lower secondary*: age ca. 11-13
- *Upper secondary*: age ca. 14-18

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SECTION 2. CURRICULAR EXPECTATIONS OF DISCIPLINARY LITERACIES (TASK-1)

2.1. INTRODUCTION TO TASK-1

This task answers directly to the objective expressed in the MoU for WG3 to "[o]verview curricular demands regarding bi/multilingual disciplinary literacies in CLIL across educational levels (grades 4,6,10,12) for Key Subjects". As detailed in the introduction (Section 1 of this report), this objective is based on the facts that a) "the transition from primary to secondary school is a key moment in children's initiation into the abstract language of the disciplines", and b) "issues arising in this transition may be even more acute if it involves changes in the language", i.e. the use of a foreign language, as is the case in CLIL-instruction. The **key question pursued in TASK-1** was, therefore, the following:

> **Do National Curricular Documents alert teachers and educators to the "double-difficulty" of learning complex abstract content through a foreign language?**

To address this question, the most obvious procedure was to **review curricular documents** to see in how far they address "the abstract language of the disciplines" and to compare CLIL and non-CLIL curricular documents in this respect. What immediately became evident in all countries represented in WG3 is that, while our countries advocate for CLIL, there is no specific "National CLIL Curriculum" which explicitly addresses the specific challenges accompanying the process of "learning complex abstract concepts through a foreign language". The original proposal by the MoU with its focus on CLIL consequently evolved into a general "**[o]verview of curricular demands regarding disciplinary literacies** in educational levels (grades 4, 6, 10, 12) for **Key Subjects of History, Maths, Science, L1 and English** as a foreign language[1]". Part-1 of the two-part exploratory survey thus sought to understand **if and how national curricula guide classroom and subject teachers towards building students' "disciplinary literacy" across educational levels.**

In Section 2.2, we briefly describe the methodological and procedural cornerstones of the analysis; Section 2.3 first provides "at a glance" overview of the dataset generated through the survey; Section 2.4 presents the individual country reports; Section 2.5 concludes with a summary overview of insights gained through Part-1 of this two-part exploratory survey.

[1] The more general formulation "first foreign language" was considered, but English is the first foreign language in all countries involved.

2.2. METHODOLOGY

2.2.1. PROCESS DESIGN: SURVEYING CURRICULAR DOCUMENTS

Given the contingencies of a COST project structure, this exploration across national education systems (ITC and non-ITC countries) was conceived as a multiple case study. In concrete terms, WG3 Members from the following countries recruited colleagues from within and outside the action to form a national curriculum analysis team (ITC countries underlined)

Albania, Austria, Bosnia-Herzegovina, Croatia, Finland, Hungary, Italy, Kosovo, Lithuania, Poland, Slovakia, Spain-Basque Country, Spain-Comunidad de Madrid, The Netherlands, Turkey

The following steps were defined for the entire process:

1. Collect national curriculum texts for the key subjects History, Maths, Science, L1 and EFL at the key levels of “primary”, “lower secondary” and “upper secondary”. Where appropriate, general parts of national curricula were also included in the survey.
2. Translate curricular texts into English. This was carried out as a two-phase procedure of automatic translation (Google Translate, DeepL and/or ChatGPT) and manual editing.
3. Upload translated key subject curricula and original curricular texts on the WG3 cloud space.
4. Analyse individual curricular documents. This was done per subject curriculum by individual researchers applying the shared analysis instrument and template (both described below).
5. Mutually cross-check the individual analyses within your national team.
6. Survey and compare analyses across subjects and write a national report.
7. Send the draft report to a previously defined TASK-1 national team for review and feedback.
8. Finalize national report based on feedback.
9. Upload of national report on the WG3 cloud space.

Some of the national teams were able to carry out only steps 1-3, or 1-5. Eventually, the following national reports were received and appear as chapters in Section 2.4 (ITC countries underlined):

- Albania, Austria, Finland, Italy, Lithuania, Poland, Spain-Comunidad de Madrid, The Netherlands

The stipulation of the MoU to obtain analyses from 3 ITC and 3 non-ITC countries has thus been more than fulfilled.

2.2.2. *INSTRUMENTS OF ANALYSIS: CODEBOOK & SURVEY TEMPLATES*

The multiple case study on the national curricula was carried out by way of a document analysis, using a shared analysis tool. This tool was devised in an iterative process by a subgroup of WG3 Members, with Teresa Ting (IT) and Christiane Dalton-Puffer (AT) participating as members of this sub-group at all stages.

The analysis tool is based on the Action's working definition of Disciplinary Literacy (DL), as produced by WG1. At the time of designing the TASK-1 analysis tool, only a short working definition of DL was available. A full account has been published since (https://www.clilnetle.eu/output), with a slightly updated version of the original working definition to be found at the end of that document.

The Codebook consists of seven categories briefly summarized in Table 4 below. A full version with illustrative examples that was distributed to the national teams can be found in the Appendix, "TOOL-1". In brief, the coding scheme was used to ask the survey question "where in the official documents are there instances where *productive* disciplinary literacy/ies are mentioned?". Therefore, a phrase such as "students should *understand*-X" would not be considered an instance which mentions *productive* literacy skills, while a phrase such as "students should *be able to explain their understanding of X, using Y*" would be considered an instance where "the official curricular document prompts for *productive* disciplinary literacy/ies". As will be explained in Section 2.4, one way to help schools and teachers become more aware that discipline-specific discourse and literacy/ies are crucial for understanding disciplinary-notions accurately and for communicating discipline-specific knowledge in discipline-appropriate ways is to ensure that official curricular documents are worded to prompt for *productive* discipline-specific and academic discourse and literacy/ies rather than simply "demanding" for the acquisition of declarative knowledge.

Table 4. Main categories of the coding scheme used in TASK-1

Code	Meaning
CV	Command verbs (i.e. Cognitive Discourse Functions / CDFs)
GG	Genres and text-types
PL	Productive use of language (not CDFs or genres/text-types)
DD	Elements of digital literacy for learning or sharing knowledge
VV	Elements of visual literacy for learning or sharing knowledge
TT	Subject-specific realia required for undertaking subject-specific hands-on actions
OTH	Anything else relevant to (subject-specific) communication not covered by the above categories

Therefore, each mention of productive disciplinary and academic literacy/ies was "tagged". Tagging was performed by marking relevant stretches of curriculum text and adding two-letter codes in brackets after the marked text. Additionally, the marked text was colour-coded according to the colour scheme indicated in Table 4.

In order to obtain a common format for the analysed documents, a "Survey Template" of preformatted boxes was used to collect stretches of curriculum text that have been tagged according to the codebook. It also includes separate spaces for observations and reflections

by the analysers. Similar comments are often implemented in the “memo”-function of qualitative data analysis software.

While it would of course have been preferable to implement the analysis on a shared software platform such as MaxQDA or Atlas.ti, the TASK-1 team had to decide against it for practical reasons. Neither the software licensing costs nor the person-hours involved would have been coverable under the COST project philosophy. That said, since TASK-1 called upon researchers to systematically tag “instances of productive displays of discipline-specific literacy/ies” by highlighting such instances (phrases or words) using specified colours and then adding specific tagging-codes, it obliged researchers to delve very deeply into their national curricula. Alongside the survey template which asked researchers to immediately note their reflections on texts they had just surveyed, we believe that the tools we developed to deal with “lack of software” actually resulted in researchers becoming deeply engaged with their official curricular documents. In fact, as will be evident in many of the National Reports in the next section, many Teams found TASK-1 challenging but informative, prompting them to consider how their curricular documents might be rehauled, reorganized, or rewritten so to draw teachers’ attention to the need to explicitly teach students the language and literacy skills school leavers need to seamlessly enter and pursue their chosen professions.

2.3. RESULTS TASK-1: DATA AT A GLANCE

A total corpus of more than 404,300 words of text were surveyed by the eight National/Regional Teams of Albania (AL), Austria (AT), Finland (FI), Italy (IT), Lithuania (LT), The Netherlands (NL), Poland (PL), and Spain-Madrid (ES-M). Detailed National/Regional Reports are found in Section 2.4. This Section intends to overview the profile of the dataset that was analysed in this exploratory survey by grade level, by school subject, and also by national/regional context. To start, Table 5 overviews the curricula analysed in terms of subject areas in three ITC countries and five non-ITC countries/regions.

Table 5. Survey of subjects covered in curriculum analysis

NOTE: (*) ITC Countries; more detailed information on exact subjects, age levels and details of education systems can be found in the respective Country Reports in the respective chapters in Section 2.4.

Subjects / *Countries*	MATH	SCIENCE	HISTORY & social science	L1	First FL	GENERAL PART
*Albania**		x	x			
Austria	x	x	x	x	x	x
Finland		x	x	x		x
Italy	x	x	x	x	x	x
*Lithuania**	x	x	x	x	x	
*Poland**		x	x			
Spain-Madrid		x				
The Netherlands	x	x	x	x	x	

Note that in Figures 3-8 below, “Spain” indicates the “Madrid Region”. See the national reports in Section 2.4 for details regarding which parts of curricular documents were surveyed, the L1-curricula which were surveyed, which subjects were included in “Science”, etc. As explained earlier, the survey was carried out on English translations of curricular documents. Except for the Finnish curriculum, which was available in English, all other bodies of texts represent the translation work of the respective national/regional teams.

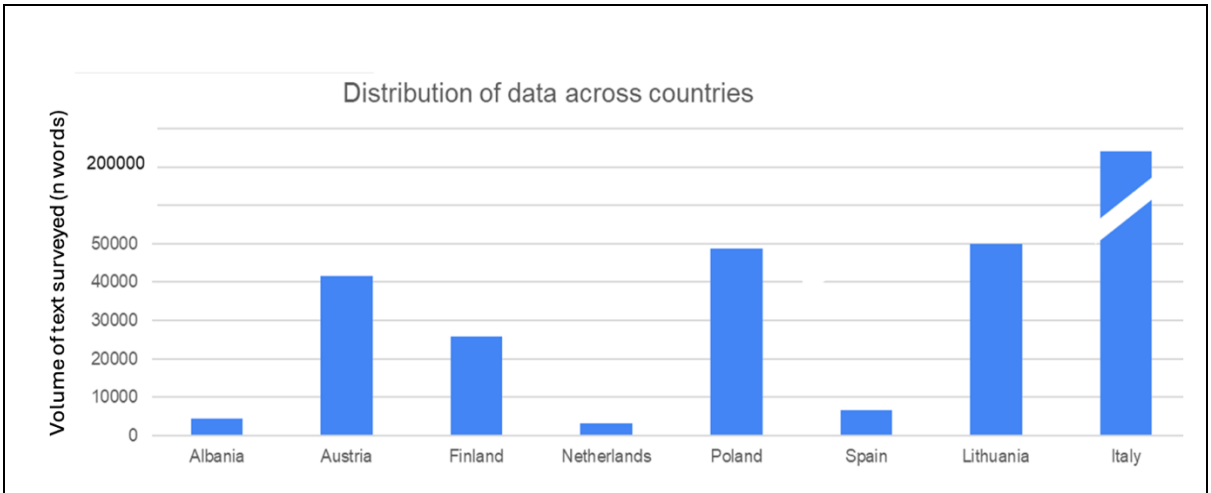


Figure 3. Volume of text each team surveyed for mentions of productive DL

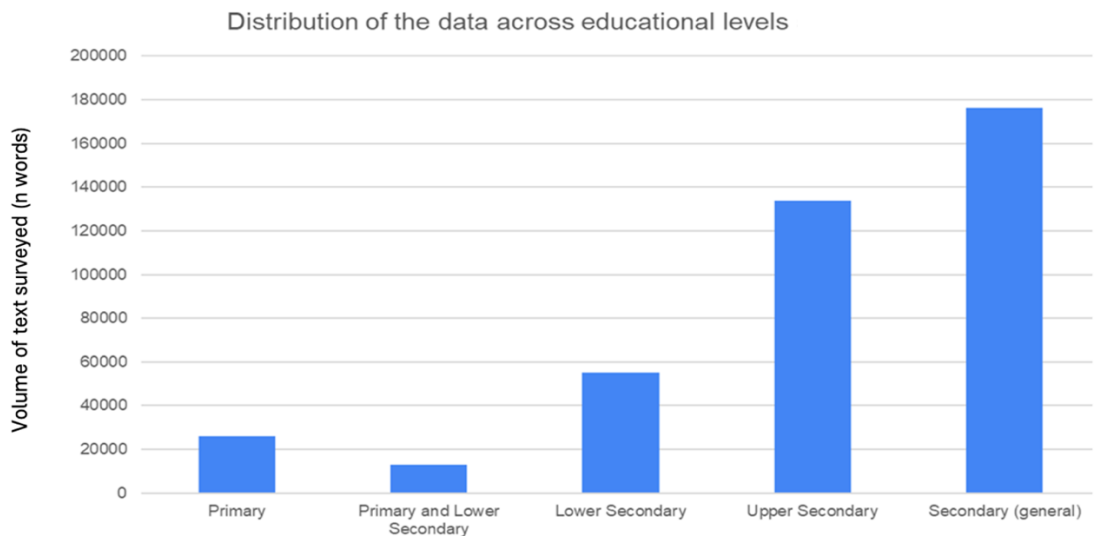


Figure 4.Total volume of text surveyed per education-level

NOTE: As explained in *Section 1.2, "Specification 3",* the labels of "primary", "lower secondary" and "upper secondary" corresponded to certain age-ranges (6-10, 11-13 and 14-18, respectively) which, however, did not correlate with some national classifications or the organisation of certain curricular documents (e.g., in Lithuania, "secondary" is 11-18, while in Finland "primary and lower secondary" ranges from 7-15 and the Italy "primary and lower secondary curriculum" is a single document for learners in the age-range 6-13. In all cases, details can be found in respective National/Regional Reports in Section 2.4.

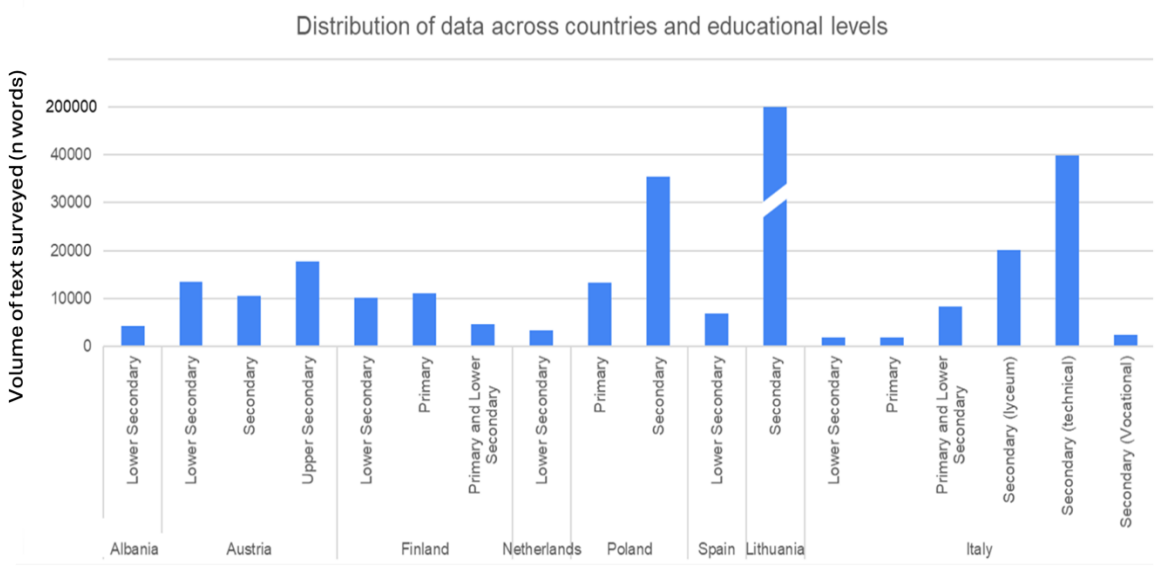


Figure 5. Total volume of texts surveyed by each team, per education-level

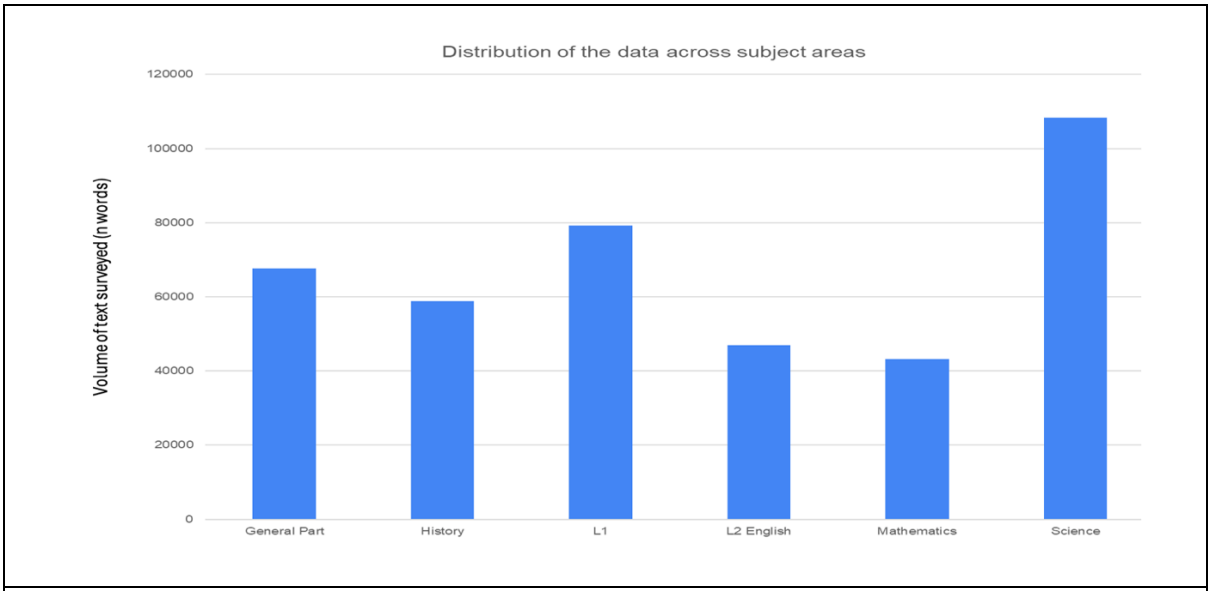


Figure 6. Total volume of text surveyed per subject area

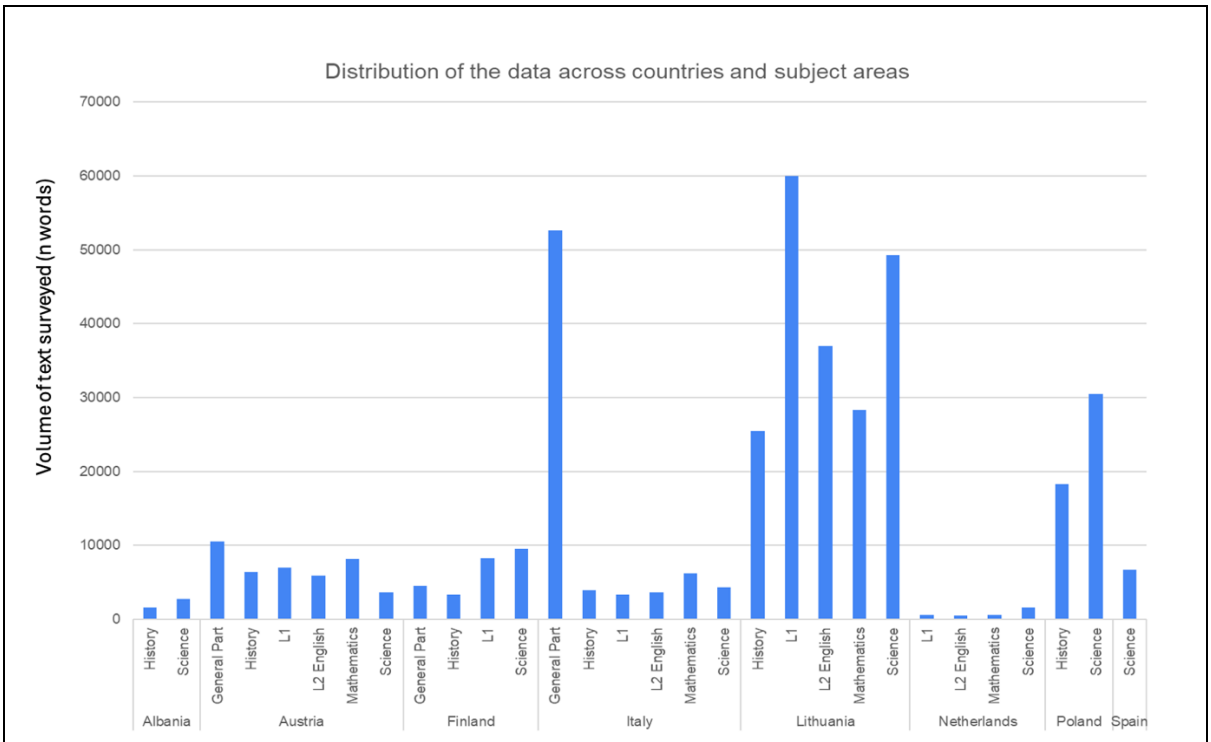


Figure 7. Volume of text surveyed by each team per subject-area

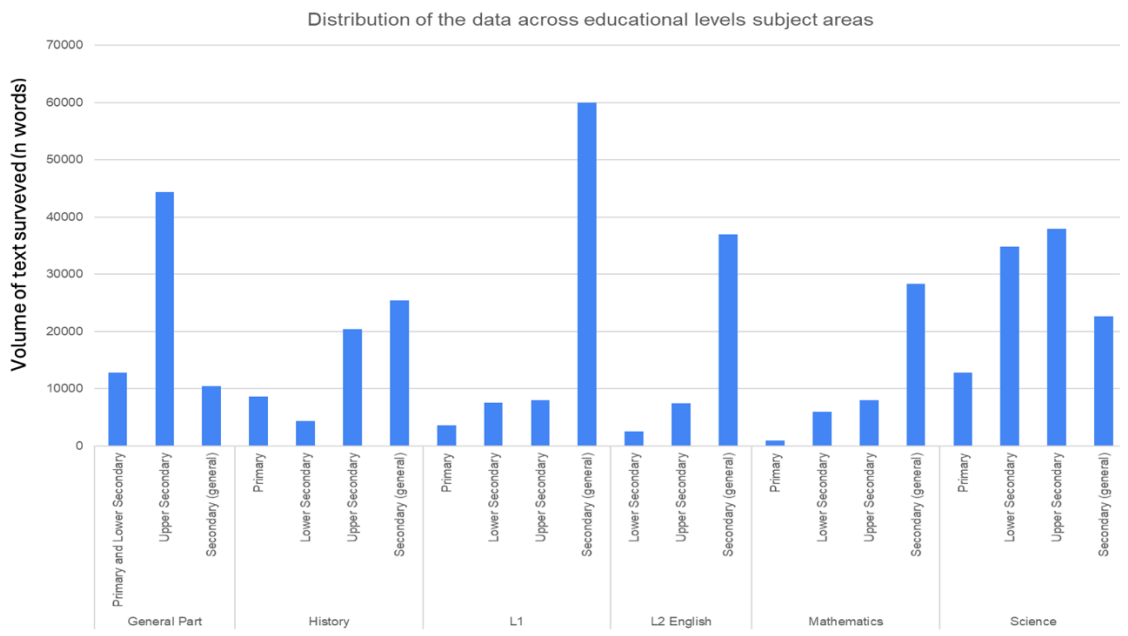


Figure 8. Volume of text surveyed as a function of subject-area per education-level

Table 6. Total words per subject, per education level

NOTE that the total word count here includes the EN-language text of the FI curriculum, accounting for the difference in word count reported in the Executive Summary

Subject/Level	Total word count of corpus surveyed
General Part	
Primary and Lower Secondary	12778
Upper Secondary	44408
Secondary (general)	10500
History	
Primary	8650
Lower Secondary	4359
Upper Secondary	20408
Secondary (general)	25453
L1	
Primary	3665
Lower Secondary	7592
Upper Secondary	7973
Secondary (general)	60013
L2 English	
Lower Secondary	2517
Upper Secondary	7465
Secondary (general)	36973
Mathematics	
Primary	950
Lower Secondary	5979
Upper Secondary	7994
Secondary (general)	28327
Science	
Primary	12827
Lower Secondary	34798
Upper Secondary	38004
Secondary (general)	22704
Grand Total	**404337**

2.4. SURVEY OF CURRICULAR DOCUMENTS: NATIONAL/REGION REPORTS

This Section presents the survey results obtained by the eight National Teams which had undertaken TASK-1, using the Codebook to survey curricular documents of their education system. These "National/Regional Reports" are organized in alphabetical order of country name.

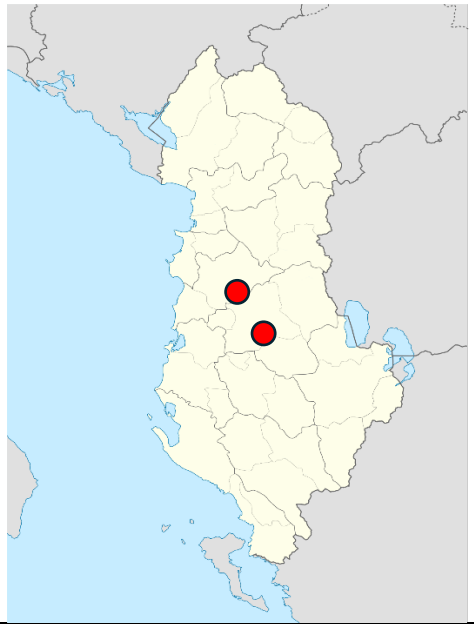
NOTE on page numbers: These eight chapters are inserted within the body of Deliverable-7 proper. As such, the page-numbering of the document pertaining to the Deliverable *proper* continue with "*page*/D7" while those of the respective National/Regional Reports are coded accordingly, e.g. page 5 of the Albanian Report is numbered "5/AL". This organisation allows national teams to continue their pursuit of interesting issues which have emerged through this exploratory survey and subsequently update their chapters. To access the survey of each country, click on the range of pages indicated. After these National/Regional Reports, readers will return to the page which follows this one, within the Deliverable *proper*.

Albanian National Report

1. Team & Process

The two members of the Albanian National Curriculum Analysis Team is shown in Table 1.

Table 1. The Albanian National Curriculum Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse	
*Merita Hoxha. University of Elbasan "Aleksandër Xhuvani"	EFL specialist interested in methods of teaching and learning languages and Disciplinary Literacies	
Gerda Sula. University of Tirana	Learning theories, interested in integrated and inclusive modalities for improving learning	

*ALBANIA National Curriculum TEAM LEADER

The Albanian-TEAM was coordinated by Merita Hoxha. The division of labour was agreed in a joint meeting between the group members. Merita Hoxha was in charge of collecting L1 and EN versions of lower secondary history and lower secondary biology curricula as well as the chosen parts of the general section and their initial analysis. The translation from Albanian to English was done by Merita Hoxha and Gerda Sula using Google Translate and checked by both researchers. The report is also produced by the collaboration of both researchers.

The team decided which parts of the curriculum of History and Biology was most important to focus on and decided that it was worth focusing on the connection between key competences and subject specific competences. While coding, the researchers met online to agree on problematic cases, outline joint decisions and to agree on the division of labour in checking the coding for each curriculum.

2. National School System

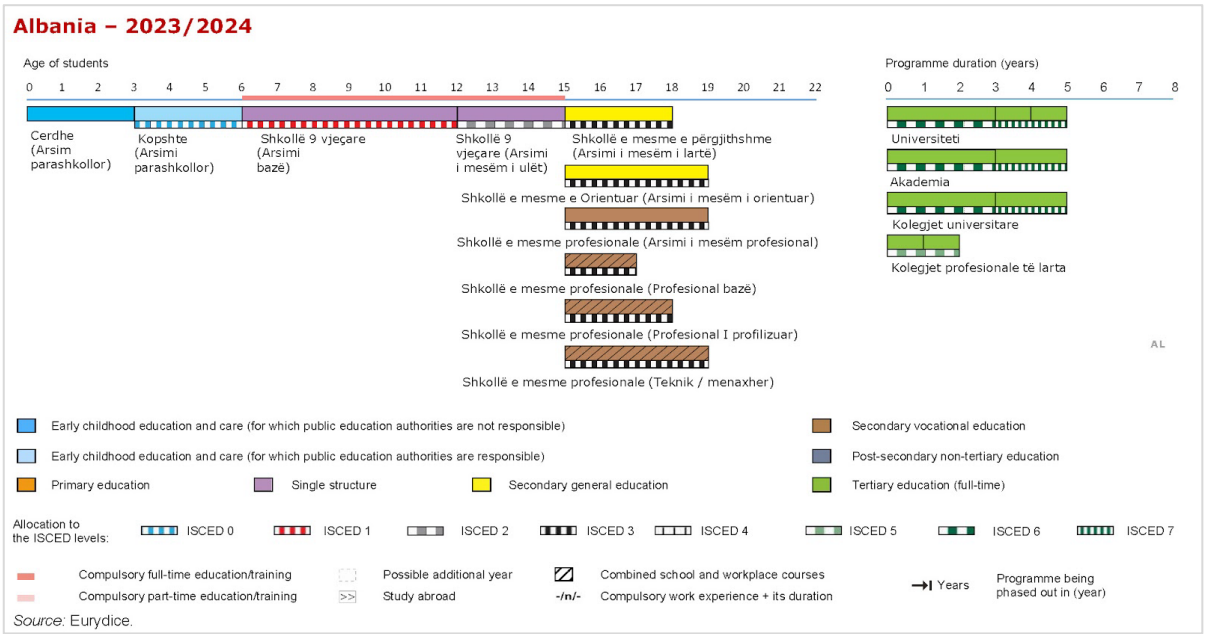


Figure 1. Albanian education system. Source: www.Eurydice.eacea.ec.europa.eu

Obligatory education age in Albania is from 6 to 16 years old. It includes basic education and lower secondary education. Classification of education level in Albania is done based on codes 0,1,2,3 in reference to the "International Standards of education" approved by UNESCO General Conference in 1997. Based on this classification the following education forms can be distinguished in regard to pre-university education.

- **Pre school education [Arsimi parashkollor]** starts from 0 to 6 years old in the Albanian education system. It is not obligatory. Institutions offering pre-school education are creches [çerdhet] and kindergartens [Kopshtet]. Creches are governed by the Municipalities and serve children 0 to 3 years old. Kindergartens are attended by children 3 to 6 years old and are co-dependent by the Ministry of Education, Sports and Youth and the Municipalities. Kindergartens can be half board and full board and organize their activities based on programmes developed by the Ministry. Preprimary education is not compulsory, even though many efforts are being made to turn it so.
- **Basic education [Arsimi Bazë]** starts at the age of 6 and ends at the age of 16 years old and is compulsory. It is composed by two cycles:
    - **primary cycle [Arsimi fillor**] coded with 1 and is composed of five classes (classes I-IV) and
    - **lower secondary education [Arsimi i mesëm i ulët]** composed of four classes (classes VI-IX). The pupils that are 16 years old but did not complete primary education can complete it in part-time schools. Basic education for pupils with limited abilities is organized in a) special schools (very few, and mostly serve as resource centers), b) special classes within mainstream schools or c) integrated in mainstream classes, supported by ancillary teachers.
- **Upper secondary education [Arsimi i mesëm i lartë]** is optional and starts at the age of 16 years old. Higher secondary education in Albania is composed by:
    - **General Upper Secondary education [Gjimnazet].** This type of higher secondary education lasts for three years and is composed of three classes. Pupils that are 23 years old but did not complete this type of education can follow it on a part-time basis.
    - **Vocational High school [Shkollat e Mesme Profesionale]** has a duration of two to four years. It is structured at three levels based on the Albanian National Qualification Framework.

- **Oriented Education Schools [Shkolla të arsimit të orientuar]** include art schools, sport schools, foreign languages schools and schools oriented in other education areas. Admission in these institutions is done based on specific criteria set by specific Decision of Council of Ministers.

All types of higher secondary education mentioned above are completed once the State Matura Exam is finished (the same for all forms of education). Matura exams include three common subjects namely Albanian Language and Literature, Math and one foreign language. They also include subjects by choice which are defined by guidance of the Minister of Education. Organization and development of national state matura exams are regulated by guidance of the Minister.

Higher Education

Students who have successfully completed secondary education are eligible for higher education in Albania.

Higher Education Institutions

Higher education in Albania is offered by following higher education institutions- University, academy and higher institutes. There are public as well as private higher education institutions in Albania.

University (Universitet): These are autonomous universities. In Albania, universities offer a wide range of courses at undergraduate and postgraduate levels.

Higher institute (institut i lartë): The higher institutes/non-university higher schools provide programmes up to master's level.

Academy (akademi): Academies offer programmes up to doctorate level.

Higher Education Qualifications

Higher education institutions in Albania provide undergraduate as well as postgraduate study programmes.

- Bachelor degree last for 3 to 4 years
- Master's degree last for 1-2 years
- Quaternary education/doctorate (doktorate) last for 3 years

There are also programmes that last for 1 to 3 years leading to Specialization Certificate (Dëshmi Specializimi)

All levels of education are public and private. A great number of private pre-university institutions apply CLIL methodology. The CLIL language in these institutions is generally English. However, there are a few public high schools in Albania which apply CLIL methodology and the CLIL languages are French, German and Italian, facilitated through bilateral agreements with the respective governments. The public interest in CLIL methodology has been growing in the recent years. Foreign languages are used as languages of instruction in bilingual high school sections, and at their meeting with the Council of Europe experts, representatives of parents' organizations expressed a strong interest in the expansion of CLIL in schools generally (Language Education Policy Profile 2015-2017, Albania). This is emphasized by empirical data gathered by Albanian researchers who also point out the importance of applying CLIL methodology based on alumni students' perceptions (Hoxha and Bejtja, 2024), on teachers' perceptions (Sula, Zahaj, and Hoxha, 2024), (Sula & Hoxha, 2024), and teachers and students' perspective (Çekrezi, 2011).

There are two institutions in charge of education policies in Albania. The first is the Agency for Quality Assurance in Pre-university Education in Albania which collaborates strongly with the second institution, the Ministry of Education and Sports. The Ministry of Education and Sports is responsible for the education policy while the Agency for Quality Assurance in Pre-university Education is responsible for implementing the policy. The Agency for Quality Assurance in Pre-university Education has 4 directories, one of which is the Directory of Curriculum and Qualifications, which among others:

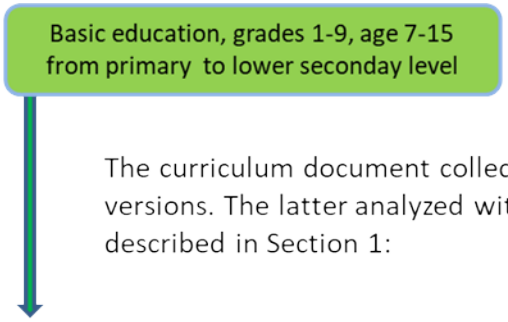
- analyzes, develops, and reviews important documents such as curriculum frameworks, subject programs, and standards according to curriculum fields;
- drafts and publishes curriculum documents for pre-university education, as well as supporting materials for the implementation of the curriculum at the national level;
- drafts subject programs for all cycles (preschool education and grades 1-12);
- drafts and publishes curriculum guides and supporting materials for the implementation of the curriculum at the national level

These two institutions form the core institutions for the curriculum design and implementation in Albania.

To know more about the Albanian education system, read the post "Albania Education Overview".

3. This Survey

Figure 2 illustrates which Albanian curricular documents were collected in L1 and EN versions; the latter were analysed with the coding system described in Section 1 of the whole report. In the Albanian context, the team provided the translation for the curricular documents published by the Albanian Agency for Quality Assurance in Pre-university Education into English by using Google Translate and then double checked by both researchers.



Lower secondary (grade 9)	General parts
History Biology	Selection containing sections of transversal competences and guidelines for developing the school culture

Figure 2. selection of curriculum documents analysed

Original L1 Documents can be found in (LINK TO FOLDER). The English versions of these documents, originally published by the Albanian National Agency for Education, can be found in (LINK TO FOLDER) and the surveyed documents can be found in (LINK TO FOLDER).

The selection of subjects for our sub-study was based on the focus of the MoU of CA21114 which is History, Maths and Science. For this reason, we decided to focus on the analysis of History and Biology for grade 9, lower secondary as this would also allow us to compare between different subjects of the same level. Even within the documents (History curriculum and Biology Curriculum), we focused only on the parts which would provide more input for our analysis, that were mostly related to students' competences on that specific subject, especially the parts of the curriculum which focus on relation between subject competences and key competences. In the analysis document the number of pages analysed is given for each document, but both researchers have agreed that a more in-depth analysis should be considered.

Other subjects were excluded from the analysis due to the focus of the COST Action and time limit the team had for completing the task. However, it is possible to later add more subjects if necessary for the comparative analyses carried out in the COST Action.

The current Biology curriculum derives from 2017 and the History curriculum from 2019. The main difference between these curricula and the previous one is that now the curriculum focuses on competences and learning outcomes rather than objectives. The curriculum has not been renewed ever since, but considering that the usual cycle for renewing the entire curriculum in most countries is around 10 years, we are hoping that the new version of the curriculum would have more emphasis in the disciplinary literacy elements as well as the language expected by the students to achieve academic proficiency in all subjects.

4. Survey results: Data, analysis, findings & reflections,

Overall, the findings show that disciplinary literacies are implicitly and explicitly present in the curricula of History and Biology, grade 9 lower secondary. Given the shared decision in WG3 to focus on *productive disciplinary literacies,* furthermore, means that those aspects of curricular text that relate to understanding/perceiving the importance of the particular ways in which subjects convey knowledge are not accounted for in the analysis unless they are accompanied with elements that relate to production-based engagement with the content. In other words, disciplinary literacies may quite often be *implicated* but not framed in terms of productive aspects beyond the coded occurrences.

Figure 3 below provides the overall number of coded instances of productive disciplinary literacies across the Albanian curriculum texts. Two subjects were analysed, and as the table shows, the overall number of different code types is rather similar. The differences rather lie in the distribution of "types" of disciplinary literacies.
As we can observe from the Figure 3, the differences of productive disciplinary mentions between subjects are not considerable. The most common ways in which the curriculum texts point to productive disciplinary literacy is through references to students' ability to perform verbal actions based on thinking skills, such as *explain, identify, give arguments, and evaluate* (coded as CV) which were the most commonly used. As per students' productive use of language for showing learning (coded as PL) the most frequently used forms were: *communicate, present, discuss, debate*. What occurred clearly less frequently were references to digital literacy elements (DD) which were generally found in Digital competence especially in Biology (see figure 5) but which were not mentioned in any competences including Digital competence in History (see figure 4). Elements of subject-specific realia (TT), extracting information from visual elements (VV) and different genre types (GG) were mentioned less frequently also in both subjects. Closer interpretation of these is needed.

	CV	GG	PL	DD	VV	TT	OTH
History	*53*	5	24	6	6	9	0
Biology	*43*	11	15	13	10	9	5
TOTAL	*96*	16	39	18	16	18	5

Figure 3. Coded instances of productive disciplinary literacies according to subjects.

As already mentioned, the team decided to focus more on the analysis of the parts of the curricula which focuses on the relation between subject competences and key competences. The Albanian curricula emphasize 7 key competences:

1. Communication and expression competence
2. Thinking competence
3. Learning competence
4. Competence for life, entrepreneurship and environment
5. Personal competence
6. Civic competence
7. Digital competence

The team decided to focus on analysing the mentions of productive disciplinary literacy in relation to key and subject competences based on the following arguments:

1. Communication and Expression Competence

- **Specific Language Use**: Disciplinary literacy requires understanding and using the specific language and forms of communication relevant to a particular field, whether it's scientific terminology, historical discourse, or mathematical symbols.
- **Effective Expression**: Mastery of disciplinary literacy enhances a student's ability to express complex ideas clearly and accurately within that discipline, contributing to overall communication and expression competence.

2. Thinking Competence

- **Critical and Analytical Thinking**: Disciplinary literacy fosters critical and analytical thinking skills. It requires students to interpret, analyze, and evaluate information specific to a discipline, which aligns with broader thinking competences.
- **Problem-Solving**: Engaging deeply with disciplinary texts and problems helps students develop problem-solving skills that are essential for thinking competence.

3. Learning Competence

- **Metacognitive Skills**: Disciplinary literacy promotes metacognitive skills, as students need to be aware of and regulate their understanding of discipline-specific content and strategies.
- **Independent Learning**: The ability to navigate and comprehend complex texts independently within a discipline enhances overall learning competence, making students more effective and autonomous learners.

4. Competence for Life, Entrepreneurship, and Environment

- **Practical Application**: Disciplinary literacy equips students with the ability to apply academic knowledge to real-world contexts, essential for life competences and entrepreneurship.
- **Informed Decision-Making**: Understanding environmental science, for example, requires disciplinary literacy in scientific texts and data, which is crucial for making informed decisions about environmental issues.

5. Personal Competence

- **Self-Discipline and Responsibility**: Mastery of disciplinary literacy often requires self-discipline and responsibility, as students need to manage complex reading and writing tasks.
- **Personal Growth**: Engaging deeply with specific subjects can contribute to personal growth and self-awareness, aspects of personal competence.

6. Civic Competence

- **Understanding Civic Issues**: Disciplinary literacy in social sciences or history, for example, enables students to understand civic issues, historical contexts, and political theories, enhancing civic competence.

- **Informed Participation**: Effective communication within a discipline helps students articulate their viewpoints and participate in civic discussions and debates.

7. Digital Competence

- **Navigating Digital Information**: Disciplinary literacy includes the ability to effectively use digital tools and resources specific to a discipline, such as scientific databases, digital archives, or online journals.
- **Digital Communication**: Competence in digital communication within a discipline is crucial, whether it's through writing emails, reports, or participating in online discussions relevant to the field.

Figure 4 and 5 below include data regarding the mentions of productive disciplinary literacy for each specific competence, for each subject.

Competences	*CV*	GG	PL	DD	VV	TT	OTH
Communication	*3*	2	4	0	0	0	0
Thinking	*5*	0	1	0	3	0	0
Learning	*5*	0	3	0	0	0	0
Comp for life	*2*	0	1	0	0	0	1
Personal	*1*	0	1	0	0	0	0
Civic	*8*	0	0	0	0	0	0
Digital	*3*	0	4	0	0	0	0

Figure 4. Coded instances of productive disciplinary literacies according to key competences for History, grade 9.

What we can observe from the figure above is that the focus is mostly on command verbs and somehow on productive use of language, and there are no mentions of digital literacy elements (DD) and subject-specific realia (TT). What might also get the attention is data from the Civic competence. While Civic competence can be perceived as "*Civic competence is a combination of knowledge, skills, attitudes and values that enable a person to perform real-world tasks such as active civic engagement including skills of communication, problem solving, critical and creative reflection, decision making, responsibility, respect for other values*", we identified only Command Verbs in this section which might raise the question: *how can students develop Civic Competence without the productive use of language, subject-sepcific realia, genre types, etc.?*

The same analysis is done for Biology, grade 9. The results are almost very similar to those found in History, grade 9.

Competences	*CV*	GG	PL	DD	VV	TT	OTH
Communication	*2*	4	8	1	0	0	1
Thinking	*14*	4	2	0	0	0	0
Learning	*8*	0	1	1	1	1	0
Comp for life	*1*	1	2	2	1	0	2
Personal	*10*	2	1	0	0	0	0
Civic	*2*	0	0	0	0	0	0
Digital	*2*	0	0	9	2	0	1

Figure 5. Coded instances of productive disciplinary literacies according to key competences for Biology, grade 9.

Although we can identify mentions of productive disciplinary literacy elements regarding all categories (genre types, digital literacy, subject-specific realia, etc.) again command verbs occur more frequently. One reflection regarding Civic competence is that there are only 2 mentions of productive literacy elements,

command verbs. Again, many questions can raise based on the data from figure 5 and it is important to address the low frequency of productive literacy mentions especially when it comes to competences.

What we found interesting during the analysis is that there were frequent mentions of productive disciplinary literacy elements in the part of History curriculum which is dedicated to the connection between History and 5 other fields of study: Languages and Communication, Society and Environment, Mathematics, Technology and IT, and Natural sciences. Not only did we notice that all types of disciplinary literacy elements are mentioned in this part of the curriculum, but also the ratio between the total number of words and the mentions of disciplinary literacy elements is notably high.

For example:

1. The connection between History and Language and Communication (pg. 15 Al_ENCURR)

The student:

- *interprets (CV) texts and different forms of communication, including historical ones;*
- *expresses opinions (PL), reasons, discusses (PL), argues (CV) and makes argumentative debates (PL) with historical themes;*
- *selects (CV) the appropriate historical information in the text;*
- *uses spelling rules for writing a historical material;*
- *distinguishes (CV) different literary genres: diary (GG), memoir (GG) and historical novel (GG);*
- *uses literary-artistic works (TT) as a source of historical information;*
- *uses Albanian folklore (TT) as a historical source;*
- *uses the work of the revivalists to evaluate (CV) the role they played in the history of Albania.*

Despite the fact that the task was interesting and valuable, some challenges were faced during its completion and it also sparked numerous questions and prompted extensive reflection. The coding process involved some challenges that had to do, for example, with the fact that it was not always straightforward to differentiate between different categories provided in the coding key. Agreement was reached by shared discussion between the researchers and joint decisions. The Finnish team reports that we are aware that in other country teams decisions might have been taken differently - cross-country joint reflection is therefore, needed as an important step for refining the coding instrument. The Albanian team agrees with this statement and admits that the collaboration among countries will definitely improve the quality of our work and of those researchers who might be willing to use the instrument for further studies. We also consider that this is not the only limitation of our study. The limited time we had for the study allowed us to focus only on two subjects, History and Biology for grade 9, lower secondary. The results of this study do not necessarily reflect all the other subjects, of all study programmes. Finally, the fact that we focused only on explicit mentions of disciplinary literacy elements in these two subjects, does not mean that there are no implicit mentions which we do consider of high relevance too.

In the next session of this report the researchers have expressed some reflections on the task including many questions. One common question that emerged during the process was**: "***Does the National Curriculum draw teachers' attention to the need to build their students' academic language/ disciplinary literacies as an essential parallel process accompanying content-learning?*"

Whatever is being taught or learned, it would be impossible to effectively be achieved if language was not used. The National Curriculum implicitly and explicitly poses on the importance of languages while learning

content subjects such as Biology in this case. In the translated version of this part of the curriculum, the word "languages" is mentioned 19 times some of which are found below:

- *explains clearly and accurately, orally or in writing, the meaning of new terms (words, concepts)* ***using appropriate language and vocabulary****;* (Pg 13)
- *correctly express an opinion or request, orally or in writing,* ***in the native or foreign language****, for a situation designated (for guidance, assistance, information, orientation, etc.) interacting in a group or in a classroom;* (Pg.13)
- *In order to analyze and evaluate the results during the study of phenomena and laws in the natural sciences,* ***the student must develop communication skills and use the language and terminology of science correctly****;* (Pg. 24)
- *If the student reads, writes or expresses his thoughts fluently about scientific information on the universe, subjects, air pollutants, water, he correctly d****evelops the competence of communication in the Albanian language****,* (Pg. 24)
- *In addition, in presenting explanations or clarifying his/her solutions, he/she will* ***be aware of the importance of correct use of language and terminology*** *in science and technology.* (Pg. 12)

As we can observe from the examples, the curriculum emphasizes the importance of language, including foreign languages in order to achieve academic proficiency in any subject and this might be considered an important stepping stone which needs to be taken into consideration when the Agency for Quality Assurance for Pre-university Education decides to renew the existing curricula not only in the subjects analyzed in this report, but in all subjects accross levels.

5. Researchers' reflections on the task.

Considering the long experience in teaching and the research interest in EFL, and the methods of teaching and learning, working with the national curriculum was not a new task. What was new in fact was the focus on disciplinary literacies and how the curriculum of History and Biology for grade 9, lower secondary, suggests the development of disciplinary literacies. The detailed analysis on command verbs, students' productive use of language, genre types, digital literacy elements, subject specific realia and visual elements, made me reflect on what the curricula offers and how it helps the academic achievements of students. Another interesting reflection regards the instrument we used to analyse the curricula, the CDF table, which was not just a simple instrument but a thought provoking one, encouraging discussion and reflection between team members on how the curricula can improve to meet students' needs as well as the standards of other European countries.
Considering the limited amount of time, we had for this task and its complexity, I think it should only be considered as the beginning of a more in-depth analysis of the Albanian curriculum across levels and subjects which might later be presented to representatives of the Agency for Quality Assurance at the Pre-university Education in the form of a report including recommendations. The reports produced by representatives of other countries who undertook this task in this COST Action, will serve as examples for recommendations the Albanian team can suggest to the Agency for Quality Assurance at the Pre-university Education. (Merita Hoxha)

I was in charge of training masters' students studying in teaching English as a foreign language at the University of Tirana, and working closely with them in understanding the task. Once students produced the first drafts, the documents were discussed in our team and the most qualitative ones (lower secondary history and biology) were analyzed and improved following the approved-upon format. The exercise was really important for the future students. 121 students participated in the exercise. The students had never before been exposed to CLIL concepts, so this exercise was very useful to them. It is a great opportunity to continue using the standardized format, which is now much more user-friendly with the students of the following years, as students' feedback was very positive and they found it very useful to learn and reflect upon using CLIL in their teaching (Gerda Sula).

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1. Team & Process

The five members of the Austrian National Curriculum Analysis Team are shown in Table 1.

Table 1. The Austrian National Curriculum Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse
Tatjana **Bacovsky-Novak** University of Vienna	PhD researcher on lesson planning in CLIL in engineering and technology at secondary level; qualified EFL and Psychology/Philosophy teacher
Christiane **Dalton-Puffer*** University of Vienna	Long-term interest in CLIL and disciplinary literacy in additional languages; university professor in English linguistics
Silvia **Rieder-Marschallinger** Kirchliche Pädagogische Hochschule Wien-Krems	Post-doc researcher and teacher educator; expertise in design-based interventions supporting disciplinary literacies; qualified history and EFL teacher
Ute **Smit** University of Vienna	EMI specialist, English in tertiary education; English as a Lingua Franca; university professor in English linguistics; qualified mathematics & EFL teacher
Sarah **Wirnsperger** University of Vienna	MA student in teacher education (English/ Digital Humanities) Student co-researcher at Department of English

*AUSTRIA National Curriculum TEAM LEADER

The AT-TEAM was coordinated by Christiane Dalton-Puffer (CDP). Sarah Wirnsperger located the latest curriculum documents and carried out the translations (using DeepL and subsequent human editing). The other team members including CDP divided up the analysis of subject curricula according to their personal expertise and availability and agreed on cross-checks by another team member.

2. Austrian National School System

Figure 1 is a schematic illustration of how the Austrian school system is organized from preschool to tertiary-level instruction.

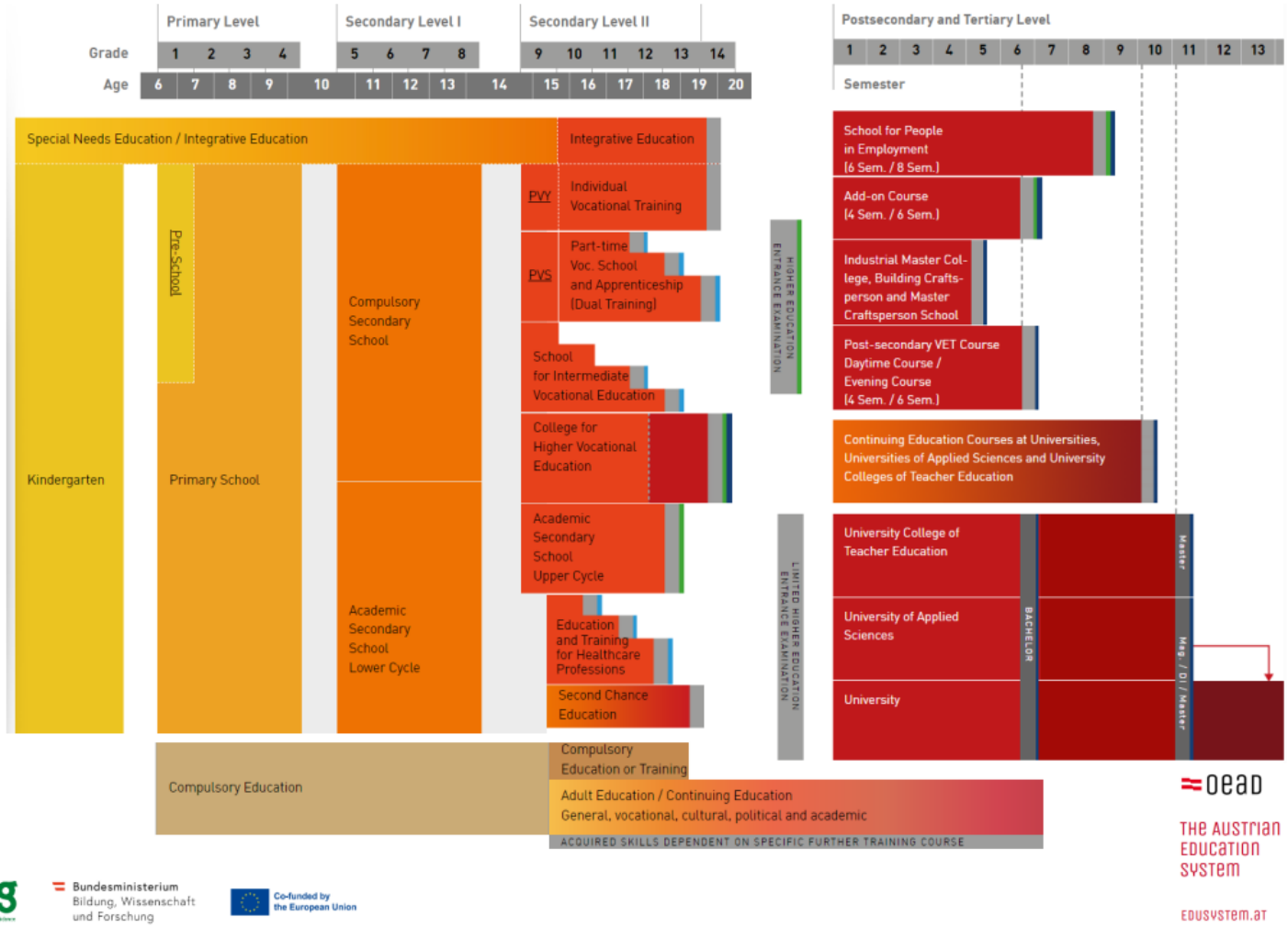


Figure AT 2.1. Organization of the Austrian school system

- Compulsory formal education starts at age 5 when children have to join half-day Kindergarten provision one year before entering school.
- Primary level “Volksschule” starts at age 6. This is the only phase where the Austrian education system is comprehensive, there being only one school type which everyone between the ages of 6 and 10 attends.
- At age 10 the system bifurcates into two options: general middle school (Mittelschule) and academic school (Gymnasium). Gymnasium, the academic track, then runs through until age 18 unless pupils switch to a vocational form of upper secondary education.
- In rural areas where the next academic school is relatively far away, the majority of 10 year-olds attend middle school, many then moving on to upper secondary academic or vocational at age 14/15. There are two assessment levels in this school-type for the core subjects German L1, Mathematics and EFL, namely Standard and Standard-AHS.

- Gymnasium. Unlike in many other countries, this academic school type runs all the way through from grade 5-12. The national school leaving exam (Matura) at age 18 gives school-leavers the right to attend university. In urban areas, the majority of pupils of any age-cohort attends lower secondary Gymnasium, turning the Gymnasium into a weakly selective comprehensive school and urban middle schools effectively into reception schools for recent immigrants with low levels of German.
- Dual track vocational school. This is for young people learning a craft or a trade via an apprenticeship. One day at school per week or blocked over 6 weeks/year. There is also a track which additionally leads to university entrance qualification.
- Vocational Schools: These upper secondary schools come in two durations: 3 years (until age 17) or 5 (until age 19). The five-year version provides university access on top of formal professional qualifications. Offered in large numbers of different specialisations from agriculture, via business studies to mechanical engineering and environmental technology.

3. The Austrian Survey

Figure 2 illustrates which Austrian curricular documents were translated into English and surveyed for mentions of *productive* disciplinary literacies, as described in Chapter 1 of this technical report.

Subjects	**Lower Secondary (Middle School & Gymnasium)**	**Upper Secondary (Gymnasium)**
General Curriculum	x	x
Biology	x	x
History	x	x
Maths	x	x
German L1	x	x
English Foreign Language	x	x

Figure AT 3.1: Austrian curriculum documents translated into English and surveyed

Original L1 Documents can be found in (LINK TO FOLDER), the English translation of these documents can be found in (LINK TO FOLDER) and the surveyed documents can be found in (LINK TO FOLDER).

The **lower secondary curriculum** is very recent, having come into effect at the beginning of the 2023/24 schoolyear, starting with grade level 5. Thus, all lower secondary schools will fully implement the new curriculum by 2026/27. Contrary to earlier generations of curricula, where lower secondary "Gymnasium" had a separate curriculum document (published jointly with upper secondary "Gymnasium"), all lower secondary schools will now follow the same curriculum.
The foundations of the **upper secondary curriculum for Gymnasium** date back to 1985. However, the curricula of individual subjects, as well as the General Part have been in continuous overhaul reflected in almost annual alterations and amendments (see Austrian Legal Information System: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10008568)

The **general part** of the national curriculum was analyzed because of its significance in terms of cross-curricular educational goals (such as academic language development) and pedagogical principles.

The **selection of the subjects** to analyse was predefined by WG3-internal agreements for the set-up of the curriculum survey task. The only slight Austrian divergence, as it were, concerns "science", as this is not one

subject but three (physics, chemistry, biology) in Austrian secondary schools. Biology was selected as the only of the three science subjects which is taught at every grade level across school types. This means that the five subjects mentioned in Table 2 were surveyed across grades 5-8 at lower secondary and grades 9-12 at upper secondary. No curricula of upper secondary vocational schools were analysed because of the large number of specialisations and, hence, large number of individual curricula.

Section 4. Survey Results: Data, analysis, findings & reflections

Our survey of the Austrian results will start out discussing the general part of the curriculum, as this covers both levels of secondary education. We then proceed subject by subject, differentiating between lower and upper if and when the curricula show discussion-worthy differences. A further element of the analysis has been to take a comparative look at the different components of the DL construct and how much or how little they figure in the Austrian curricula analysed. The Austrian report will conclude with reflections and recommendations.

4.1. Analysis per subject

The general part

The curriculum states the overall legal mandate of the general secondary education to be (among other things) to "contribute to the education of young people by supporting them in the acquisition of knowledge and the development of competences" (p.2), a statement that can be interpreted as a very general indication of a potential role of language in this undertaking; an interpretation that is underscored by the **topicalization of language at four key points** in the General Curriculum:

- Firstly, the text mentions "the 4C model" (no source given), as an overarching conceptualisation for the goal-setting within the curriculum. One of its four C's is Communication (in addition to Collaboration, Creativity and Critical Thinking).
- Secondly, *Language and Communication Education* is presented as one of five general educational areas that form the frame of reference for the contributions of the individual subjects. This particular educational area is described as follows:

> Language and communication education
> The ability to express, think, communicate and act is highly dependent on language skills. In every subject, pupils must be enabled to utilise and expand their cognitive, emotional, social and creative capacities with and through language - e.g. also in the form of figurative language. (p.3)

Interestingly, language also surfaces in connection with another educational area, namely *Creativity and Design Education* where it is stipulated that "expressing thoughts and feelings verbally and non-verbally is an essential part of human life" (p.4).

- Thirdly, one of the eight **General Didactic Principles** (p.8-10) is entitled **"Language-sensitive subject teaching takes place in all subjects" (Principle 7)**. We quote the description here in full as it encapsulates many aspects of Disciplinary Literacy. In addition, Digital Literacy has its own Didactic Principle.

> Educational language skills are an essential prerequisite for success at school, for later opportunities on the labour market and for participation in political, economic, cultural and social life. Pupils must be able to use specialised language, express thoughts and ideas, ask questions, name, depict and describe objects (CV) as well as grasp, justify, argue (CV) and interpret facts. In addition to subject-specific knowledge, educational language skills are necessary for these language activities. These are taught gradually, age-appropriately and continuously in all subjects and across all school levels and types. Language-sensitive teaching serves to develop skills in everyday, educational and specialised language. Pupils become aware of the different registers of a language and can use them appropriately for the situation.

> Teachers actively support the learning of subject-specific vocabulary or the specialised language of the subject matter. Lessons create language-stimulating situations and offer pupils the opportunity to try out and practise language in an appreciative environment. Teachers themselves act as language role models, pay attention to the way they express themselves and use various methods and task formats to implement language-sensitive subject teaching. (p.10).

- Fourthly and finally, when the general curriculum turns to its **thirteen "overarching themes"** that need to be addressed by all subjects in order develop transversal competences in the pupils, there is **theme 10 "Language education and reading"**. Once again the key role of language in the educational process is highlighted and the need for teachers to have a "language conscious attitude" is stated. Reading is highlighted as a key to access knowledge but also to other sign systems (visual literacy) apart from writing.

In sum then, The General Part of the Austrian Curriculum for secondary schools definitely draws educators' attention to the role of language in education, based on some strong claims and principles. Because of the historically layered nature of the document, however, no strong coherent concept is visible. Themes and principles have been added at different points in time reflecting the conceptualisations and key ideas of the day. The vital question will be, however, in how far these principles are really taken up in the individual subject curricula.

Biology

The **lower secondary biology** curriculum rests on a 4-part competence model. We find it remarkable that one of the components is "Justify points of view and act reflectively (S)", putting a lot of emphasis on reasoning in the subject of biology (*explain, evaluate, justify* in CDF-terms). In fact, also another one of the three competences subsumes language via "communicating knowledge". As can be expected from this configuration of the overall biology competence model, the skill-descriptions elaborating the competence areas feature a series of language behaviours, most of them pertaining to the CDF-construct. A couple of other more general productive language use behaviours are mentioned as well. However, non-verbal modes of subject-specific communication get relatively short-shrift with just one mention of visual elements of subject literacy (p.2) and one of Digital DL (p.1), tool-based or realia-based DL aspects are not mentioned at all (although use of tools is presumably implied when experiments are mentioned).

The curriculum does not specify which of these active communicating behaviours are to be mastered in the oral and/or written mode. No exemplifications are given for concrete genres or speech events that would require learners to apply the science-communication competences they are presumably acquiring through their biology education. The progression of students' DL competences via the 4 lower-sec years is captured via a statement saying that the increasing complexity of areas of application will take care of making DL competences more complex over the years. We are not convinced of that.

Our bottom line for the lower-secondary curriculum: it contains promising basics for attention to language in biology learning and assessment but does not concretize them.

The **upper secondary years** rely much on the same biology competence model as the lower years, the main differences between the two curricula being the topics to be covered. When sub-competences are spelled out (p.171-172), it becomes obvious that in actual fact many of them are grounded in language/literacy behaviours, such as justifying standpoints in social discourse (CV), explain biological processes and phenomena (CV), describe biological processes and phenomena. (CV), formulate hypotheses about biological processes and phenomena (CV); comparing (CV), interpreting (CV), justify positions (CV), *a*rgue in a technically correct and consistent manner (CV), evaluate facts and problems (CV).
Several mentions are made of "participation in social discourse" on the basis of the biology knowledge acquired. However, this is not concretized in terms of which (language) behaviours would count as such participation. There is no mention of genres or language functions in this connection, but the upper secondary curriculum does mention some potential contexts or even genres where "participation in social discourse"

could be realized: “nature conservation strategies, health concepts, nutrition plans, (GG)” (p.172). Upper-secondary also mentions speaking and writing abilities once. Interestingly these are not positioned as something that prepares one for “participation in social discourses” at large, but as something that prepares students for the school-leaving Matura exam.

In sum, the Austrian biology curriculum does cast verbal communication in a surprisingly central role via giving it much prominence in its 3-part Competence Model and also via including language behaviours (mostly via CDFs) in many of the skills descriptions that are based on the model. In that sense building disciplinary literacies is not only a parallel process accompanying content-learning but an integral part of it. This we find quite remarkable. However, zero guidance is given to teachers in terms of how they might bring about those language behaviours.

History

In the Austrian school system, ‘history’ is conceived of as a subject cluster of history, social sciences and political education.

The **lower secondary history** curriculum is very learner- and competency-centred, e.g., by using a great number of command verbs in certain parts of the curriculum or by structuring the content according to competences. However, it does not point out the importance – or even just the role – of language for that. This issue is sometimes aggravated by the use of very dense nominalized phrases, obscuring the roles of learners when engaging with a topic or what verbalizations should be involved at this stage (e.g., “critical work with sources”). This seems to be a missed opportunity. For each grade, however, the curriculum lists a number of can-do statements, which does make up for this somewhat. Here, there’s usually a cognitive command verb or another action verb entailing productive language use that shows what learners need to do (and thus verbalize) – often in combination with different media (visuals (VV), different text types (GG), digital media (DD)).

This curriculum nicely outlines what the different subject-specific competences entail in terms of subject-specific procedures, which concepts need to be considered when teaching history or political education, or which topic areas need to be included. It also lists a great number of cognitive operations and learning objectives, but it never once mentions that doing these things needs a very specific type of language and that it would be the teacher’s job to help learners verbalize their disciplinary skills. Moreover, because of its heavy use of abstract concepts and nominalized phrases, it obscures somewhat

- what learners should really do with the long list of content areas,
- what some of the set learning objectives really involve,
- and what type of language this involves.

It is quite possible that this could lead to insecurity among teachers (and consequently among learners who prepare for exams etc.). Despite being very current (published 2023) - and despite the rise of language-aware teaching also outside the CLIL context - this document again misses the opportunity to draw content teachers’ attention to the role of language for teaching their subject.

The **upper secondary history** curriculum does relate to many aspects of disciplinary literacies, if only at certain points and often only at the surface level. For example, it highlights that language and language reflection contribute to general areas of education (see General Part of the national curriculum) and how this crystalizes in this particular subject cluster (p. 150). Moreover, it suggests a differentiation based on a system of command verbs pertaining to different levels of cognitive complexity. However, the curriculum never explains what that would mean in concrete terms. It also never mentions explicitly that it would be the teacher’s responsibility to teach learners how to apply historical or political skills linguistically. A good place for that would be the “didactic principles” section. However, this section - and many other parts, and even some of the competences to be taught - focus clearly on passive familiarization with and understanding of conceptual knowledge. What is more, despite providing ample space for central subject-specific concepts and considerations, the curriculum does not discuss how subject-specific genres or media-types should be included. This is only implied in some of the learning objectives, where the granularity is not clear either (e.g.,

should learners conduct complete historical deconstructions or build up complete historical narratives, i.e., develop genre-specific skills, or is it enough to work on the level of individual functions without putting them together?).

To conclude, while this curriculum implicitly expects learners to apply disciplinary skills using language, it is not very clear concerning the extent or the ways teachers need to consider that in their teaching.

Mathematics

The **lower secondary mathematics** curriculum is based on a competence model involving four core processes for "doing mathematics":

- Modelling & Problem Solving,
- Operating & Calculating,
- Representing & interpreting,
- Assuming & Justifying.

The process-descriptions mention visual, symbolic, textual and verbal resources they involve. In its didactic principles the curriculum foregrounds reasoning, explaining and arguing as central to developing mathematical understanding, but also explicitly mentions digital literacy elements as well as mathematical realia: e.g. *spreadsheet programmes, dynamic geometry software, interactive exercises, calculators and graphic calculators* (p.3). Visual literacy elements are foregrounded in the description of many competence/content areas to be covered at each of the four grade levels: *axially symmetrical figures, use of different forms of representation, crosstables, diagrams, (p.4—15).* Digital technology is mentioned in support of certain competence areas (p.10-11, p.15).

Throughout most of its sections the curriculum combines references to language with references to other semiotic modes. In other words, this curriculum understands mathematical competences as requiring multimodal productive skills and does not allow for a clear distinction between 'language' and other semiotic modes.

The **upper secondary mathematics** curriculum has only been partially coded in view of its very extensive module descriptions which are all similar in character. Our analysis consists of the curriculum's general part and the specific competence modules for Grade 11, as this is the focal upper secondary grade for our analysis. (i.e. module description for Grades 9, 10 and 12 were NOT coded).

The general parts of the curriculum – although rather short – specify student multimodal practices quite extensively, referring to CV, VV, TT, GG and VV. For example, the Action Dimension of the curriculum's mathematical competence model prominently includes multimodal meaning making amongst experts and laypeople; the text refers explicitly to "activities that have to do with the translation of mathematical representations, relationships and facts into everyday language (PL OR GG) as well as the interpretation and documentation of results (PL OR VV)" (p. 166) but also "*Critical-argumentative work"* (p.166) including arguing, questioning, exploring boundaries and justifying. It is partially difficult to draw clear lines between CV, PL, VV and GG.
In those parts of the curriculum where the content of the so-called competence-modules is described, (e.g. p.169), competences are mainly mathematical, reflected in the predominantly mathematical semiotic modes learners need to use, e.g. solve, calculate or 'describe' by calculation. Also, the only mention of 'Define' does not entail a linguistic definition but the appropriate calculation. Generally, the module-specific competence descriptors, are rather thin and underspecified. There is very little reference to anything else but mathematical content. This stands in clear contrast to the Austrian mathematics curriculum of the lower secondary grades where the literacy elements get much more attention throughout.

German as L1

The **lower secondary German L1** curriculum aims at "introducing pupils to literary and oral culture and practice by teaching them the basic skills of communicating, reading and writing and to develop comprehensive language skills" (p.1.). In this endeavor the curriculum mentions not only different types of verbal texts ("literary and pragmatic"), p.1) but also other media formats and the "multimodal world of signs" (p.1)

As is presumably the case in all subjects that are skills-based (such as languages, mathematics, sports, or art), the German L1 curriculum encapsulates a tension between declarative and procedural knowledge. While the opening statement of the whole curriculum declares that "Language is both a medium and an object in German lessons" (p.1.), the main focus throughout the remaining sections of the curriculum seems to be on the procedural, i.e. the medium. Five pairs of central concepts are established (Standard and Change, Content and Form, Diversity and Identity, Mediality and Modality, Aesthetics and Pragmatics) which need to be understood, reflected upon, evaluated etc., all of which should eventually "help pupils to develop into self-determined, critical and diversely educated personalities" (p.2). Thus, while the curriculum often mentions the pupils' desired ability to reflect, analyse, compare, or discuss literary and other texts, there is no indication of which linguistic/literary concepts and terminology pupils would need to learn in order to enable them to talk about texts and uses of language. The curriculum conveys only a very weak sense of there being such a thing as disciplinary literacy with regard to Language Studies. There is also no indication of how the teachers are supposed to bring about these abilities in the pupils. In sum, the German L1 curriculum embraces a conception of literacy as something generic rather than subject-specific. The dimension of transfer to pupils' work in other subjects is never even alluded to and thus left entirely to the pupils themselves.

Interestingly, the transversal nature of literacy is mentioned directly on the first page of the **upper secondary German L1** curriculum, with the blunt statement that "The German lessons are to be seen as linked to the other subjects. They should secure and expand the linguistic means so that the pupils can communicate appropriately about factual topics, about relationships and about language" (p.116). A similar statement opens the presentation of the Didactic Principles: "The diverse tasks of language suggest meaningful contexts of action for German lessons. In doing so, they challenge students to work in interdisciplinary and interdisciplinary subjects" (p.117). Productive language ability is related to the production of a wide range of genres from private, public, journalistic life, especially summaries, letters to the editor, discussions (p.118) but also to write text types that support the learning process (p.118) as well as oral presentations of information. However, the learning goals of the subject German L1 are chiefly couched in terms of non-linguistic states and non-linguistic actions such as recognize, understand, reflect, grasp, open up tensions, problematize etc. The only concrete linguistic action called for is "describe" (pp. 121-125).

German is referred to as "object of investigation" as well as "specialist content and methods" – beyond that there is no indication that specialist language or DL for German Studies is an issue. That is to say linguistics, literary and media studies are not treated as full subject areas with their own terminology etc. similar to other subjects.

English as a Foreign Language

The Austrian national curriculum does not feature individual curricula for different modern foreign languages but bundles them in joint documents on "First foreign language" and "Second foreign language" respectively. Since, in practice, English **is** the first foreign language for around 95% of pupils, we are here analyzing the first foreign language curriculum. Across all school levels, the CEFR and Companion Volume (2018) form the basis of the competence model for teaching modern foreign languages in the Austrian education system.

At **lower secondary level** curriculum goals are to "develop communicative competence [….] to communicate in the foreign language in everyday life and at work […]" (p.1). Thus, listening, speaking, reading and writing skills should "enable access to and the exchange of knowledge, experiences and information" via the possibility to "independently grasp and understand simple foreign language factual and everyday texts" (p.1) reaching CEFR level A2+/B1 in grade 8. The curriculum clearly aims for students to develop some awareness of a large number of different text types (…) and aims at adequate command of productive language skills via repeated mentions of generic productive language use such as "speaking coherently and writing" (p.2), or "have short conversations", "give simple information" (p.4). On the other hand, digital and visual literacy skills are definitely sidelined in this curriculum.
The development of disciplinary literacies skills (or their foundations that could be transferred to content subjects) does not seem to be a primary aim of the curriculum for lower secondary foreign language teaching. This becomes evident in the relatively infrequent references made to verbal actions based in thinking skills. Those that are present often pertaining to less complex thinking skills. No mention is made of disciplinary aspects of the study of language itself.

The curriculum for **upper secondary** level **foreign language learning** introduces progressively more challenging language skills, with students in the higher grades being expected to grasp more complex meanings and have command of more elaborate language functions (B2 by the end of grade 12). Many of the genre-related goals pertain to the students being able to *produce* very specific text types. This might need to be reevaluated in the light of recent developments in AI text production tools, especially considering that digital literacy skills receive almost no mention in this curriculum. Visual literacy skills are not mentioned at all, which also seems like a missed chance in view of the extent of young people's visual media consumption. It is explicitly stated in the first sections of the curriculum that the language and communication skills should also form the basis for similar literacy achievements in content subject disciplines. However, no concrete ideas for how this can be achieved are present in the text. The foreign language teaching curriculum does not specify any particular content areas that need to be covered. This is true also of the study of "language and literature" which are not given any attention as content or knowledge areas.

4.2 Components of disciplinary literacy across subjects and levels

This section looks at the curricula mostly through a quantitative lens and seeks to answer the question which aspects of DL are mentioned by Austrian curriculum authors to what extent across subjects and age levels. As specified in section 2.3 of this technical report, the analytical framework for the curriculum analysis was designed following the specifications of the Action's WG1's Definition of DL. The analysis tool's seven components are listed in Table AT 4.2.1 (see page 10). The table shows the absolute and weighted frequencies of all mentions of DL in the curriculum documents that were analysed. Word-counts of the curriculum documents (or the parts that were analysed) are also included in the table.
As can be gleaned especially from the weighted frequencies, the different subject curricula differ widely in the extent to which they include references to disciplinary literacy. The general mean value of 23.9 mentions/1000 words of curriculum text is not really informative in this respect as there is considerable dispersion. The content subject with the most explicit reference to DL is definitely history, at both educational levels (59.5/1000w in lower, 45/1000w in upper). The general mean is also upped by the frequent mentions of DL aspects in the EFL curriculum. EFL is actually the subject curriculum which has the highest values, even higher than history. One might be inclined to think that this is not surprising for a language subject, after all, linguistic competences are the core of language curricula. A look at the curriculum for German (L1), however, demonstrates that this is by no means a matter of course. In fact, the weighted frequencies in the German (L1) curriculum are among the lowest across subjects for both lower and upper secondary.

Table AT 4.2.1: Quantitative analysis of DL elements in different curricula

Subject	Age	Words	absolute or weighted	Command Verbs (CV/PV)	Genre or text types (GG)	Productive Language (PL)	Digital Literacy (DD)	Visual literacy (VV)	Subject-specific Realia (TT)	All Else (OTH)	Sum across aspects
Biology and Environmental Education	10-14*	1689	a	9	0	5	1	1	0	0	16
			w	5.3		2.9	0.6	0.6			9.5
	15-18**	1968	a	27	3	12	0	4	0	0	46
			w	13.7	1.5	6		2			23.4
History and Political Education	10-14*	2823	a	67	26	22	20	29	4	0	168
			w	23.7	9.2	7.8	7	10.2	1.4		59.5
	15-18**	3540	a	34	38	24	15	31	9	8	159
			w	9.6	10.7	6.8	4.2	8.7	2.5	2.2	45
Mathematics	10-14*	4407	a	28	4	18	4	35	0	0	89
			w	6.3	0.9	4	0.9	7.9			20.2
	15-18**	3714	a	6	5	9	2	7	2	0	31
			w	1.6	1.3	2.4	0.5	1.9	0.5		8.3
First Language German	10-14*	2400	a	3	10	8	0	1	0	9	31
			w	1.5	4.1	3.3		0.4		3.8	12.9
	15-18**	4600	a	7	4	3	0	0	0	9	23
			w	1.5	0.9	0.7				1.9	5
English as a Foreign Language	10-14*	2044	a	9	56	56	3	2	0	13	139
			w	4.4	27.4	27.4	1.5	1		6.3	68
	15-18**	3868	a	57	72	120	8	0	0	16	273
			w	14.7	18.6	31	2			4.1	70.5
General Part	10-18	10500	a	6	0	0	3	3	0	6	18
			w	0.5			0.28	0.28		0.5	1.71
TOTALS	**10-18**	**41553**	absolute	**253**	**218**	**277**	**56**	**113**	**15**	**61**	**993**
			weighted	**6.1**	**5.2**	**6.6**	**1.3**	**2.7**	**0.4**	**1.4**	**23.9**
				CV	**GG**	**PL**	**DD**	**VV**	**TT**	**OTH**	**ALL**

*LS = lower secondary (both school types); **US = upper secondary academic (AHS)

Given the fact that the lower secondary curricula for all subjects are the most recent ones, one might have expected a relative rise in DL visibility. In fact, there are no discernible trends for mentions to become more from lower to upper or vice versa.

With regard to the different components of DL, Realia and Digital literacy are mentioned least often. **Realia** actually appear only in History and Mathematics. **Digital literacy** is mentioned in all subjects except German L1, though not very often as can be read from the 1.3 average/1000 words. **Visual literacy** gets mentioned twice as often and is featured across all subjects except for upper secondary German L1 and EFL. The most visual literacy prone subjects are History and lower secondary Mathematics. There is a general trend for visual literacy to be (relatively) more prominent at the lower level.
Almost equal in weight are the three categories involving "use of language", that is to say literacy in a more traditional and more narrow sense. Mentions of different textual genres are particularly frequent in History and EFL by a wide margin; in this category it was not always possible to discern active production of genres from their recognition and evaluation. The command verbs based on the CDF-Construct (Dalton-Puffer 2013), on the other hand do refer to active uses of language to categorize, evaluate, explain causes, define

(etc.) aspects of subject knowledge. They are spread over most of the subjects at all levels, with the notable exception of German L1. The largest category, “Productive Use of Language”, encompasses the less specific functional labels such as “being able to communicate in a wider social context”.

Table AT 4.2.2: Summary per DL component

TOTALS secondary education 10-18		Words of curriculum text analysed: 41,553
a	w	
253	6.1	Command Verbs (CV/PV)
218	5.2	Genre or text types (GG)
277	6.6	Productive use of Language (PL)
56	1.3	Digital Literacy (DD)
113	2.7	Visual literacy (VV)
15	0.4	Subject-specific Realia (TT)
61	1.4	All Else (OTH)
993	23.9	**Total DL mentions**

In sum, it can be said that each subject curriculum for each educational level is a world onto itself, as it were. This is explained by the fact that each of the subject curricula has been authored by different groups of specialists and practitioners, thus reflecting the disciplinary traditions of said subjects as well as the specific conceptualisations of subject competences represented among the authoring group.

4.3 Possible implications or recommendations

As pointed out at the end of the last section, the Austrian secondary curriculum is a compendium combining the work of a large number of subject-specific working groups. While the most recent curriculum, the one for lower secondary, seems to have been authored following a guideline concerning the length of the individual parts, and is thus more concentrated and easier to grasp in its entirety, no attempt has apparently been made to impose a common ground on the conceptual level.

Some of this common ground is established in the general part of the National Curriculum (see section with this title above) but the historically layered nature of this document makes it impossible to discern a unified concept with regard to literacy education. There is none, even though literacy is addressed at several points in the document. At the end of the section on the General part we asked the question of how the individual subject curricula would take up these binding general principles. As has already become evident from our analysis above, they do not do this to any significant extent.

It is true that schematic cross-references are made in each of the subject curricula to the Eight General Didactic Principles of the general part (two of them being digital education and language education), as this is a stipulation of the National Curriculum as a whole. However, these references are stated in a very summary fashion (CITE Example) and specifications as to what these principles mean in the context of the individual subject are missing. It looks as if the assumption were that subject teachers have deep knowledge and awareness of the language requirements of their subject and so can smoothly implement the principles of language education in their pedagogical actions without any guidelines being formulated in their subject’s curriculum. Teacher education programmes in Austria pursue a similar strategy, as they may (but not all of them do) include some general input on language in education. It is almost as if the General Part of the

curriculum were mirrored in the teacher education programmes, but the subject specific PCK, pedagogical training etc. do not systematically address the role of language for the learning of specific subject A/B/C.

Thus, a rehaul of the Austrian national curriculum would need to take place in order to inscribe the Eight General Didactic Principles (Principle 7: “Language-sensitive subject teaching takes place in all subjects”; Principle 2: “Teachers offer digitally enhanced instruction and use innovative teaching methods”) into each subject curriculum. Such concretization and explicitness would be necessary in order to make an implementation of language-sensitive subject teaching more likely. If language and more generally literacy-sensitive teaching were made explicit and linked to subject specific learning goals in each of the subject-curricula, the officially commissioned teaching materials and textbooks would have to adapt and adopt explicit literacy elements.

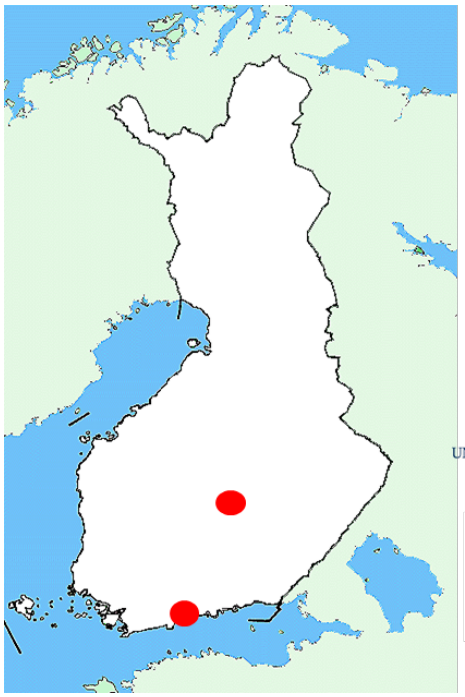
Finland National Report

1. Team & Process

The five members of the Finnish National Curriculum Analysis Team is shown in Table 1.

Table 1. The Finnish National Curriculum Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse
Tarja **Nikula***, University of Jyväskylä	Language Specialist: expertise in conceptualising integration in CLIL and subject-specific aspects of language use in classrooms.
Sari **Sulkunen**, University of Jyväskylä	L1 Specialist: expertise in disciplinary literacies and in adolescent and adult literacy and.
Sami **Lehesvuori**, University of Jyväskylä	Science education specialist: expetise in learning interactions and dialogic pedagogy in science classrooms.
Anne **Tiermas,** University of Helsinki	Language Specialist: expertise in disciplinary literacies.
Teemu **Rainamaa**, University of Jyväskylä	Language Specialist: MA student in subject Finnish and research assistant in applied linguistics projects.



UNIVERSITY OF JYVÄSKYLÄ

UNIVERSITY OF HELSINKI

*FINLAND National Curriculum TEAM LEADER

The FI-TEAM was coordinated by Tarja Nikula. The division of labour was agreed in a joint meeting between the group members. Tarja Nikula was in charge of collecting L1 and EN versions of primary level history and lower secondary biology curricula as well as the chosen parts of the general section and their initial analysis (there exist an EN version of the National Core Curriculum published by the Finnish National Agency for Education so the team did not produce own translations). Sari Sulkunen & Teemu Rainamaa were jointly in charge of collecting the lower and upper secondary curriculum of the subject mother tongue and literature (L1 and EN versions) for primary and lower secondary level and their initial analysis. Sami Lehesvuori was in charge of L1 and EN versions of lower secondary physics curriculum and its initial analysis and Anne Tiermas for L1 and EN versions of primary level environmental studies. During the coding, the group met to agree on problematic cases, outline joint decisions and to agree on the division of labour in checking the coding for each curriculum. Reflective points were also discussed and each coder added points in the documents they analysed.

2. National School System

Figure 1 is a schematic illustration of how the Finnish school system is organized (see also more detailed information provided on Finnish education system by the Ministry of Education and Culture at https://okm.fi/en/education-system).

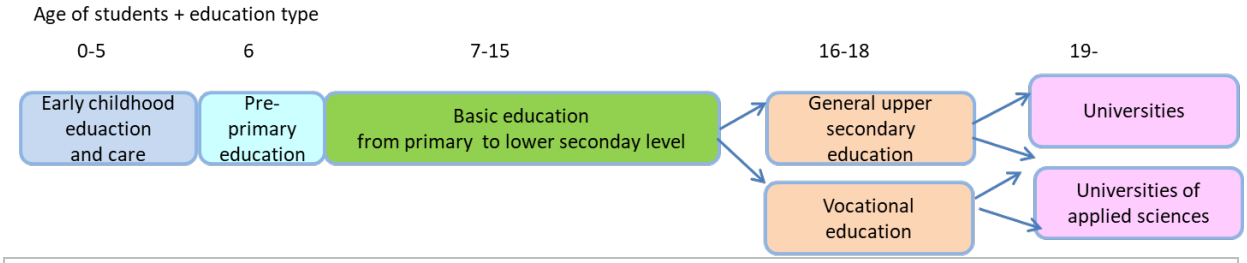


Figure 1. Organization of the Finnish education system.

2.1 The details

These are the key features of the Finnish education system:

- The way early childhood and care (between ages 0-3) is organized depends on the choices by families. Children are either taken care of at home for the early childhood or they are in day care.
- According to the law, children must attend pre-primary education or other similar activities that prepare children for compulsory education, one year before its start, usually in the age of 6.
- Compulsory education begins when children are 7 years of age. Basic education lasts for nine years and is realized as comprehensive education. It comprises primary level (grades 1-6, ages 7 to 12) that is based on class teacher model and upper secondary level (grades 7-9, ages 13 to 15) realized through subject teacher model.
- After the basic education, students are entitled to carry on with their studies until the age of 18. They have the option of either going to general upper secondary schools or to vocational institutions (three year programmes, i.e. students typically aged 16-18 even though anyone can seek a place in these institutions).
- The school-leaving examination after the general upper secondary schools (so called matriculation examination) is a final certification of upper secondary studies and completing the test is also the most typical way to show eligibility to higher education institutions.
- After the upper secondary level, be it in general upper secondary or vocational schools, students can apply for study right either in universities or universities of applied sciences.

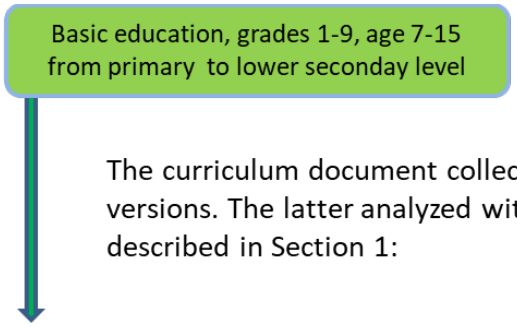
In Finland, the great majority of schools are public, the number of private schools is very low. The level of similarity between school provision in different parts of Finland is generally high. However, some selectivity is included in schools that emphasise certain areas such as music, sport, languages, arts. Bilingual provision (i.e. CLIL) typically involves some form of student selection. Bilingual education (either through immersion or CLIL-type provision) is an established part of Finnish education even though not very extensively offered. The school system is officially bilingual but that means parallel education in the national languages: education in Finnish for Finnish speakers and in Swedish for Swedish speakers (plus some Sámi language schools in the Sámi-speaking areas).

In Finland, the national education administration is organised at two levels. The Ministry of Education and Culture is responsible for the education policy. Implementing the policy is the responsibility of the Finnish National Agency for Education. It works with the Ministry to develop educational objectives, content and

methods for education at different levels. The Finnish National Agency for Education produces the National Core Curriculum; there are separate curricula for basic education and general upper secondary education and they are they are the key documents to steer the provision and implementation of education. The curriculum outlines the objectives, core contents and assessment criteria for all subjects and provides a common ground for the local authorities (most commonly municipalities or joint municipal authorities) for administering and developing/writing the local curricula. For this reason, the FIN team used the national Core Curriculum for the curriculum analyses (for more details on Finnish education, see https://www.oph.fi/en/statistics-and-publications/publications/finnish-education-nutshell).

3. This Survey

Figure 2 illustrates which Finnish curricular documents were collected in L1 and EN versions; the latter were analysed with the coding system described in Section 1 of the whole report. In the Finnish context, the team did not provide any translations themselves because an English version of the core curriculum is available, published by the Finnish National Agency for Education.



Primary (grades 3-6)	Lower secondary (grades 7-9)	General parts for all levels
- history - environmental studies - mother tongue and literature	- biology - physics - mother tongue and literature	-Selection containing sections on transversal comptences and guidelines for developing the school culture

Figure 2. Selection of curriculum documents analysed.

Original L1 Documents can be found in (LINK TO FOLDER). The English versions of these documents, originally published by the Finnish National Agency for Education who has granted permission for their reuse, can be found in (LINK TO FOLDER) and the surveyed documents can be found in (LINK TO FOLDER).

The selection of subjects for our sub-study was based on including both social science, science and language subjects. We hence included from primary level curricula for history, environmental studies and mother tongue and literature (grades 3-6, for students aged 9-12) and from lower secondary level biology, physics and mother tongue and literature (grades 7-9, for students aged 13-15). We chose history, biology and physics as they are the core subject in this COST Action and mother tongue and literature to allow for comparison on how matters of productive disciplinary literacy are dealt with in language and content subjects. More specifically, as the subject 'mother tongue and literature' includes 9 syllabi for different mother tongues, we chose 'Finnish as mother tongue and literature' as more than 90% of students in Finland study according to this syllabus.

Apart from these subjects, other subjects were excluded due to the time limit the team had for completing the task. However, given that both Finnish and English versions of the curriculum texts are readily available, it is possible to later add more subjects if deemed necessary for the comparative analyses carried out in the COST action. As regards the other parts besides the subject curricula, we only chose a specific selection as the National Core Curriculum for Basic education is a very long document, the original Finnish version containing 472 pages, with 95 pages covering general matters that pertain to matters of general educational administration, working culture, assessment of learning, support in learning and school attendance and student welfare. Of these, in addition to subject curricula described above, we chose for analysis the sections that outline the transversal competences to be developed in and through all school subjects and provide guidelines for developing the school culture, again a task for all subjects.

The current national core curriculum derives from 2014, and its English version was published in 2016. We have used this version in our coding. Over the years, some parts of the curriculum have been renewed, specifically concerning specifying the final assessment in primary and lower secondary education according to specific assessment grades. The usual cycle for renewing the entire curriculum is around 10 years so it is likely that in the near future there will be a new version coming out.

4. Survey results: Data, analysis, findings & reflections

The data consisted of the entire curriculum texts for the six subjects introduced above. In addition, a part of the general section pertaining to transversal competencies and development of school culture were analysed.

Overall, the findings show that disciplinary literacies are frequently present in the curricula for all subjects studied. Given the shared decision in WG3 to focus on *productive disciplinary literacies,* furthermore, means that those aspects of curricular text that relate to understanding/perceiving the importance of the particular ways in which subjects convey knowledge are not accounted for in the analysis unless they are accompanied with elements that relate to production-based engagement with the content. In other words, disciplinary literacies may quite often be *implicated* but not framed in terms of productive aspects beyond the coded occurrences.

The following table (Figure 3) provides the overall number of coded instances of productive disciplinary literacies across the Finnish curriculum texts from the two educational levels. Three subjects were analysed at each level, and as the table shows, the overall number of different code types is rather similar. The differences rather lie in the distribution of “types” of disciplinary literacies. The most common ways in which the curriculum texts point to productive disciplinary literacy is through references to students’ ability to perform verbal actions based on thinking skills, such as *explain, describe, report* (coded as CV) or to students’ productive use of language for showing learning (PL). References to different genre types (GG) were also quite common. What occurred clearly less frequently were references to digital literacy elements (DD), to subject-specific realia (TT) and to extracting information from visual elements (VV). Closer interpretation of these are needed, but it may be that the relative infrequency of these in the National Core Curriculum is due to its role in providing general guidelines for all schools, the more detailed level to be specified in local curricula at municipality level.

	CV	GG	PL	DD	VV	TT	OTH
primary	123	66	99	21	6	22	45
secondary	119	96	103	32	0	17	55
TOTAL	242	162	202	53	6	39	100

Figure 3. Coded instances of productive disciplinary literacies according to educational level

As regards the break-up of different categories based on the use of the coding tool in different subjects, the following table (Figure 4) provides the initial picture that needs to be refined once the WG3 has gathered more information and shared experience of potential issues in coding across the contexts.

	CV	GG	PL	DD	VV	TT	OTH	TOTAL
PRIMARY								
History	28	4	9	1	0	0	3	45
Environmental studies	61	3	29	7	6	21	11	138
Mother tongue and literature	34	59	61	13	0	1	31	199
LOWER SECONDARY								
Biology	36	0	7	6	0	10	14	73
Physics	42	4	31	15	0	7	12	111
Mother tongue and literature	41	92	65	11	0	0	29	238

Figure 4. Break-up of disciplinary literacy types across different subjects.

Even if preliminary, the figures show that at both primary and secondary levels, the curriculum of the subject 'mother tongue and literature' outnumbers other subjects as regards references to types of DL, which can be expected given the nature of the subject. The difference to other subjects is particularly pronounced in the case of references to genres or text types (GG). However, also other interesting features emerge. Firstly, in lower secondary physics curriculum, the number of references to students' ability to perform verbal actions based on thinking skills (CV) is at equal level to mother tongue and literature and in the category PL, i.e. students' productive use of language for showing learning, physics curriculum has quite a number of occurrences, noticeably more than in biology. At the primary level, the curriculum for the Environmental studies quite frequently refers to productive disciplinary literacy, the total number is in fact the third largest in the whole data set, after the two 'mother tongue and literature' curriculum texts. References to the use of subject-specific realia (TT) or to extracting information from visual elements (VV) as key elements of productive disciplinary literacy are rare across all the subjects. Environmental studies, biology and physics are the three subjects with references to TT which is explained by the nature of the subjects: all the three curricula bring up students working with various experiments designs, often with measurement techniques.

The coding process involved some challenges that had to do, for example, with the fact that it was not always straightforward to differentiate between different categories provided in the coding key. Agreement was reached by shared discussion among coders and joint decisions but we are aware that in other country teams decisions might have been taken differently - cross-country joint reflection is therefore needed as an important step for refining the coding instrument. In the case of the Finnish curriculum, as mentioned earlier, the focus on *productive* disciplinary literacies also meant that several instances that clearly had to do with disciplinary literacies, usually from the perspective of the teacher familiarising students with subject-specific ways of seeing the world, remained out of this analysis and would thus merit attention in the further rounds research activities in WG3.

Italy National Report

Team & Process

The five members of the *Italian National Indications & Guidelines* analysis team: Costa Francesca, Lopriore Lucilla, Minardi Silvia, Morgana Valentina and Ting Teresa, are presented in Table 1.

Table 1. The Italian National Indications & Guidelines Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse
Francesca Costa Università Cattolica del Sacro Cuore (Milan) francesca.costa@unicatt.it	Language Specialist: expertise in EMI & CLIL implementation; formerly primary school EFL and CLIL teacher.
Lucilla Lopriore* Università degli Studi Roma Tre (Rome) TESOL Italy lucilla.lopriore@uniroma3.it	Language Specialist: expertise & teacher-educator(EFL/ELF/ItalianL2/CLIL); coursebook & materials developer; formerly EFL up.sec. school teacher; TESOL Italy pres.(1996-98).
Silvia Minardi Liceo Statale 'S.Quasimodo', Magenta (Milan) silvia.minardi@gmail.com	Language Specialist: upper Secondary EFL Teacher; expertise & teacher-educator (CLIL/EFL/Italian/CDF for science education); President National Language Association (LEND).
Valentina Morgana Università Cattolica del Sacro Cuore (Milan) valentina.morgana@unicatt.it	Language Specialist: expertise in EFL, CLIL, Task-Based Language teaching & technology; teacher-educator in CLIL & EFL; formerly lower secondary EFL Teacher; DELTA.
Teresa Ting University of Calabria (Rende) teresa.ting@unical.it	STEM Content and EFL Education across all levels; EMI/CLIL teacher-training; CLIL/EMI Materials Development.

*ITALY National Indications & Guidelines Team Leader

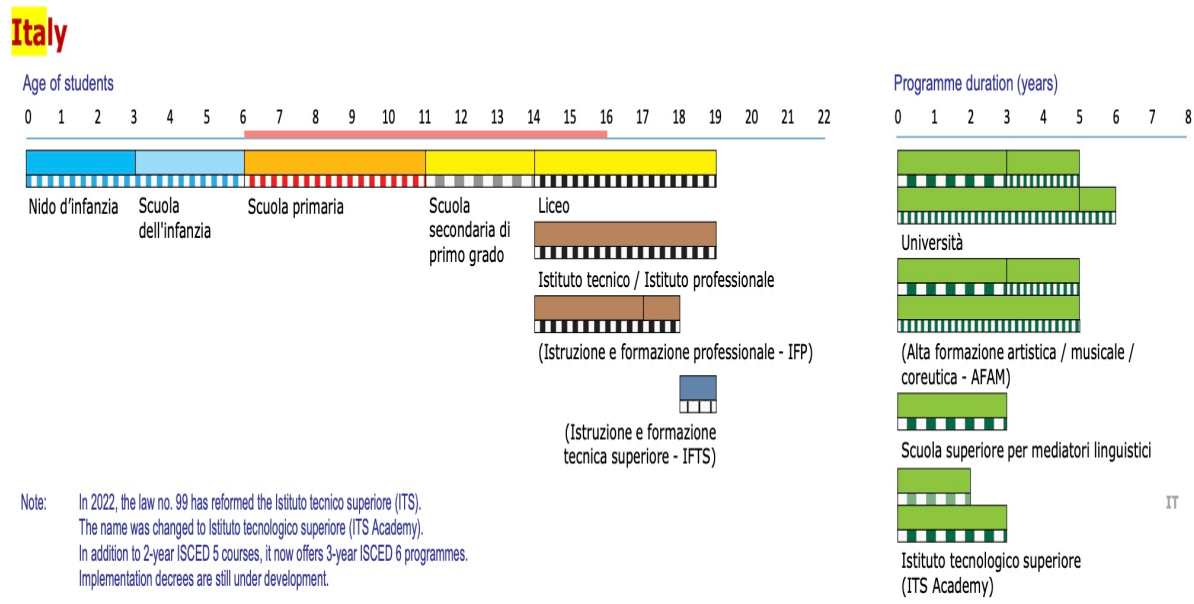
1.1 TEAM ORGANIZATION

The Italian (IT) *National Indications & Guidelines*[1] analysis team (IT-Team) was coordinated by Lucilla Lopriore who, in contact with the Italian Ministry of Education, identified the most recent (2010-2021) *National Indications & Guidelines(NI&G)* documents. In addition, these contacts provided access to how various *NI&G* documents were developed and information which explained some of subsequent analyses. Teamwork was divided as follows:

- Lopriore: retrieval of all L1 documents (*NI&G* of each Italian school level/type/chosen subject);
- Costa and Morgana: analysis, translation & coding of primary and lower secondary Italian *NI*;
- Lopriore and Minardi: analysis, translation[2] & coding of Italian upper secondary schools *NI&G* across eight diverse school types, i.e., Lyceum (Artistic, Classical, Human Sciences, Linguistic, Musical, Scientific), Technical and Vocational schools, and five disciplinary subjects, i.e., History, Italian (1st language), English as a Foreign Language (EFL), Mathematics, Science.
- Ting: regular consultation with team members on *NI&G* analysis; codings double-checking.

2. THE ITALIAN NATIONAL SCHOOL SYSTEM

Figure 1 is a schematic illustration of how the Italian national school system is organized (Eurydice, 2023: 21).



Nursery; **Pre-primary**; **Primary**; **Lower** Secondary School; **Upper** Secondary Schools (Lyceum, Technical, Vocationa&Training schools)

- Up to now, education is compulsory until the age of 16.
- Tertiary studies vary in duration since students may resit exams numerous times

Figure 1. The Italian education system with students' age and duration of studies(Eurydice, 2023:21)[3]

[1] Italian national curricular documents referring to Primary, Lower secondary schools and Lyceums in Upper secondary schools, are defined "Indicazioni nazionali"= *National Indications (NI)* by the Italian Ministry of Education, while the national curricular documents referring to Upper Secondary Technical and Vocational schools are defined "Linee guida"= *Guidelines (G)*. These terms are used in this document, while the terms 'curriculum' and 'curricular' are used as general references.

[2] *NI&G* documents and curricula translation was done with www.DeepL.com/Translator

[3] European Commission / EACEA / Eurydice, 2023. *The structure of the European education systems 2023/2024: schematic diagrams.* Eurydice Facts and Figures. Luxembourg: Publications Office of the European Union, p.21.

2.1. The Details

The Italian education and training system is organized according to the principles of subsidiarity and autonomy of school institutions. The State, via the MIM (Italian Ministry of Education and Merit)[4], has exclusive legislative competence for the 'general rules on education' and for determining the essential levels of services that must be guaranteed throughout the national territory. The State also defines the fundamental principles that each Italian Region must respect when exercising their specific competences; the Regions have specific competences in the field of education and vocational schools (art.117)[5]. All state schools and state educational institutions can operate autonomously with regard to teaching, organization, research, pilot projects & development.[6]

Compulsory education in Italy, up to now, lasts 10 years, from 6 to 16 years of age (Law 296, 2006), inclusive of the first two years of Upper Secondary Schools, is organized as follows:

- Age: 3 to 36 months: Pre-School, (*Asilo Nido*). Non-compulsory; both State as well as private pre-schools.
- Age 3-5 years: Kindergarden (*Asilo*). Non-compulsory; both State as well as private kindergardens.
- Age 6-14 years: "First Cycle Education", (*Primo Ciclo*). Compulsory, with a total duration of eight years, divided into two levels:
  - Age 6-11: Primary School (*Scuola Primaria*);
  - Age 11-13: Level-1 Lower Secondary School (*Scuola secondaria di Primo Grado*).
- Age 14-18: Compulsory until the age of 16.

  This "Second Cycle Education", under the term "*Scuola secondaria di secondo grado*" (Upper secondary school) is divided into three types of pathways (Lyceum, Technical, Vocational) of different duration and outcomes:
- Duration 5-years: Lyceums and Technical&Vocational Training Schools
- Duration 3-4 years: Vocational&Training School (IFP: Istruzione e Formazione Professionale) organized by Regional Education Authorities
- As shown in Figure 1, students can complete the last two years of compulsory education through either state-run or regional education and professional training schools. At the end of the compulsory education period, students can conclude their studies, receiving a certification of the skills acquired: This "School Leaving Certificate" (Diploma) is issued under Ministerial Decree 139, 2007[7].
- Students continuing beyond compulsory education and completing Upper Secondary School, receive their "High School Diploma" after sitting a a Final State Examination. With this "High School Diploma", students can access tertiary education courses.
- Age 19+: Higher education is offered by Universities as well as by Institutions, such as Institutions of Higher Education in Art, Music and Dance (*AFAM*), Technical Institutes of Higher Education (Istituti Tecnologici Superiori, *ITS Academy* https://www.miur.gov.it/tematica-its); ITSs are schools of excellence with a high degree of technological specialisation that enable students to obtain the title of higher technician. They are the expression of a strategy based on linking education, training and

[4] https://www.miur.gov.it/

[5] Italian Constitution art.117, https://www.senato.it/istituzione/la-costituzione/parte-ii/titolo-v/articolo-117

[6] The text was adapted and translated from the Italian Ministry of Education & Merit (MIM) website https://www.miur.gov.it/sistema-educativo-di-istruzione-e-formazione

[7] In 2024, a Ministerial Decree on new models for key competences certification defined European level competences (multilingual competence being the most relevant one) acquired by learners at the end of primary, lower secondary and compulsory education; models differ in the analytical description of competences.
https://www.miur.gov.it/-/decreto-ministeriale-n-14-del-30-gennaio-2024

labour policies with industrial policies. They work closely with Tertiary Technical High Schools (*ITS-Istituti Tecnici Superiori*),

Additional Details:

- CLIL was introduced by law into the Italian secondary school in 2010. Disciplinary subjects are taught in a foreign language by content teachers. The CLIL foreign language most often used is English, but also French, Spanish and German are offered[8]. In 2012, the Ministry of Education offered, through Universities, CLIL Teacher-Education courses (20 ECTS) for upper secondary content CLIL teachers that were run between 2013 and 2019. More recently (DM 1511, 2022), the Ministry of Education defined the profile of CLIL primary teachers and offered a new organization of the 20 ECTS University run CLIL Teacher Education courses for pre-primary, primary, lower and upper secondary school teachers defining a new CLIL teacher profile.
- Foreign languages: in the Italian school system, English is compulsory from primary to lower secondary level, where a second language (French, German, or Spanish) is mandatory and also taught in many cases[9], at upper secondary level. At upper secondary school, besides the previously mentioned languages, Arabic, Chinese, Japanese or Russian are also introduced as an option in some school types.
- Non-Italian school population: In 2023, there were 967,394 students with non-Italian citizenship. 11.3% of the total number of students enrolled in schools in Italy (8.5 million), 66% were born in Italy, while there is a much lower percentage of non-Italian students with Italian citizenship[10]. The first four countries of origin of non-Italian students are: Romania (17.8%), Albania (13.4%), Morocco (12.6%) and China (5.8%)[11]. The amount of non-Italian students requires support (Italian as L2 courses)
- Private schools: In 2021 there were 2,238 private parochial schools for secondary education in Italy, of which 640 catered to Level-1 Secondary Education (age 11-13) and 1,598 catering to 14-19 year old students in Lyceum or Technical or Vocational &Training Schools. These private schools enrolled a total of 181,840 students, 5% of the total number of secondary school students; most private schools also receive financial support from the State and must therefore offer curricular indications which are coherent with those of state schools.

[9] English, even if not compulsory, is the most taught foreign language at upper secondary schools.
[10] https://www.minori.gov.it/it/notizia/rapporto-ismu-sulle-migrazioni-2023-i-dati-sugli-alunni-stranieri

[11] Figures of learners' 'school delay' in the years 2021/2022 concern 8,1% of Italian students and 25,4% of 'non-Italian citizens', these figures highlight their specific learning needs in terms of study skills, of the language of schooling, and of their still partial integration in the Italian school system.

3. This Survey

In Italy, curricular *National Indications and Guidelines (NI&G)*, written by teams of experts appointed by the Ministry of Education, are issued by the Italian Ministry of Education, and addressed to schools in order to be implemented, and are specific for different school pathways from primary to upper secondary schools. These *NI&G* are usually age-specific and/or specific for each type of school (see Section 2.1) and are organized into two sections, an Introduction followed by different Subject-Specific Sections. The Introduction specifies general educational objectives, defines outcomes, defines students' profiles and approaches for that particular age-group and school-type, while the Subject-Specific Sections outline subject-specific outcomes. With each school reform, the Ministry of Education publishes new guidelines, including pedagogical innovations. Academic experts in the field, teachers'professional associations as well as school principals may often be consulted by the Ministry of Education as for the *NI&G*.

For this Survey, we analyzed the most recent *NI&G* documents which were published by the Italian Ministry of Education for primary, lower and upper secondary schools, between 2010 and 2019. After collecting these documents, the Team identified sections addressing the subjects of interest to be translated into English before proceding to coding the presence of productive disciplinary literacies, as it was done for History, Mathematics, and Science, but also for those more directly related to language use, as English as a foreign language, and Italian (1st language, mother tongue), to investigate how and if productive disciplinary literacies (DLs) are addressed in content as well as in first and foreign language subjects.

Figure 3A illustrates which Italian curricular documents were selected and translated while Figure 3B illustrates which documents were surveyed for mentions of productive disciplinary literacies.

Original L1 Documents can be found in (LINK TO FOLDER). The English versions of these documents can be found in (LINK TO FOLDER) and the surveyed documents can be found in (LINK TO FOLDER).

Figure 3A. Italian N.G. documents which were translated into English.

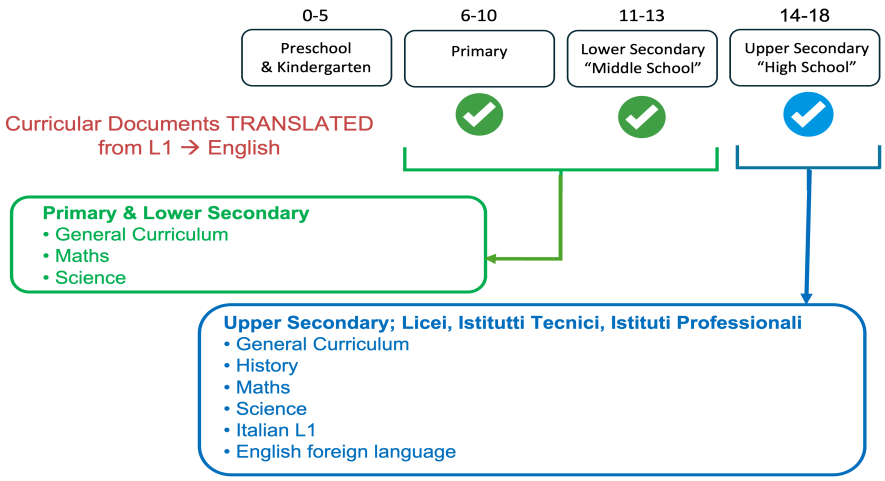
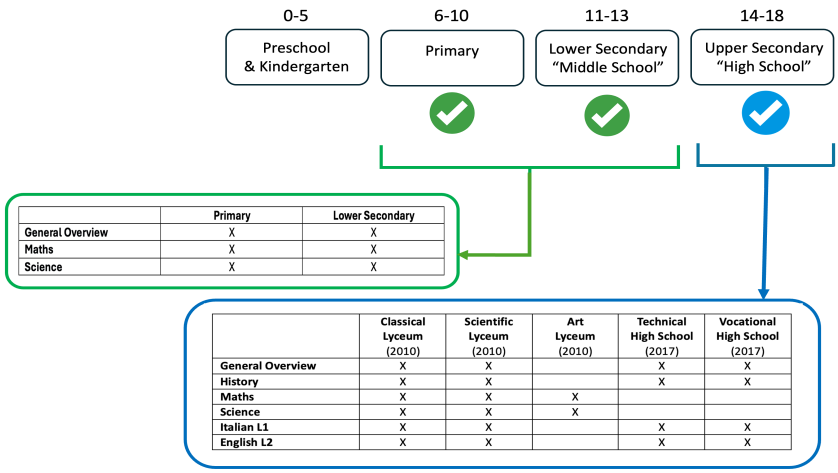


Figure 3B. Curricular documents which were surveyed for mentions of *productive* disciplinary literacies.



	Primary	Lower Secondary
General Overview	X	X
Maths	X	X
Science	X	X

	Classical Lyceum (2010)	Scientific Lyceum (2010)	Art Lyceum (2010)	Technical High School (2017)	Vocational High School (2017)
General Overview	X	X		X	X
History	X	X		X	X
Maths	X	X	X		
Science	X	X	X		
Italian L1	X	X		X	X
English L2	X	X		X	X

The Team surveyed the National Indications of pre-primary, primary, lower and upper secondary schools, specifically the 2010 *National Indications* published for Classical, Scientific and Art Lyceums, and the *Guidelines* for Technical and Vocational & Training upper secondary schools (Figure 3B). It should be noted that, the decade between 2010 and 2019 represents a moment of rapid change in societal conditions in Italy, reflecting changes in educational needs and thus a call for innovations at all levels of schooling. The Team surveyed the *National Indications and Guidelines NI&G* for the subjects specified in the project MoU and by WG3 (see Section 2.1), i.e. History, Mathematics, and Science, L1 language (Italian) and the first foreign language, i.e. English.

NI&G are most significantly modified with each reform, thus "most innovative and updated", so all the sections were surveyed for "mentions of productive disciplinary literacies". This allowed us to appreciate whether, how and how much *NI&G* addressed the need to provide explicit instruction for building students' disciplinary literacies and answer the question: "Do demands of disciplinary literacies change from primary to lower secondary to upper secondary in the *NI&G*?" In addition, the General section of the two most popular Lyceums, Classical and Scientific, and the Technical and Vocational Upper Secondary Schools, were also surveyed. This allowed us to ask the question, "Do demands of disciplinary literacies differ as a function of the type of schooling students pursue?" Together, both questions allow us to trace elements of continuity in disciplinary literacies development for each subject and across subjects along the whole educational path.

It should be noted that the inclusion of Technical and Vocational High Schools was especially relevant, because their outcomes are related to professional profiles, and Vocational schools were recently updated (2019)[12] representing an innovative trend in terms of their connection to the *European Vocational Education and Training* (VET) system and to the *European Qualifications Framework* (EQF)[13], tools to make national qualifications easier to understand and more comparable in Europe.

Recent reforms of Vocational schools (2019) and their *National Guidelines* represented an innovative trend in terms of their exit professional profiles and connection to the *Key competences for lifelong learning*[14]. All key competences are considered equally important and aspects essential to one domain will support competence development in another. For example, skills such as critical thinking, problem solving, team work, communication, creativity, negotiation, analytical and intercultural skills are embedded throughout the key competences, and these are connected to the models of exit certifications in schools[15].

These indications and guidelines were also founded on competence-based Learning Units which go beyond traditional teaching, centred on learning experiences, privileging laboratories, personal research, group activities, extracurricular experiences, aimed at a "holistic formation" of the person, through the development of transversal and disciplinary competences. To achieve this, educational paths in vocational schools use an "Interdisciplinary Didactic Planning Table" which attends to students' development along four axes: Language Axis, Historical-Social Axis, Mathematical Axis which is common for all educational paths; Scientific-Technological-Professional Axis which is specific for each student's chosen professional path (Appendix A). As will be discussed in more detail below, we mention this Planning Table because it became apparent to us during the survey, that it would take so little effort to add a row below row 12 which is labelled "12 - Use the concepts and fundamental tools of the cultural axes to understand reality and operate in applied fields", which states "13 – Use age-appropriate academic and discipline-specific discourse to

[12] Both schools respond to requirements in terms of cultural and professional preparation. The "New Vocational schools" Guidelines were linked to Law 107, 13/07/2015, called "The Good School", meant to redefine the Italian school vocational curricular guidelines. https://archivio.pubblica.istruzione.it/varie/superiori/nuova_istruzione_tecnica_e_professionale.pdf

[13] The EQF seeks to support cross-border mobility of learners and workers, promote lifelong learning and professional development across Europe.

[14] European Commission, Directorate-General for Education, Youth, Sport and Culture, *Key competences for lifelong learning*, Publications Office, 2019, https://data.europa.eu/doi/10.2766/569540 The eight key competences are: Literacy competence; Multilingual competence; Mathematical competence and competence in science,technology and engineering; Digital competence; Personal, social and learning to learn competence; Citizenship competence; Entrepreneurship competence; Cultural awareness and expression competence.

[15] Competence certification model (DM14, 30.01.2024) https://www.miur.gov.it/-/decreto-ministeriale-n-14-del-30-gennaio-2024

communicate one's understanding of discipline-specific notions related to the reality and operation in applied fields".

4. Survey results: Data, analysis, findings & reflections

4.1 Word count and results of preliminary analysis

Figure 5 summarizes the word count the corpus of respective sections of the Italian *IN&G* which the team surveyed.

English version	***NI*-Overall**	**Mathematics**	**Science**	History	Italian L1	English L2	
Primary	**8218 w.**	950 w.	776 w.				
Lower Secondary[16]		990 w. pp.25-27	723 w. pp.29-31				
Upper Secondary **Lyceums:** Artistic, Classical, Human Sciences, Linguistic, Musical, Scientific. **New Technical (Economic); New Vocational(Services)**							
Lyceums (2010) (Type: Scientific[17])	***NI*-Overall 8271 w.**	**Mathematics** pp.337-341 2508 w.	**Science** pp.344-347 2853 w.	**History** pp.332-335 2155 w.	**Italian L1** pp.353-355 1975 w.	**English L2** pp.330-332 2304 w.	**W. Total Subjects 11795 w.**
		Intro: 1170 w. 1st 2ys: 584 w. 2nd2ys: 389 w. 5th yr.: 365w.	Intro: 2012w. 1st 2ys: 281w 2nd 2ys:323w. 5th yr.: 237w.	Intro: 1388 w. 1st 2ys: 120w. 3rd4thyr:238w. 5thyr: 409w.	Intro: 1370w. 1st 2ys: 337w. 2nd 2ys+5th yr: 268w.	Intro: 998 w. Total L/C: 662 1st2ys:211,L/C 2nd2ys:268L/C 5th yr:165 L/C	
New Technical[18] (Type:Economic[19]) ***(2010/2018***[20]***)***	***G*-Overall 36,137 w.**	pp.45-46 1772 w. Intro: 82w. 1st 2yrs.:189W. Knowledge (skills etc.): 1501 w		pp.43-44 772 w. Intro: 194 w. including 5 yrs aims; 1st2yrs:372w.; Knowledge 127w.+Skills 77s.=204 w.	pp.44-45 591 w. Intro: 154 w. 1st 2yrs Language & Literature+Knowledge description (skills etc.) 437 w.	pp.41-42 670w. Intro: 68 w. 1st 2yrs 526 w. B1 CEFR/B2 5th yr. Intro: 257 w. Knowledge& Skills: 269 w.	**3805 w.**
New Vocational - (Service sector[21]) *(DM2017-**2018**/19)*	***G*-Overall Annex A 1660 w**.[22] pp.12-14			pp.48-49 992 w. Gen. Intro. 154w. 1st2yrs 861W.: (K129+S140)	pp.45-46 807 w. 1st 2 yrs325w. Language&Literature321 w. (K146w+S175 w)	p.47-48 623 w. B2 CEFR G. Intro: 80w. 1st2yrs: 522 247w+ (K123+S150)	**2422w.**

Figure 5. Word count of the Italian National Indications and Guidelines (NI&G)

[16] D.M. n. 254 (16/11/2012, G.U. 30, 5 /02/ 2013) hubmiur.pubblica.istruzione.it/web/istruzione/prot7734_12. The subjects: History, L1 and L2 , at primary and lower secondary schools, were not subject to specific analysis in this report.

[17] The choice of reporting here the data of this type of Lyceum is due to the specificity of the curricular indications mostly based upon scientific subjects

[18] The New Technical Guidelines are composed by: a general introduction to contents for all the 5 years; this is followed by a detailed section for the first 2 years with a detailed description of what should be enhanced by the teacher to develop learners' competences; the last section is distinguished into 2 parts: *Knowledge & Skills* concerning each specific subject.

[19] The choice of the Economic type of New Technical schools was based upon the relevance of the subjects and of the strong interdisciplinary focus provided.

[20] First designed in 2010, Technical schools were later (2017/19) further refined in terms of final competences achievement

[21] The choice of the Services sector of the New Vocational schools was based upon the specificity of the subjects and skills promoting interaction and interdisciplinary links.

[22] Intermediate learning outcomes of the exit profile of vocational education pathways for general area activities and teaching.

An important part of all Italian *NI&G* documents is the first part that introduces the main aims of a specific type or level of school, provides a very general objective for each subject and describes the students' profile and the expected learning outcomes. It specifies the disciplinary declination of the educational, cultural and professional profile a student is expected to achieve.

As shown in Figure 5, all *NI&G* surveyed had a longer introductory section with details of the main notions of each subject matter. Indeed, it represents a guideline and framework to help schools design their Educational Offer, help teachers build their teaching plans and defines students' exit profiles, the learning objectives and level of competences which are expected at the end of their studies within that particular school (MIUR, 2010:5). The Team thus surveyed the Sections of the *NI&G* at all three levels of schooling (primary, lower secondary and at upper secondary level) six types of Lyceums (Artistic, Classical, Human Sciences, Linguistic, Musical, Scientific), one type of Technical High School (Economic) and one type of Vocational & Training School (Social Services).

4.2. Coded instances of DLs in National Indications and Guidelines

UPPER SECONDARY **Lyceums:** Artistic; Musical; Scientific; ***Classical, Linguistic, Human Science[23]** **Technical Schools**	**CV** **Command verbs**	**GG** **Genre**	**PL** **Productive use of language**	**DD** **Digital literacy**	**VV** **Visual elements**	**TT** **Subject-specific realia**	**OTH** **Other**
Mathematics *Artistic Lyceum*	**1**	**5**	**5**	**10**	**5**	**3**	**22**
Mathematics *Scientific Lyceum*	**5**	**19**	**5**	**12**	**3**	**4**	**8**
Mathematics *Musical Lyceum*	**2**	**8**	**12**	**6**		**3**	**11**
Mathematics *Classical, Ling., Hum. Science Lyceums*	**2**	**8**	**12**	**6**		**3**	**11**
Mathematics *Technical schools*	**13**	**4**		**2**	**6**	**3**	**2**
Science *Artistic Lyceum*	**14**	**1**				**4**	**10**
Science *Scientific Lyceum*	**20**	**4**	**2**		**1**	**5**	**15**
Science *Musical Lyceum*	**13**	**2**				**3**	**10**
Science *Classic., Ling., Hum. Science Lyceums*	**17**	**1**	**2**		**1**	**5**	**13**
Science (Biology) *Technical schools*	**16**	**1**		**1**			**6**

Fig.6 - Instances of DLs in Mathematics and Science in upper secondary Lyceums & Technical schools

[23] Guidelines for Classical. Linguistic and Human Sciences schools for Mathematics and Science are the same.

UPPER SECONDARY LYCEUMS (*Scientific.*) **- TECHNICAL Schools - VOCATIONAL Schools**	**CV Command verbs**	**GG Genre**	**PL Productive use of language**	**DD Digital literacy**	**VV Visual elements**	**TT Subject-specific realia**	**OTH Other**
Italian L1 *(Scientific.) 1975 w.*	**4**	**3**	**7**	**1**			**5**
Italian L1 *New Technical schools 1182 w.*	**3**	**2**	**4**	**3**		**2**	**4**
Italian L1 *New Vocational schools 1774 w.*	**3**	**1**	**6**		**1**		**2**
English L2 *(Scientific) Intro: 998w, 2304 w.*	**13**	**2**	**8**	**2**	**1**	**2**	**3**
English L2 *New Technical schools 1790 w.*	**5**	**1**	**7**	**1**			**7**
English L2 *New Vocational schools 1392 w.*	**3**	**2**	**8**	**1**		**2**	**1**
History *(Scientific) 2155 w.*	**8**		**18**	**1**	**2**	**5**	**7**
History *New Technical schools 899 w.*	**14**		**2**		**2**	**1**	**5**
History *New Vocational schools. 2007 w.*	**13**	**2**	**2**		**2**	**1**	**2**

Fig.7- "Instances" of DLs in History, Italian L1, English L2 in upper secondary Lyceums, New Technical and New Vocational Schools. The total word count was calculated summing the subject introduction, and excerpts from the first and second two years and fifth year descriptions.

The word count associated with the number of DLs instances in each subject guidelines is meant to help the reader get an overall impression of how much National Indications and Guidelines are representative of DLs.

5. Reflections & Comments

5.1 Comments and reflections on the Primary and Middle School National Indications[24]

The analysis of the *Italian National Indications* for primary and lower secondary schools was carried out on Mathematics and Science. In Mathematics, the *National Indications* emphasize the description of key goals. For primary schools, the *NI* highlight the use of real-world objects (realia) as an effective teaching method and include many references to visuals. Verbal actions are also quite frequent, particularly with reference to describing thinking skills and solving mathematical problems.

[24] From the *Italian National Indications* (Francesca Costa and Valentina Morgana)

Excerpt 1 "Gradually, stimulated by the teacher's guidance and by discussion with peers, the pupil will learn to tackle problem situations with confidence and determination, representing them in different ways (VV), conducting the appropriate explorations, taking the necessary time to precisely identify what is known and what is to be found, conjecturing solutions and results, and identifying possible solution strategies (CV)."

In Science, the indications emphasize key concepts like identifying and describing. *NI* frequently mention hands-on experiences and experiments but make fewer references to thinking skills related to language actions. This focus on practical experiences aims to enhance students' understanding of scientific concepts.

Excerpt 2 "In the course of each primary school year, therefore, each pupil must be involved in various practical experiences."

5.2.1 Comments and reflections on the Science and Mathematics National Indications and Guidelines[25]

SCIENCE

We have analyzed the Science indications and guidelines for both Lyceums and New Technical Schools in Italy. For Italian Lyceums, the indications are identical across Classical Lyceum, Linguistic Lyceum, and Human Science Lyceum. However, different indications exist for Scientific Lyceum, Artistic Lyceum, and Musical Lyceum. Our analysis covered the entire course of study for Lyceums, which spans ages 14 to 19. In the Lyceums the indications for science refer to Earth Science, Biology and Chemistry.

The survey analysed a total of **4,619** words for Lyceums and **499** words for Technical Schools.

The difference is due to the fact that for Technical Schools, the Italian team decided to focus the analysis on the first two years of the Economic and Technological Technical Schools, specifically on the biology and Earth science guidelines. This decision was necessary due to the large number of new technical school types within the Italian education system and the various subjects that include a science pathway.

The most frequently occurring elements within the Science guidelines are command verbs (CVs), although there were notable differences between indications for lyceums and technical schools regarding these verbs. In the Guidelines for Technical Schools, within a corpus of 499 words in the sections surveyed, there were only 16 instances of CVs and they lacked diversity, with "describe," "analyse," and "recognize and identify" being the most common.

Conversely, the indications for the lyceums exhibit a broader range of CVs. Among these, "categorize" is the most frequently used, and "describe" also appears prominently. The verb "explain" is particularly frequent in the Scientific Lyceum guidelines compared to the others. Interestingly, command verbs related to the Cognitive Discourse Function "evaluate" appear in three of the lyceums analyses. The exception is the Artistic Lyceum, where such verbs are absent.

Lyceums

In the lyceums all National Indications start with a paragraph called "General Guidelines and Competencies" in which emphasis is given to the fact that all the disciplines have their own specific notions to be learnt and specific methods of investigation. What they have in common is a "strategy of inquiry" based on observation and experimentation. All the disciplines included in the science indications use observations and make experiments to teach and learn science. The main focus seems to be on "doing science".

> *Excerpt 1 – Scientific Lyceum (p. 344)*
> *Of fundamental importance in this course is **the experimental dimension (OTH)**, a constitutive dimension of scientific disciplines and as such, always to be kept in mind. The laboratory is one of the most significant moments in which it is expressed, as a privileged circumstance of "doing science" through the organization and execution of **experimental activities (TT),** which can however also usefully take place in the classroom or on the field. This dimension remains an indispensable aspect of science education and a guide for the whole educational path, even when real laboratory activities*

[25] From the *Italian National Indications* (Silvia Minardi)

*are not possible, e.g. through the **presentation, discussion and processing (PL)** of **experimental data (TT),** the use of **films (VV), simulations, models and virtual experiments (GG),** the **presentation (PL)** - also through **original excerpts (GG) written by scientists (OTH)** - of major experiments in the development of scientific knowledge.*
*Indeed, the experiment is an indispensable part of science education and should therefore be promoted during all the years of study and in all subject areas, because it educates the student to **ask questions (CV), collect data (OTH)** and **interpret (CV)** them, gradually acquiring the attitudes typical of scientific inquiry.*

In terms of disciplinary literacies

- There are some language activities mentioned which imply both a receptive and productive use of language: presentation – discussion – processing (all classified as PL) as well as reading (which we classified as OTH) original excerpts written by scientists;
- Experiments are seen as a way to enable learners to ask questions (CV), collect data (OTH) and interpret (CV) them: all these activities imply using and producing language.

After the "General guidelines and competences" the text is divided into three parts: a) first two years, b) second two years, c) fifth and last year. It is often emphasized that learning science goes through a cycle which is not linear but recursive. There seems to be a step-by-step approach which suggests using description (CV) in the first two years and gradually introducing the learner to "new ways of interpretation" and to the "explanation" (CV) of data or phenomena in the second two years.

In the first two years an element which seems to indicate a progression towards disciplinary literacies is the combination of observation, which has been classified as OTH (other), and description, which we coded as CV[26]. Once learners have observed phenomena, they are required to describe what they have noticed in the observation process.
Interestingly for the first two years, Chemistry is the subject with a greater emphasis on DL:

Excerpt 2 – Artistic Lyceum (p. 29)
*The Chemistry course contents include the **observation (OTH)** and **description (CV)** of phenomena and simple reactions (their **recognition (OTH)** and **representation (OTH)**) with reference to examples taken from everyday life; the states of aggregation of matter and their transformations; the **classification (CV)** of matter (homogeneous and heterogeneous mixtures, simple and compound substances) and their operational **definitions (CV);** the fundamental laws and Dalton's atomic model; the chemical formula and its meaning; the **classification (CV)** of elements according to Mendeleev.*

Technical Schools

The text starts with a page of general objectives in which DLs are sparsely present.

Excerpt 3 – Technical Schools (page 49)
The basic skills expected at the end of compulsory education […]:
*- **observe (OTH), describe (CV)** and **analyze (CV)** phenomena belonging to natural and artificial reality and **recognize (CV)** the concepts of system and complexity in various forms.*
*- qualitatively and quantitatively **analyze (CV)** phenomena related to energy transformations based on experience.*
- be aware of the potentials and limitations of technologies in the cultural and social contexts in which they are applied.
[…]

[26] In the category CV (command verbs) I focused on Cognitive Discourse Functions (Dalton-Puffer, 2013) not only those realized through performative verbs, but also nominalisations, as "description", "classifications" and others.

*The teacher enhances, in the student's career, the contribution of all disciplines, especially the experimental ones, **with their specific languages (OTH),** in order to **investigate (OTH)** topics that are relevant to students' cultural and civic growth, such as, by way of example, issues related to health education, safety and environmental education.*

The presence of DLs can only be inferred when the text mentions the role of "investigation" and "observation" in teaching and learning science: in order to investigate topics learners need literacies which may be general as well as specific to each discipline. The "specific languages" of experimental disciplines may lend to various interpretations: if intended in a restricted way it only refers to vocabulary. Buf if it were intended in a broader sense it could also include the use of language dimensions such as texts and genre types or language modes of communication and activities which are typical of learning science.

The *NI* are organised with two columns on each page, in the left-hand column (labelled as "knowledge") there is a list of factual knowledge to be taught while in the right-hand column (labelled as "skills") the indications specify what the learner is expected to be able to do with those contents. In our analysis we focused on the right-hand column:

Excerpt 4 – Technical schools

Skills
***Identify** the consequences of Earth's rotational and revolutionary motions on the planet.* ***Analyze** the current state and changes on the planet also with reference to the exploitation of the Earth's resources.* ***Recognize** the cell as the basic functional unit of construction of every living thing.* ***Compare** the structures common to all eukaryotic cells, **distinguishing** between animal and plant cells.* ***Highlight (OTH)** the common characteristics of organisms and the parameters most frequently used to **classify** organisms.* ***Reconstruct** the evolutionary history of humankind by **emphasizing** the complexity of the hominid phylogenetic tree.* ***Describe** the human body, and **analyze** the interconnections between systems and organs.* ***Describe** the mechanism of DNA duplication and protein synthesis.* ***Describe** the role of organisms, which is fundamental to the balance of natural environments and the rebalancing of those degraded by pollution.*

From such a way of organizing the guidelines we can see how contents (topics) listed on the left are used in some kinds of actions which imply the use of DL. There are 10 occurrences of CVs, with "describe" occurring three times and "analyse" twice. What is missing in the list are the kinds of texts or genres which learners are expected to produce.

MATHEMATICS

We have analyzed the Mathematics NI&G for both Lyceums and New Technical Schools in Italy. For Italian Lyceums, the indications are identical across Classical Lyceum, Linguistic Lyceum, Musical Lyceum, and Human Science Lyceum. However, different indications exist for Scientific Lyceum and Artistic Lyceum. Our analysis covered the entire course of study for Lyceums, which spans ages 14 to 19. The survey analysed a total of **7,540** words for Lyceums and **962** words for Technical Schools

The difference is due to the fact that for Technical Schools, the Italian team decided to focus the analysis on the first two years of the Economic and Technological Technical Schools. This decision was necessary due to the large number of new technical school types within the Italian education system. There are notable differences between the *NI&G* for Mathematics in Technical Schools and Lyceums. In general, what they have in common is great emphasis on contents and on students' ability to understand notions, concepts, and more. However, there is very little mention of how students will learn to use the language of mathematics to demonstrate their understanding.

Lyceums

The coding process had to make some choices after recognising that mathematics has a language of its own which is built upon general language. The point which is generally missing in the indications is the fact learners should be taught how to language their thoughts and their learning.

In the indications for lyceums, the most frequently occurring elements are genres (GG), digital literacies (DD), and productive use of language (PL). Regarding PL (productive use of language), two cases can be used to exemplify the role of language in math teaching and learning.

> *Excerpt 5 – Lyceums*
> *construction **(PL)** and analysis **(CV)** of simple mathematical models of classes of phenomena*

In the case of mathematics, we considered this a form of production which shows discipline-specific comprehension and interpreted language as any form of "mathematical language", which would, in this case, be a "mathematical model".

> *Excerpt 6 – Lyceums*
> *demonstration **(PL)** of the irrationality of $\sqrt{2}$ and other numbers will be an important opportunity for conceptual deepening.*

This is particularly interesting because it explicitly states that the process of demonstration, which requires production, contributes to "conceptual deepening", i.e. deeper learning. This refers to some form of Disciplinary Literacy, but these aspects should be made more explicit. How language can be used by learners to "demonstrate" is a key component of DL when learning mathematics.

The role of digital literacies is very important in the mathematics indications for lyceums with a strong emphasis on students' ability to analyze and represent data using the most appropriate computer tools. For instance, the national indications for Scientific Lyceums include a specific section on "Elements of Computer Science," stating that students should become familiar with computer tools for representing and manipulating mathematical objects and explore ways to represent elementary textual and multimedia data. Here, digital literacies encompass the ability to use computer tools for geometric representations and calculations, as well as the representation of mathematical objects through texts or multimedia data. Interestingly, while the curricular indications emphasize encouraging the use of computer tools, they also stress the importance of critically introducing these tools in Mathematics.

Regarding genres (GG) in Mathematics, there is a notable emphasis on:

a. *Procedures* unique to mathematical reasoning, such as definitions, demonstrations, generalizations, axiomatizations, and formalizations, which we coded as Genres (GG).
b. Mathematical *models to represent* phenomena, including geometric representations. The various methods of representing a geometrical fact are referred to as "registers of representation" (numerical, graphic, functional), borrowing terminology from linguistics.

In the indications for Artistic Lyceum, digital literacy elements (DD) are the most frequently emphasized. Computer tools are utilized for describing phenomena, performing calculations, and creating geometric representations. Interestingly, the indications advocate for the combined use of computer and traditional tools. They emphasize that students should not only become proficient with these tools but also use them in a critical and thoughtful manner.

In other types of lyceums, elements of productive use of language (PL) and genres (GG) frequently overlap as in excerpt 7.

> *Excerpt 7 – Lyceums*
> - *the concept of **a mathematical model (GG)** and a clear idea of the difference between the view of **mathematization (GG)** characteristic of classical physics (unambiguous correspondence between mathematics and nature) and that of **modeling (possibility of representing the same class of phenomena through different approaches) (GG);***
> - ***construction (PL) and analysis (CV) of simple mathematical models of classes of phenomena (GG),** including **using computer tools (DD)** for **description (CV)** and calculation;*

Language plays a crucial role in constructing simple mathematical models, representing problems, and demonstrating general results. Mathematics integrates various genres and mediates between different "registers," allowing students to describe problems using equations or other tools which belong to the language of mathematics. For example, students are expected to transition smoothly between different registers of representation—numerical, graphical, and functional (GG)—while using computer tools for data representation (DD). It should be noted that:

- The most common activities coded as PL are "representing" and "modelling."
- Effectively choosing the appropriate tools to represent data or mathematical phenomena also requires genre awareness.

Technical schools

In Technical Schools, the most frequently occurring elements are command verbs (CVs) and visual elements (VVs). The distribution of command verbs is fairly uniform, with "identifying" and "analysing" being the most common. Regarding visual elements, both receptive and active skills are emphasized. Students are expected to both interpret "graphic representations" of mathematical concepts, such as functions, and to express these concepts through "graphic forms."

In the text, there is a short introduction with the expected outcomes for the 5 years of schooling:

> *Excerpt 8 – Technical schools*
> ***master the formal language (OTH)*** *and* ***demonstrative procedures (GG)*** *of mathematics; possess the mathematical, statistical, and calculus of probability* ***tools (TT)*** *necessary for understanding scientific disciplines and for being able to operate in the field of applied sciences; situate mathematical and scientific thought in the major themes of the development of the history of ideas, culture, scientific discoveries, and technological inventions.*

It is interesting to note that mastering the formal language of mathematics is the first outcome mentioned in the list of key expected outcomes. The procedures and tools characteristic of the discipline inherently rely on the use of language. However, the Guidelines currently lack a focus on how Disciplinary Literacies contribute to deeper understanding, practical application in the field of applied sciences, and other related competencies.

As regards the guidelines for the first two years here is the list of "basic skills expected at the end of compulsory education":

> *Excerpt 9 – Technical schools*
> *the basic skills expected at the end of the compulsory education requirement, listed below*
> *- using* ***the techniques and procedures (GG)*** *of arithmetic and algebraic calculation,* ***representing them also in graphic form (VV)***
> *-* ***comparing and analyzing (CV)*** *geometric figures,* ***identifying (CV)*** *invariants and relationships*
> *-* ***identifying (CV)*** *appropriate strategies for problem solving*
> *-* ***analyzing (CV)*** *data and* ***interpreting (CV)*** *them* ***developing deductions (CV)*** *and reasoning about them also with the help of* ***graphic representations (VV),***
> *- consciously using* ***computational tools (TT)*** *and the potential offered by* ***specific computer applications (DD).***

The most important elements refer to CVs, with "identifying" being used twice. As it is used here, it does not refer to basic or lower thinking skills, as learners are here expected to identify "invariants and relationships" as well as "appropriate strategies" in the solution of math problems. In the former, we are in front of a compare-and-contrast CV (belonging to a "categorise" CDF element). In the latter, the ability to identify the correct strategy for solving a problem implies the ability to read and understand a word problem with all its features and complexities. The CV "analyse" is also used twice, referring to both geometric figures and data, which require analysing, interpreting and – in the case of "data" – making deductions.

After this introduction, "skills" are listed with a differentiation between (a) arithmetic and algebra; (b) geometry; (c) relations and functions. In the three parts, the verb "use" is often employed. We have coded

it as a CV when it is associated with something which implies a linguistic dimension, even though this is not explicitly mentioned.

> *Excerpt 10 – Technical schools*
> *Arithmetic and Algebra*
> ***Use (CV)** the **procedures (GG)** of arithmetic to calculate arithmetic expressions and solve problems; […]*
> ***Use (CV)** the concept of approximation correctly.*
> *Geometry*
> *Perform elementary geometric constructions using **a ruler and compass (TT)** and/or **computer tools (DD).***
> *Know and use measurements of geometric quantities: perimeter, area and volume of major geometric figures of the plane and space. […]*
> *Solve problems of the plane and space using properties of geometric figures or properties of appropriate isometries*

Using procedures and concepts as in the arithmetic and algebra guidelines implies using language to read, understand, apply what has been learned. This is not the case when learners are asked to use a ruler and compass or computer tools as in the geometry guidelines.

5.2. Comments and reflections on Italian L1, History, English L2 National Indications & Guidelines [27]

Analyses were carried out on *NI&G* for History, Italian (L1), English (foreign language) from three types of Lyceums (Classical, Scientific and Linguistic) and both New Technical and New Vocational High Schools. Not surprisingly, on a general level, the main educational aims differed between Lyceums and the more professionally oriented High Schools. Since the Technical and Vocational Schools had recently undergone reform and innovation, an interesting observation was that these guidelines followed a more linear organization with suggestions for each subject presented through easy-to-follow prose that facilitated our analyses and the identification of instances of disciplinary literacies. In fact, since these curricular documents provided such well-structured guidelines regarding teaching approaches, they could be adapted for the purpose of teacher education which aims to provide cross-disciplinary perspectives that would highlight the role of cognitive discourse functions and language for the learning of content.

5.2.1 The L1-Italian-Language Indications

All upper secondary level curricular documents for *Italian Language Education* were surveyed for *productive disciplinary literacies*, based on the logic that "students' ability to use L1 effectively to communicate in age-appropriate academic ways is essential for future professional success" and should therefore be an explicit objective of L1-language education. With all Language indications, be they for L1-Native Language (Italian) or English as a Foreign Language, it was necessary to keep the distinction between *Language* and *Literature* as used in the National Indications. In the Italian language indications, specific sections drew attention to "competence in the Italian language", providing numerous descriptions of language components which students should learn. Since these were L1-language curricular indications, and not disciplinary-subject ones, rather than analyzing for *productive disciplinary discourse,* we sought mentions of *productive academic discourse*. In fact, Table 2 illustrates a segment within the **first 150 words** of the **1370** word English translation of the L1-Italian-Language indications which clearly state that, at the end of their studies, students should be able to use Italian to express themselves "with clarity and propriety", adapting to the circumstance at hand (GG) to achieve various *productive* communincative objectives (PL, CV). While this excerpt already makes explicit reference to students' ability to use language effectively, the modified excerpt (Table 2(B)) illustrates how, with the addition of only four words, the indications could make even more explicit the need to build students' *productive language skills*.

[27] From the *Italian National Indications and Guidelines* for Italian L1, English L2, History in Lyceums, Vocational and Technical schools (Lucilla Lopriore)

Table 2. An excerpt from the document surveyed in Table 1, illustrating instances of the productive DL as they appear within the document **(A)**; How the indications could be modified to prompt for more explicit attention towards Productive-DLs **(B)**.

(A) Excerpt

At the end of the Lyceum the student masters the Italian language: he/she is able to express him/herself, both orally and in writing, with clarity and propriety, varying - according to the different contexts and purposes (GG)- the personal use of the language; to perform fundamental operations, such as summarising and paraphrasing a given text (PL), organising and motivating an argument (CV); to illustrate and interpret (PL) in essential terms a historical, cultural, scientific phenomenon. (74 words)

(B) Modified Excerpt

By the end of the Lyceum, students should be able to masterfully use the Italian language to express him/herself, both orally and in writing, with clarity and propriety, varying in registers which respond to different contexts and communicative purposes. Such communicative competence must therefore range from language for fundamental everyday operations, summarising and paraphrasing texts, organising and motivating arguments, to the ability to use language for academic purposes such as explaining ones interpretation of historical, cultural, scientific phenomenon. (78 words)

Finally, it should be noted that, although the excerpt seems to be characterized by a dense distribution of Productive-DLs, this was rather unusual. In fact, these 74 words are followed by a paragraph of 119 words containing no instances of Productive-DLs. As shown in Figures 6 and 7, since instances mentioning Productive-DL were few and far between, it is important that all references to students' command over language should raise readers' awareness to the fact that students' productive academic/disciplinary literacies requires systematic and explicit instruction.

Reflection: The main point that clearly emerges is the missed opportunity for the L1-Italian-Language indications to raise teachers' awareness to the need to explicitly develop learners' language awareness and *productive* language skills while using 'languaging' activities as examples of activity types that would suit even first language approaches. The absence of references to "explicit language instruction" and the need to "explicitly build students' language production skills" explains the difficulties encountered when coding for *productive* disciplinary/academic literacies in these curricular documents.

In fact, the two excerpts below – used in the initial part of the Italian indications - illustrate how "instruction on language" is glossed over, as also mentions of "vocabulary".

> Excerpt: *Italian language teaching requires effective and planned collaboration with the other disciplines*.(Scientific Lyceums, introduction to Italian, p.335-38)
>
> Excerpt: *This course will use the opportunities offered by all the disciplines with their specific languages to facilitate vocabulary enrichment and develop the ability to interact with different types of texts, including scientific texts.*

Not only do the *NI&G* not suggest how such "collaboration with other disciplines" could be "planned effectively", this very valid suggestion is also stated without any reference to the rationale behind using complex disciplinary concepts to build more complex academic language skills, nor do the *NI&G* mention the types of instructional tasks and authentic materials which might sustain such interdisciplinary collaborations. Likewise the reference to "vocabulary enrichment" is taken no further than the 'ability to interact' which is itself only presented as "interaction with written texts". This not only ignores the power of oracy for learning, it also ignores the fact that *productive* language skills do not automatically result from *receptive* language skills.

By contrast, the L1-Italian-Language Guidelines of the *New Vocational Schools* approached "language" more explicitly. As shown in the Excerpt below, the writers of these guidelines made explicit not only the importance of language as a tool for effective learning but also as a tool for formulating and communicating knowledge.

Excerpt:

- ***Listening to and understanding**, globally and in its constituent parts, texts of various kinds, articulated and complex; using methods and tools to fix fundamental concepts e.g.* ***notes, outlines,maps**.*

- *Apply reading **techniques, strategies** and **modes** to different purposes and contexts.*
- *Apply an orderly knowledge of the structures of the Italian language at different levels of the system.*
- *In the context of oral production and interaction, through **active and conscious listening**, master communication situations taking into account purpose, context, recipients.*
- ***Express and support** one's own point of view and **recognise** that of others*.

Reflection: In spite of the explicit reference to "listening & understanding" and to oral production and interaction through active and conscious listening, and the ability to "express and support one's point of view", the points could also be formulated so as to prompt teachers towards Productive-DL:
e.g. the last point could be re-written as
"Use context-appropriate language to express and support one's own point of view and effectively communicate the acknowledgement of the viewpoints of others."

New Vocational schools focus on more practical outcomes. As such, the L1-Italian-Language Guidelines of New Vocational schools frequently emphasize the relevance of interdisciplinary links and the importance of subject specific languages to the learning of the Italian language, something almost always ignored in the lyceums.

5.2.2 The History National Indications and Guidelines
The history indications in the Scientific Lyceums are particulary relevant as central in this traditional type of lyceums. If we read the following introduction to the 5-year course, we notice how the diverse dimensions linked to history learning are immediately put to the fore, while teaching history is defined as:
"teaching history is to propose the unfolding of interrelated events according to time".
Why and how this is proposed is not taken into consideration, rather it is only stated. Let's observe the following excerpt:

Excerpt: "At the end of the high school course **the student is familiar with** the main events and long-term transformations in the history of Europe and Italy, from antiquity to the present day, within the framework of the global history of the world; he/**she uses appropriately** (PL) **the vocabulary** and interpretative categories proper to the discipline(PL); **he/she knows how** to read and evaluate the various sources; **he/she looks at** history as a significant dimension for understanding, **through critical discussion and comparison (CV)** between a variety of perspectives and interpretations, the roots of the present. The starting point will be **emphasising the temporal dimension** of each event and **the ability to place it in the correct chronological succession (OTH)** since **teaching history is to propose the unfolding of interrelated events according to time.** On the other hand, the **second dimension of history, namely space**, should not be overlooked. History indeed entails **a geographical dimension**; and human geography, in turn, needs **temporal coordinates**. The **two spatio-temporal dimensions must be an integral part of learning** the discipline."

Reflections
Most of the occurrences of the 7 categories were identified in the premise to the History indications, where the expected results of the students are outlined. Surprisingly, none are present in the first two years curriculum description, and only one in the final year:

Excerpts (p.332/3)

1)"he/she uses appropriately (PL) the vocabulary and interpretative categories proper to the discipline";
2)" he/she knows how to read and evaluate the various sources";
3) "he/she looks at history as a significant dimension for understanding, through critical discussion and comparison (CV) between a variety of perspectives and interpretations, the roots of the present".

"…..adequate space may be reserved for activities that lead to evaluating different types of sources (TT), reading historical documents or comparing different interpretative theses: this is in order to understand the ways in which scholars construct the narrative of history, the variety of sources used, the succession and contrast of different interpretations".

To be noted how attention to study skills development is focused in the following excerpt:

Excerpt: Students will also develop a study method in line with the subject under investigation, enabling them to summarise (PL) and schematize (VV) an expository text of a historical nature, grasping the salient points of interpretation, exposition and the specific meanings of the disciplinary lexicon (OTH). Attention will also have to be paid to the frequent verification of oral exposition (OTH), of which in particular it will be desirable to monitor the accuracy in placing the events according to the correct spatial-temporal coordinates, the coherence of the discourse and the mastery of terminology (PL).

In the first part of the introduction there are 3 instances of awareness of "discipline-specific", counted as **PL**:

1. uses the vocabulary appropriated (4 words), proper to the discipline (p. 332)
2. making use of basic vocabulary of the discipline (8 words)
3. (expounds on topics) "dealt with in an articulate manner" (6 words)

Total. PL 4 + 8 + 6 = 18 words.

Reflection: Note that, while the indications acknowledge the importance of "producing good language", calling for *"students [to] elaborate and expound on the topics dealt with in **an articulate manner**"* , it is interesting to note that the indications are very word-focused: *"[students should] use vocabulary appropriately… proper to the discipline"*; *"making use of the basic vocabulary of the discipline"* .
By focusing Teachers' attention on only vocabulary and words, such indications may communicate the erroneous message that "languaging about history" is simply about "learning the words". What is missing is the need to help students produce "whole language about whole thoughts" which embody discipline-specific words, but a list of words is not "discourse".
To be noted is also the use of 'teaching history': this illustrates clearly that attention is still on the teaching of, rather than the learning of …

5.2.3. The English as a Foreign Language (EFL) National Indications

The choice of analysing the two – Italian 1st language and English foreign language – indications and guidelines was made in order to investigate whether and how subjects directly language connected to learners' use of language – either their language of origin or the first foreign language they had studied – had been enhanced by specific indications and/or by specific tasks meant to develop learners' awareness of the language they studied and used.

Reflection This is an aspect to be considered also in terms of the growingly non-Italian school population daily exposed to the language of schooling to learn. The analyses of the English L2 *National Indications and Guidelines* developed for the Lyceums, Technical and Vocational schools, besides revealing the use of recent approaches as used for foreign language teaching, in terms of established references to the CEFR levels and to corresponding and appropriate descriptors, reveal how the emphasis is posed in the three types of schools on teaching approaches favouring spoken and written language development, awareness of diverse cultures, and with a stronger emphasis on literature in the scientific Lyceums. The preliminary statement at the introduction of the English L2 indications underlines the relevance of the study of foreign language and culture that should proceed:

Excerpt 1: "along two fundamental, interrelated axes: the development of linguistic-communicative skills and the development of knowledge related to the cultural universe linked to the language of reference".
The goal of the entire high school course (5 yrs) is to reach a level of proficiency to at least level B2 of the CEFR.

Excerpt 2: "To this end, during the high school course the student acquires the ability to understand oral and written texts (PL) on topics of both personal and scholastic interest (literary, artistic, musical, scientific, social, economic); to produce oral and written texts to report facts, describe situations (PL) , argue and support opinions. (CV) ; to interact in the foreign language in a manner appropriate to both the interlocutors and the context; to analyse and interpret aspects of the culture of the countries (CV) whose language is spoken, with attention to topics common to several disciplines".

Reflection: If we observe the longitudinal development within the third and fourth year where English literature is introduced, there is a reference to the learners' emerging cognitive & language skills development and to the relevance of establishing connections with other disciplines through the use of different tools, as technology, and of 'communicating' with foreign interlocutors;

Excerpt 3 - the learner "analyses and compares literary texts, but also artistic productions from different languages/cultures (Italian and foreign); uses the foreign language in the study of topics from non-linguistic disciplines; uses new information and communication technologies to study topics in depth". In the fifth and last year, the learner "analyses and compares literary texts coming from different languages and cultures (Italian and foreign); he/she understands and interprets cultural products of different types and genres, on current affairs, cinema, music, art; he/she uses new technologies to carry out research, investigate non-linguistic topics, express him/herself creatively and communicate with foreign interlocutors".
Counting: **13 CV, 8 PL, 2 TT**

Reflection**:** The description of the actions leading to learning through language is not fully detailed, but several hints at possible activities are mentioned. Interesting once more is the reference to the mother tongue and to the need to 'develop' awareness of communication and of subject language specificity as well as the reference to establishing meaningful connections with other subjects through diverse means of communication.

English L2 in Vocational &Technical schools Guidelines
There are several points in common with the National Indications for the Lyceum English L2 curriculum, but what is noticeable in Vocational & Technical schools is, in the first two years, the reference to aspects such as:
"Interact in short, clear conversations" (PL) on topics of personal, everyday, social or topical interest.
"Use appropriate strategies to search for information" (PL) and understand the main points in clear, short written and oral messages on familiar topics of personal, everyday, social or topical interest."
"Describe (CV) in a simple manner experiences, impressions and events, related to personal, social or current affairs." "Produce short, simple and coherent texts on known topics of personal, everyday, social interest, appropriate in lexical and syntactic choices."
"Recognize (CV) the structural aspects of the language used in communicative texts in written, oral and multimedia form".
" Understands the intercultural character of the English language, also in relation to its global dimension and geographical varieties".
Counting: **2 CV, 8 PL, 1GG**

Reflections on Technical schools (1st 2 yrs) There are several hints on communication, but not a clearer presentation of what the teacher should promote to have learners achieve the course outcomes and develop the final profile, what is present here is a list of déjà vu actions, usually listed in language courses, without references to ways of enhancing them. Rephrasing the list of 'use..' by adding where and how the learners should be put in the position of using the language, would have helped.
Within plurilingual contexts, reference to aspects such as intercultural communication or comparative reflection with learners' mother tongue, meant to stimulate learners' noticing and awareness of language as used in spoken exchanges if related to learners' own language of origin and other modes of oral

interaction, could be useful ways of promoting learners' reflection..

Reflections on Vocational schools (whole cycle)
What emerges clearly in the general outline and in the specific description of English L2 across the whole cycle is its direct connection with the 12 main competences of the new Vocational schools (Appendix A), where competence 5 (related to the foreign language) states:
5 - Use the sectorial sector-based languages of the foreign languages of the study courses to interact in different fields and contexts of study and work. and in the Skills description the whole use of the 12 competences is connected to the cognitive and language dimensions of learning:

Excerpts:
"- **establish connections** between local cultural traditions, national and international cultural traditions, both in an intercultural perspective and for the purposes of study and work mobility;
- **use the sectorial languages** of the foreign languages to interact in different fields and contexts of study and work.study and work contexts;
- **recognise** the value and potential of the artistic and environment;
- **identify and use** modern forms of **visual, multimedia and digital multimedia** and digital communication, also with reference to **expressive strategies** and technical tools of online communication;
- **use** computer networks and tools to access the web and social networks in study, research and in-depth study activities;
- **recognise** the main communicative, cultural and relational aspects of bodily expressiveness and exerciseeffective practice of sport for individual and collective wellbeing"(pp.12-14)
Counting (introduction&2yrs): **2 CV, 8 PL, 1 GG, 1 TT**

Concluding remarks
As stated at the beginning (p.6), the report aimed at finding out whether current Italian National Indications and Guidelines provided explicit guidance for building learners' disciplinary literacies. The overview showed that there are several , often implicit, suggestions that might develop and promote learners' (and teachers') awareness of and use of disciplinary literacies. Further investigations should explore whether and which of the learning outcomes currently present in the *NI&G* are already functional to disciplinary literacies development and how they might be inter-connected with European K competences, or whether they should be reformulated.

References

Dalton-Puffer, C. 2007. *Discourse in Content and Language Integrated Learning (CLIL) Classrooms*. Amsterdam-Philadelphia: John Benjamins.

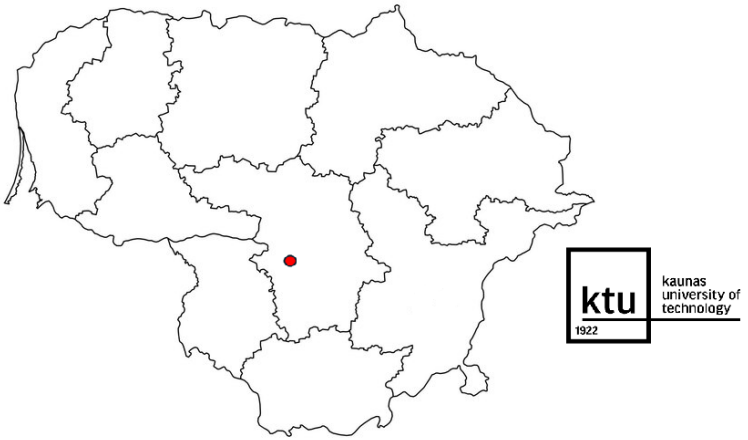
Dalton-Puffer, C. 2007. *Discourse in Content and Language Integrated Learning (CLIL) Classrooms*. Amsterdam-Philadelphia: John Benjamins.

Jarvinen, H.-M. 2010. "Language as a Meaning Making Resource in Learning and Teaching Content. Analysing Historical Writing in Content and Language Integrated Learning". In *Language Use and Language Learning in CLIL Classrooms*, edited by C. Dalton-Puffer, T. Nikula and U. Smit, 145-168. Amsterdam-Philadelphia: John Benjamins.

Lithuania National Report

1. Team & Process

The two members of the Lithuanian National Curriculum Analysis Team are shown in Table 1.

Table 1. The Italian National Curriculum Analysis Team		
Members & Affiliation	**Interest in COST and Disciplinary Discourse**	
Jolita **Horbačauskienė*** Kaunas University of Technology (Lithuania)	Language Specialist: Expertise in EMI and CLIL implementation; Formerly EFL Teacher in tertiary level.	
Milda **Ratkevičienė** Kaunas University of Technology (Lithuania)	Experience in teacher-training, curriculum development from the perspective disciplinary literacy.	
*Lithuania National Curriculum TEAM LEADER		

LT-TEAM was coordinated by Jolita Horbačauskienė who located the most up-to-date curriculum documents.
Jolita Horbačauskienė was responsible for the translation of the national curriculum from L1 (Lithuanian) to L2 (English) (using the deepl.com tool) - editing, proofreading, and matching the translated documents with the original ones. Jolita Horbačauskienė also did the initial search for DL items in the programs.
Milda Ratkevičienė was responsible for tagging, re-searching, analysis, and visual presentation of the results.
Throughout the National Curricula analysis process, both team members worked together in a collaborative manner. All the analyses presented in the text in the chapters and the summary conclusions of the curriculum analysis are the result of a collaborative process of sharing observations and insights.

2. National School System

Figure 1 is a schematic illustration of how the Lithuanian school system is organized from preschool into tertiary-level instruction.

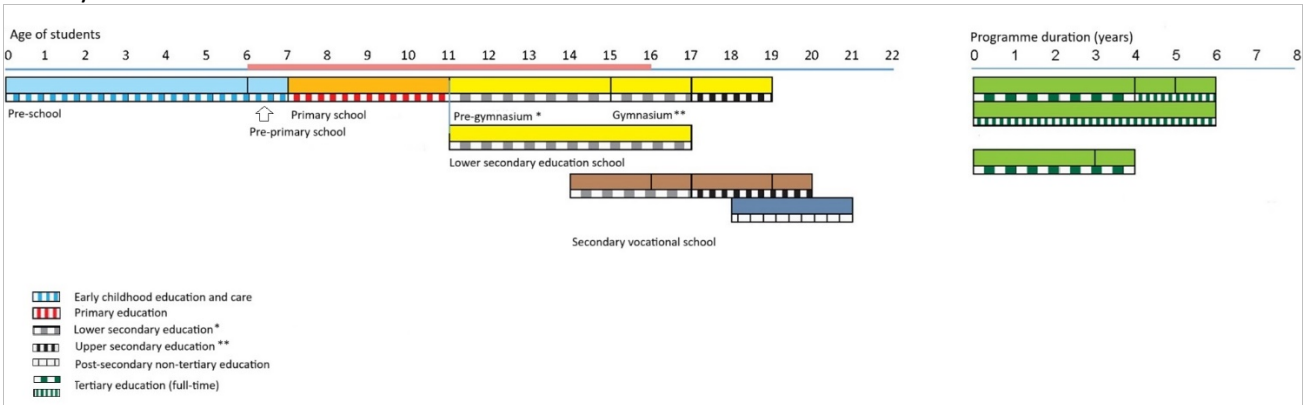


Figure 1. Organization of the Lithuanian school system (adapted from "Key features of the Lithuanian education system", Eurydice, 2024[1], and European Commission, 2022[2])

Stages of the Lithuanian education system

The education system in Lithuania is decentralized rather than centralized, which means that responsibility for the organization and delivery of education is divided between different levels of institutions - the government, the Parliament, ministries, municipalities, and the educational institutions themselves. In general, the national-level institutions - the Government, the Parliament, and the ministries - are responsible for the formulation of education policy and the adoption and implementation of legislation in force at national level. The middle level of government - the municipalities - is responsible for their own strategic education plans in line with national documents, formal and nonformal education, etc. Meanwhile, schools themselves, which may be public or private, organize and deliver education services in accordance with national education policy.

The system of education in Lithuania includes the following four stages[3]:

- Pre-school and pre-primary education (typically 0 – 7 years). Early childhood education includes pre-primary education (which is not compulsory) and pre-primary education (which is compulsory), which is classified as non-formal education. It can take place in pre-school, pre-primary, or general education settings, or be provided by free teachers or other education providers.
- Primary and lower secondary education (typically 7 – 17 years). Primary education in Lithuania lasts for 4 years (grades 1-4) and is free in public institutions. Lower secondary education lasts 6 years and is divided into two parts: the first part lasts 4 years (grades 5 to 8); the second part lasts 2 years (grades 9 to 10 or gymnasium I to II). Education in Lithuania is compulsory up to the age of 16 and usually continues until the student completes 10 years of schooling. Primary education in Lithuania lasts for 4 years and is free in public institutions, while basic education lasts for 6 years. Education in Lithuania is compulsory up to the age of 16 and usually continues until a student completes 10 years of school.
- Upper secondary and vocational education and training (typically 17 – 19 years). Secondary education (Grades 11-12 or Grades III-IV) is provided in gymnasium and vocational schools, which can offer both lower secondary and upper secondary education programmes. Vocational training is between one and two years, either as a school-based course or as an apprenticeship.

[1] Eurydice (2024). Overview Retrieved from: https://eurydice.eacea.ec.europa.eu/lt/national-education-systems/lithuania/lithuania.

[2] European Commission (2022). The structure of the European education systems. Schematic diagrams. Eurydice – Facts and Figures.

[3] Eurydice (2023). 2. Bendroji švietimo sistemos struktūra ir švietimo valdymas. Retrieved from: https://eurydice.eacea.ec.europa.eu/lt/national-education-systems/lithuania/svietimo-sistema-ir-jos-struktura.

- Higher education. Higher education is for people with at least upper secondary education and is organised in colleges or universities. The degrees awarded are divided into bachelor's (awarded in colleges (vocational) or universities (university), 3 - 4 years), master's (awarded in universities, 1.5 - 2 years), doctorate (awarded in universities, 4 years).

Currently, general education in Lithuania (including lower secondary and upper secondary education) is based on the Law on Education, which is the primary legal act governing education in Lithuania. Curriculum inventory for primary, basic, and secondary education approved by the Lithuanian Ministry of Education, Science and Sport (approved in 2023). However, in 2022, a very important change was made in the field of pre-primary, primary, basic, and secondary education in Lithuania, with the approval of the new Common Curricula for Pre-primary, Primary, Basic, and Secondary Education. It is very important to note that this initiative has fundamentally changed the education system at this level (see further for more details on these curricula). The content, achievement, and assessment of learning (e.g. mid-term examinations, graduation exams, etc.) are developed and implemented on the basis of these documents.

It should also be noted that multilingualism in schools is not regulated by law, except in the case of education in national minority schools, in which case children are taught both their mother tongue and Lithuanian as the state language, as well as foreign languages in the framework of the general curriculum. Multilingualism in the country's schools is also an initiative to be promoted in the context of the idea of a multilingual Europe, i.e., to ensure that citizens are able to speak not only the national language but also at least one foreign language of the European Union. More and more schools are therefore opting for multilingualism practices (e.g. International Baccalaureate classes taught in English), independently but without prejudice to national documents.

3. The Survey

Figure 2 illustrates which Lithuanian curriculum documents were translated into English and which were analyzed with the coding system described in Section 1.

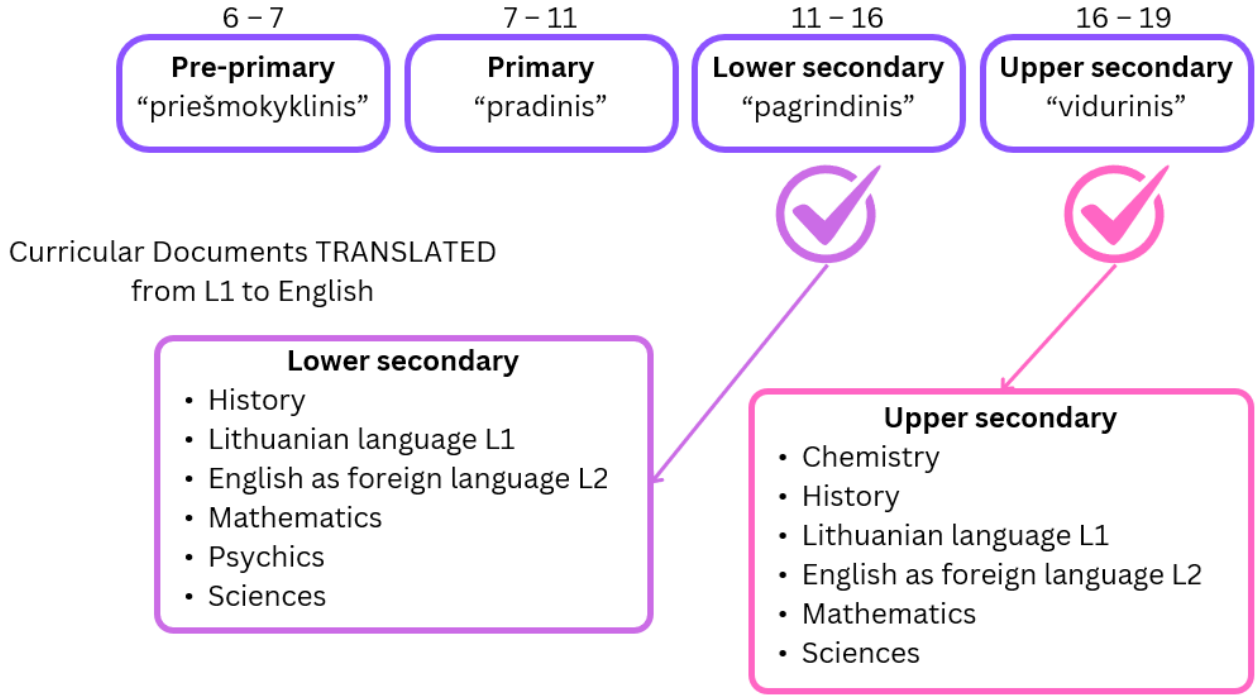


Figure 2. Lithuanian curricular documents which were translated into English documents which were surveyed for mentions of *productive* disciplinary literacies, as described in Section 1

As can be seen in Figure 2, the main subjects chosen for the analysis were the core subjects of primary and secondary education - history, Lithuanian as a mother tongue, English as a first foreign language, mathematics, physics, and sciences, which are only taught in grades 5-8, that is, implemented in lower secondary education, and chemistry, which is taught in grades 7-12, that is, implemented in upper secondary education.

These subjects have been chosen because they are similar in an international context, allowing a comparative perspective to be taken in this analysis. The choice was also influenced by the fact that these subjects cover a fairly wide range of knowledge, both sciences and humanities, and are taught in virtually the entire general education curriculum (not to mention primary education). In addition, subjects that are essentially fixed (not in terms of content), i.e. they have been included in the general curriculum since the country's independence, except for sciences. The sciences curriculum is chosen because it is relatively new but is included to strengthen children's basic knowledge of sciences.

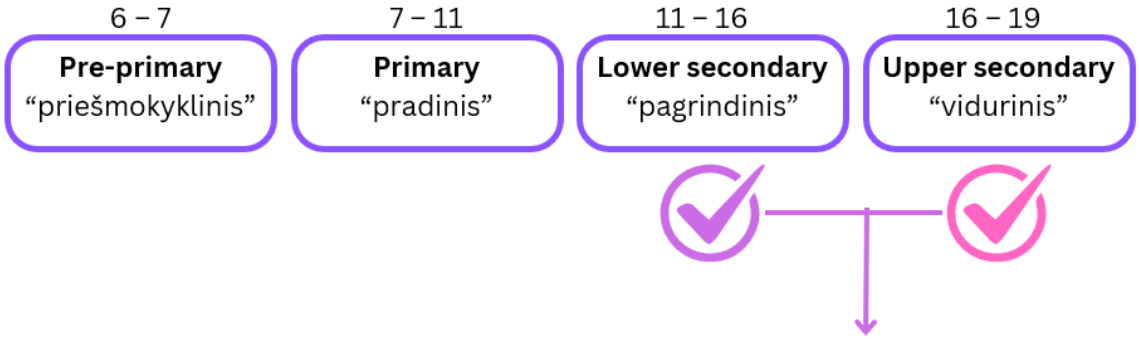
Original L1 Documents can be found in (https://drive.google.com/drive/folders/13G1MUQaaEVPZCH82Uyo--IexJAtBqGkN), the English translation of these documents can be found in (https://drive.google.com/drive/folders/16h8Uqr-Tj6TucQN2KE_yxubXB8Dg-WeX) and the surveyed documents can be found in (https://drive.google.com/drive/folders/1mRJ6HWayGgMsIfVznTbBo3kvZlXBazvc)).

As mentioned above, the new Curriculum Programmes for pre-primary, primary, primary and secondary education were adopted in 2022. As the focus of this analysis is on secondary curricula, it is appropriate to elaborate on the composition of these curricula in some detail. All curricula consist of seven main parts:

I. General provisions – general background information focused on the programme of the subject.
II. Aim and objectives – details the aim and objectives of the programme.
III. Developing competences – subject-oriented competences, detailing the essential elements of the competences.
IV. Areas of achievements and achievements – detailed definitions of pupils' achievements and their levels by grade.
V. Content of the training(s) – curriculum content, broken down by grade.
VI. Assessing pupil's achievements – the process for assessing achievement in the subject.
VII. Characteristics of pupils' levels of achievements by attainment area – summarised information for the whole programme, focusing on achievements.

It is also very important to note that the curricula are not divided by grade. Only Part IV (Areas of Achievements and Accomplishments) details the levels of achievement for each grade, and Part V (Content of the training(s)) details the content of the training(s) for a particular grade. The analysis therefore also provides a general analysis without specifying the grades, except for more detailed DL analyses by grade in the Areas of achievements and achievements analysis.

Given the large size of the national programmes, and in particular the humanities programmes (up to 250 pages), it was decided not to analyze the entire programme. Figure 3 shows the logic of which parts of the document of the national curricula were analyzed.



	Sciences		History		L1		L2		Maths		Physics		Chemistry	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
I chapter	x		x	x	x	x	x	x	x	x	x	x		x
II chapter	x		x	x	x	x	x	x	x	x	x	x		x
III chapter	x		x	x	x	x	x	x	x	x	x	x		x
IV chapter	x		x	x	x	x	x	x	x	x	x	x		x
V chapter	x		x	x	x	x	x	x	x	x	x	x		x
VI chapter	x		x	x	x	x	x	x	x	x	x	x		x
VII chapter	x		x	x	x	x	x	x	x	x	x	x		x
Words in total*	15915		25453		60013		36973		28327		15048		18323	

** I chapter – VI chapter*

Figure 3. Curricular documents’ chapter which were surveyed for mentions of *productive* disciplinary literacies, as described in Section 1

As can be seen in Figure 3, all parts of the curricula were chosen for analysis, with the exception of Chapter VII, because, as already mentioned, this part is summarizing, i.e., no summary information is provided to consolidate the key messages of the achievements. Therefore, to avoid repeating the analysis of the elements already analyzed, it has been decided not to include this part in the analysis.

Section 4. Survey Results: Data, analysis, findings & reflections

This research is focused on the question whether Lithuania’s national secondary education curricula draw the attention of teachers to the need to build their students’ academic language or disciplinary knowledge as an essential parallel process accompanying content learning.

The categories of disciplinary literacy analysis are the following:

- mention of the ability of students to perform **verbal actions based on thinking skills (CV)**, using command verbs denoting **language actions**;
- mention of the student’s awareness of **genre or text-types (GG)**;
- other mentions of the **productive use of language by students (PL)** to show learning that are not covered by the first two types;
- mention of students’ ability to navigate, use, and also show learning through **digital literacy elements (DD)**;
- mention of the ability of students to extract information from **visual elements (VV)** for learning and also use visual elements to show their knowledge;
- mention the ability of the students to work with **subject-specific realia (TT)** required to carry out subject-specific hands-on actions;
- **all what is (OTH)** relevant but does not fall into the categories above.

An analysis of how DL manifests itself in the national curricula shows that different elements of DL can be found in all the programmes, although they are expressed very differently (see Figure 3).

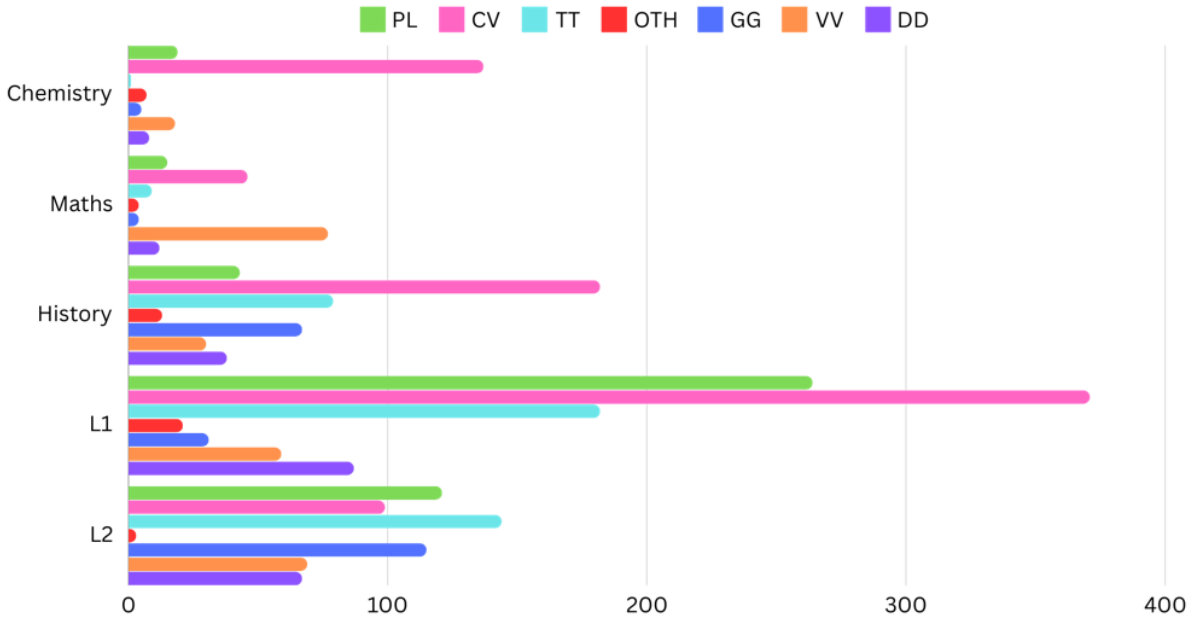


Figure 4. DL in national curricula

As can be seen in Figure 4, it is not a surprise that the humanities curricula are the richest in the expression of DL elements: the results show that the category of verbal actions based on thinking is dominant in Lithuanian language discipline, followed by instances of productive use of language. In addition to the "soft" DL elements, the digital or visual elements are also quite frequent in the humanities curricula. While in the sciences curricula, the Verbal actions based on thinking skills element is quite dominant (in chemistry 137, while in maths only 46), and in the mathematics curricula, the visual element is prominent accounting for 77 mentions. For instances of verbal actions based on thinking skills (see Figure 5), it can be noted that these DL items are usually defined by words such as relate, evaluate, compare identify.

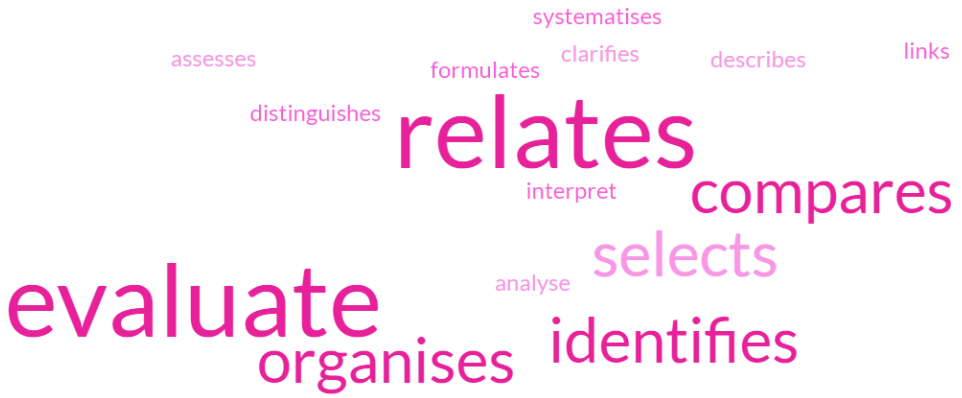


Figure 5. Instances of verbal actions based on thinking skills

In terms of the elements of the DL CV, the Lithuanian national curricula focus mainly on basic knowledge and skills. Examples illustrating this are given below:

- critically **evaluate popular science texts** (CV), **(**Chemistry curriculum, p. 3);
- **critically evaluating** historical narratives and sources of historical knowledge (CV), (History curriculum, p. 4);
- select relevant information from different sources in a variety of ways, **compare** (CV), critically **evaluate** (CV), classify, summarise, interpret and combine information from different sources (Physics curriculum, p. 5);
- **select** information from a variety of sources (CV), (Sciences curriculum, p. 4).
- critically **reflects** (CV) on mathematical activities and their outcomes, (Maths curriculum, p. 3);
- **describe** (CV) the rights and duties of a citizen, analyse why it is necessary to defend one's rights and fulfil one's duties (L2 curriculum, p. 5).

For instances of genre or text types the most commonly used text types are summaries, messages, essays, CVs, etc. (see Figure 6). These types are mentioned in relation to students' need to be able to create and analyze the texts.

Figure 6. Instances of genre or text-types

As for the elements of DL GG, their variety in the national curricula is quite wide: students need to know, be able to create, and analyze a wide range of genres or text types. Most GG elements can be found in the history, L1 or L2 curricula, but they are also present in, for example, mathematics curricula. Below are some examples:

- Writing texts of a personal nature: **a letter** (GG), **a diary** (GG)**; texts of a subject nature: an article** (GG) **on the problems of young people's lives, an interview** (GG)**, an essa**y (GG)relating to a work of literature, an **annotation** (GG)**, a characterisation** (GG)**, an autobiography** (GG)**, a report** (GG) **on a piece of work (e.g. research), a motivation letter** (GG)**, and a folder of wor**k (GG). (L1 curriculum, p. 90);
- create <…> **a mathematical report** (GG), (Maths curriculum, p. 5);
- Writes detailed written descriptions (GG) of a wide range of subjects and events <...> writes an informative report (GG), a curriculum vitae (GG); writes a **review** (GG) and/or **testimonial** (GG) of <...> **book** (GG), (L2 curriculum, p. 12).

Instances of productive use of language are reflected by words such as argue, express, reflect, apply, justify (see Figure 7).

Figure 7. Instances of productive use of language

The expression of DL PL elements in national curricula is also quite broad. PL illustrates how and in which contexts the use of language is defined. Below are some examples to show the expression of PL in different national curricula:

- **to discuss** (PL) the cultural, historical, social and other contexts in which they operate; (L1 curriculum, p. 100);
- When communicating with a real or imaginary interlocutor or in a group, students learn to choose and **combine** different mathematical communication strategies (PL), and **gain a better understanding** (PL) of the purpose and features of mathematical language. (Maths curriculum, p. 3);
- creatively **applies** existing knowledge, skills and research findings in standard situations (PL), (Sciences curriculum, p. 15);
- **formulates** (PL) the problem questions, related research objectives and hypotheses (Physics curriculum, p. 11);
- **apply** (PL) their cultural knowledge in personal and social life and in the process of foreign language teaching (L2 curriculum, p. 5);
- **use chemistry concepts and terms meaningfully in their own language (PL)**; (Chemistry curriculum, p. 3);
- **construct** (PL) a historical narrative based on historical knowledge, the identification and analysis of sources, the cultural context and the arguments, based on the values of democracy, humanism, empathy and human solidarity; (History curriculum, p. 1 – 2).

The digital element of DL is also very dominant in the curricula (see Figure 8), often manifesting itself through the aim of empowering students to create and develop digital content, to be able to interact in virtual space, to be able to find the right information on the Internet, and to use different platforms, tools and apps.

Figure 8. Instances of digital literacy elements

As data in national curricula demonstrate, DD is essential for the education of today's learners. Therefore, the expression of DD elements is very wide and varies in all the curricula analyzed. Below are some illustrations that show the contexts and meanings of DD as an element of DL:

- **creative use of digital technologies, interactive simulations or virtual laboratories** to search for information, collect and process research data, investigate processes and phenomena (DD), (Chemistry curriculum, p. 5);
- using the possibilities of **modern technologies** (DD) (**mapping platforms** (DD), **mobile apps** (DD), etc.), (History curriculum, p. 7);
- students should also gain experience in using digital (DD) content for mathematics learning and educational applications that shorten the solution path. (Maths curriculum, p. 21);
- in physics lessons, activities are planned and organised in such a way as to enable students to use **digital technologies** (DD) in a skilful, creative and purposeful way in a variety of tasks <…> (Physics curriculum, p. 4)
- **use of a range** of digital devices, tools, technologies and to **interact** in the digital environment (DD), (Sciences curriculum, p. 4);
- **develop information technology literacy** (DD) **by creating e-books** (DD)**, films** (editing and publishing) (DD), **creating** (DD) and **broadcasting podcasts** (DD), <…> **composing** (DD) and **editing audiovisual works** (DD), (L1 curriculum, p. 6);
- Students develop **digital competence** (DD) when they understand the main ideas and details of the videos, TV programmes, films they watch; **use digital dictionaries** (DD)**, translation programmes** (DD)**, other comprehension tools** (DD), (L2 curriculum, p. 4);

Visual elements are also very important in the learning process (see Figure 9). The aim is for students to be able to present results in appropriate formats (tables, charts and graphs), to analyze photos, pictures, maps, create family trees and other visual elements using the right tools.

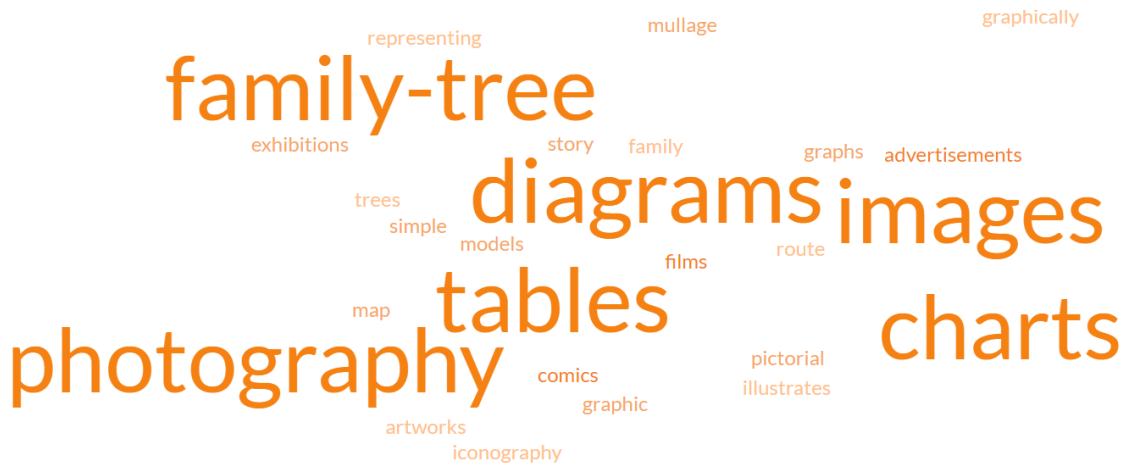


Figure 9. Instances of visual elements

Here you can see examples from different national curricula of how the elements of VV appear in the context of DL:

- **presents** results in appropriate formats (tables, charts and graphs) (VV), (Chemistry curriculum, p. 13);
- **Compares maps** (VV) from different periods and uses them to identify changes and their causes, (History curriculum, p. 13);
- independently analyses mathematical messages in various forms (**text, figure, diagram, chart, formula, table, drawing, graph, diagram**) (VV) and combinations of forms (**text, figure, diagram, formula, table, drawing, graph, diagram)** (VV), (Maths curriculum, p. 9 – 10);
- presents data in the **form of tables** (VV), **graphs** (VV) or **other selected methods** (VV), (Physics curriculum, p. 14);
- learning how to turn a text into a **graphic structure** (VV): drawing **action diagrams** (VV), a **network** (VV) of connections and relationships between the characters in a work, etc. (L1 curriculum, p. 83);
- presents data in the form of **tables** (VV), **graphs** (VV) or **other selected methods** (VV), (Sciences curriculum, p. 13);
- **creates** presentations with notes and visual elements, voice-overs (VV); **produces** a film, report, interview about personalities, environmental phenomena, important events, different (L2 curriculum, p. 12 – 13).

Instances of subject-specific realia (see Figure 10) are usually revealed through a variety of specific skills in handling nonverbal tools, correcting, proofreading, exploring and other activities.

Figure 10. Instances of subject specific realia

As for the expression of the TT elements in the national curricula, it should be noted that, unlike the other DL elements, their definitions tend to be very subject-specific, i.e. they are very specifically related to the subject in whose context they appear. Examples of the expression of TT in national curricula are given below:

- **Draws** (TT) on sources or historiographical examples to explain why one or other person qualifies as a historical figure, (History curriculum, p. 11).
- **choosing** (TT) appropriate reading methods according to the task and the nature of the text (L1 curriculum, p. 15)
- Students learn <…> using numerical tools as well (TT) (Maths curriculum, p. 23)
- **Uses** (TT) natural science concepts, terms and conventional signs correctly to explain phenomena, (Physics curriculum, p. 9);
- listening comprehension (A1): comprehension of **spoken instructions** (TT), **directions** (TT), **announcements** (TT), **conversations** (TT), **debates** (TT), **reports** (TT), **speeches** (TT), **lectures** (TT), **oral narratives** (TT), **spoken journalistic** (TT) **or popular science texts** (TT), (L2 curriculum, 6 p.)

Meanwhile, when it comes to the instances of DL OTH elements in the national curricula, OTH tends to emerge in the definition of more abstract, interdisciplinary competencies and competencies to be developed. Some examples of OTH from different national curricula are given below:

- **develop** their science literacy (OTH), (Chemistry curriculum, p. 2);
- **consider questions** (OTH) of authorship and reliability, (History curriculum, p. 7);
- **the ability to respect** (OTH) copyright and accepted rules for the presentation of bibliographic information, (History curriculum, p. 8);
- **creates a positive environment** (OTH) (L1 curriculum, p. 16);;
- Mathematical language is developed through observation, description of mathematical models and objects, exploration of natural and social phenomena, works of art and literature, etc." (OTH) (Maths curriculum, p. 3)
- This enables pupils to **develop** critical and creative thinking and problem-solving skills (OTH), to pose personal challenges, to **generate** new knowledge (OTH) (Physics curriculum, p.1).

As the new curricula are based on developing students' competencies in each discipline, it was interesting to see the manifestation of DL in this particular section (see Figure 11).
When analyzing the manifestation of DL in the competences part of the national curricula, it was observed that all types of DL can be found in the history curriculum and that their expression is quite similar. It is

interesting to note that in the L1 curriculum the digital element is the most expressed in the description of competences, while in chemistry it is Verbal actions based on thinking skills.

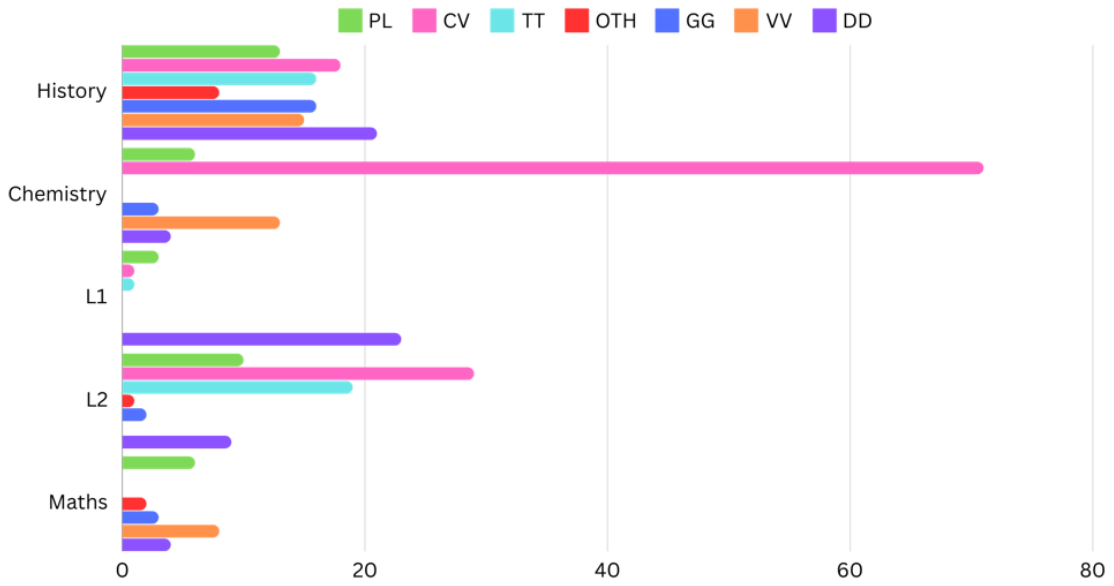


Figure 10. DL in national curricula's Competences section

The aim was also to analyze whether there is a difference in the expression of DL when comparing the achievements of the students at different grades. As shown in Figure 11 example of Lithuanian as a mother tongue (L1), no significant differences emerged when comparing manifestation of DL in different grades. Even when comparing the general and advanced levels of gymnasium III-IV, there is no significant difference.

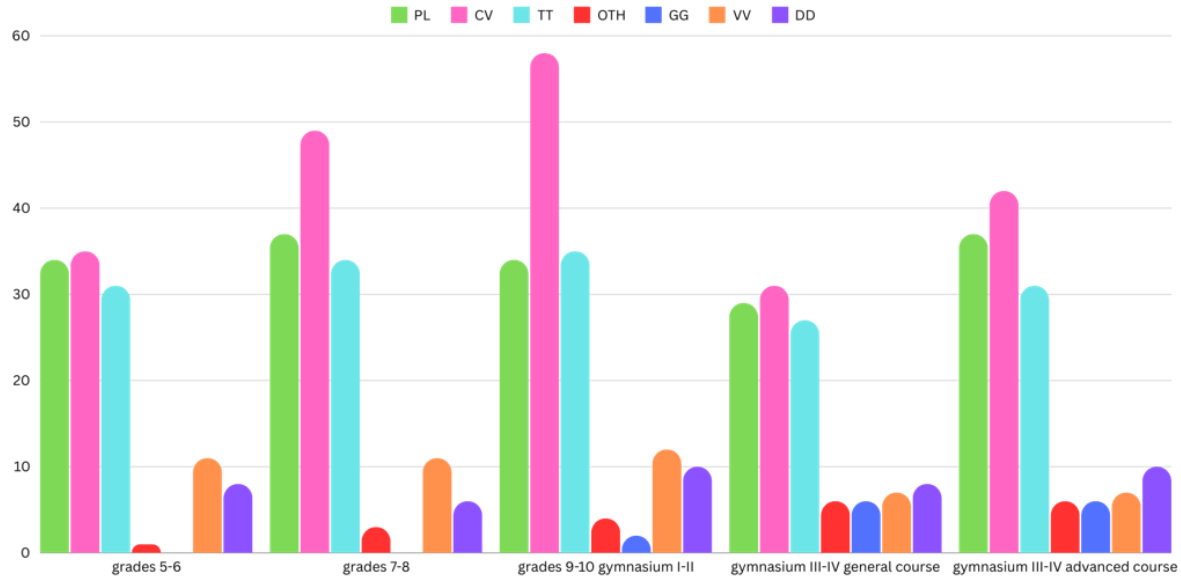


Figure 11. DL in L1 achievement section (grade 5 – gymnasium IV)

When analyzing how DL is manifested in the history curriculum in a grade-by-grade comparison (see Figure 12), it is observed that in the last grades there is no emphasis on digital and visual elements, which are present

to some extent in other grades. While the frequency of verbal actions based on thinking (CV) is increasing with a higher level of secondary education.

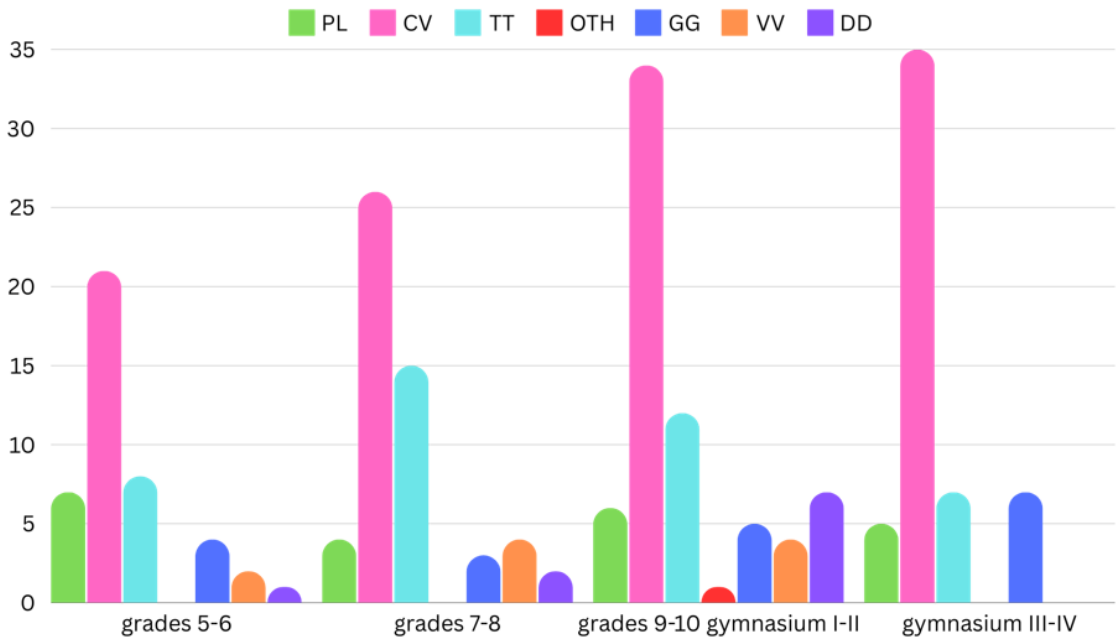


Figure 12. DL in History achievement section (grade 5 – gymnasium IV)

When analyzing the achievements of the chemistry curriculum in the different grades (see Figure 13), it was once again observed that the sciences curriculum is not characterized by an orientation towards digital or visual DL elements, but rather by the expression of "soft" DL competences such as verbal actions based on thinking skills.

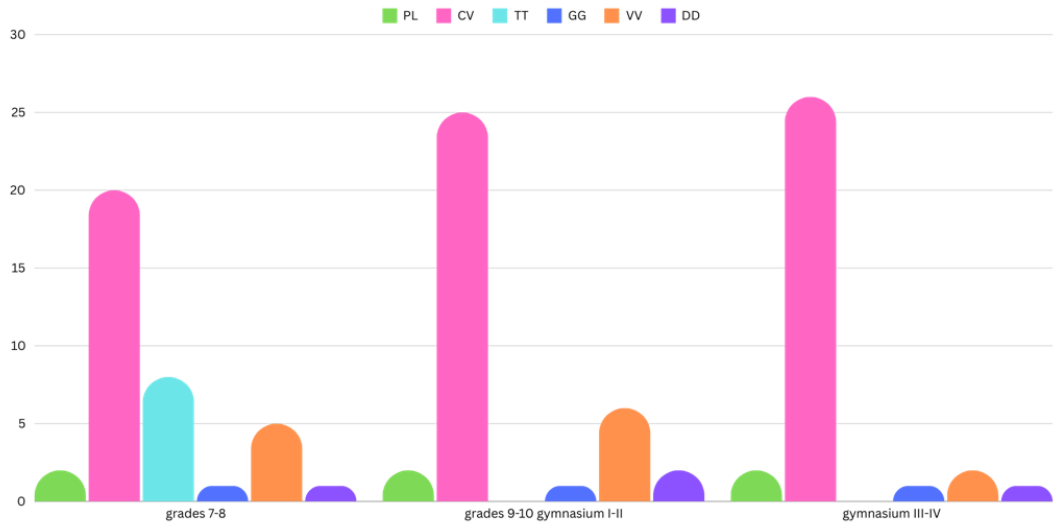


Figure 13. DL in Chemistry achievement section (grade 7 – gymnasium IV)

It is also very important to note that interdisciplinarity is reflected in the national secondary education curricula. As the aims or objectives of the curricula, and priorities are set to enable pupils to develop cross-curricular content in order to see science as part of the natural, social and cultural environment.

For example, in the Lithuanian curriculum as the mother tongue, the skills to create digital content are highlighted by creating digital content related to the subject of Lithuanian language and literature and cross-curricular digital content are highlighted; in History universal interdisciplinary concepts used in the language of the various humanities are mentioned to represent interdisciplinarity; in Chemistry – raising students' awareness to critically evaluate the technologies emerging from advances in chemical science and their role in human life and their relationship to the natural, social, and cultural environment; in Math – mathematical language is developed through exploration of natural and social phenomena, works of art, and literature.
Thus, in summary, it can be stated that various mentions of disciplinary literacies can be found in Lithuanian national curricula. The representation of disciplinary literacies is quite rich, and all national curricula focus on competence development.

The humanities are characterized by a greater variety of disciplinary literacy instances, while the sciences are, paradoxically, more characterized by elements of verbal actions based on thinking skills and productive use of language.

The Netherlands National Report

1. Team & process

The Dutch national team for this task consisted of four members, as illustrated in Table 1.

Team member	Position & Organisation	Subject specialism	Roles & relevant expertise
Dr Tessa Mearns	Assistant professor, Leiden University	Modern Languages	Researcher & teacher educator Applied linguistics, CLIL, bilingual education
Prof. Rick de Graaff	Full professor, Utrecht University	Modern Languages	Researcher & teacher educator Applied linguistics, CLIL, bilingual education, multilingualism, language-oriented content teaching
Dr Jannet van Drie	Associate professor, University of Amsterdam	History	Researcher & teacher educator Historical reasoning, language in history education
Dr Gerald van Dijk	Senior lecturer, Amsterdam University of Applied Sciences	STEM	Researcher & teacher educator STEM teaching, language-oriented content teaching

Table 1: Netherlands national team

All members of the team contributed to retrieving the L1 curriculum, and for translating and proofreading translations of the relevant sections. As can be seen in Table 2, each team member was responsible for the first analysis of one or more subject curricula. Those analyses were then checked by at least one other member of the team. These steps took place in parallel with each other. Once all analyses were completed, Tessa Mearns collated the analysis documents, performed final checks on the analysis, ensured that the documents were in line with each other. She wrote the final reflections in the analysis documents and the other team members checked them and suggested improvements. This national report was authored by Tessa Mearns and Rick de Graaff.

Team member	Tasks
Tessa Mearns	First coding L2 English & Maths curricula; checked all other analyses; collated and prepared analysis documents; synthesised reflections for final documents; quantitative analyses; co-authored final report
Rick de Graaff	First coding L1 Dutch curriculum; checked analysis of L2 English & Maths curricula; checked final reflections; co-authored final report
Jannet van Drie	First coding Humans and Society (social sciences) curriculum; checked analysis of Humans and Nature (natural science) curriculum; checked final reflections
Gerald van Dijk	First coding Humans and Nature (natural sciences) curriculum; checked analysis of Humans and Society (social sciences) curriculum; checked final reflections

Table 2: Distribution of tasks

2. The national school system

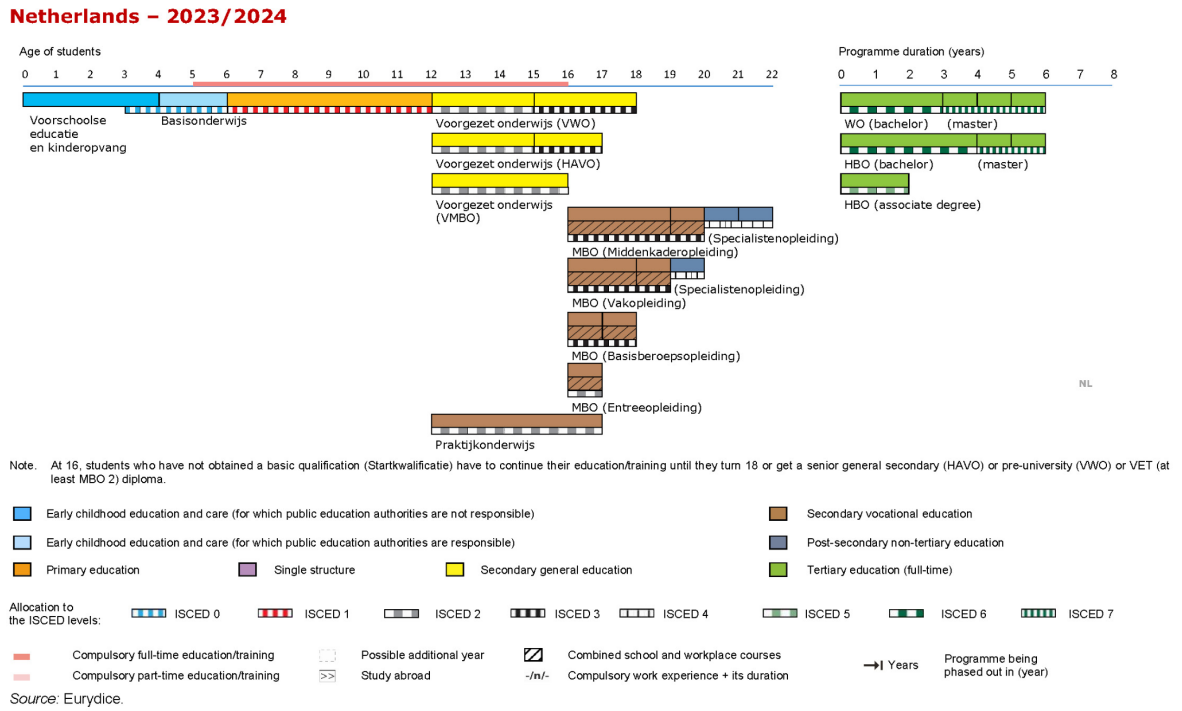


Figure 1. Structure of the Dutch education system[1]

- In the Netherlands, the school system is divided into primary, secondary and tertiary levels. After primary education (8 years, at age 12) pupils are streamed into three different secondary school types: pre-vocational (4 yrs), general secondary (5 yrs), pre-university (6yrs).
- National curriculum descriptions are available at the primary, lower secondary and upper secondary level, taking into account the different school types.
- Curriculum descriptions focus on general characteristics and achievement goals at program level, for each school subject separately.
- Curriculum descriptions do NOT specify content, planning or pedagogies. This is the schools' own responsibility, who usually make use of materials by (commercial) textbook publishers
- Achievement goals are evaluated at the end of primary and of (upper) secondary education by means of national standardised tests, usually in combination with school-based assessments.
- During lower secondary education, achievement goals are evaluated by means of school-based assessment, usually in combination with tests provided by (commercial) textbook publishers.
- Bilingual Education (CLIL/TTO) is provided as an option mainly at lower secondary level, for all school types
- **For this report, we have analysed the national curriculum descriptions at the lower secondary level.** Note that in terms of achievement goals these do not distinguish between pre-vocational, general secondary and pre-university school types.
- The following subjects have been included in the analysis presented in this chapter (see also Table 3):
    - Dutch [L1]
    - English [first FL]

[1] Source: https://eurydice.eacea.ec.europa.eu/national-education-systems/netherlands/overview

- Arithmetic and mathematics [henceforth 'maths']
- Humans and nature [henceforth 'natural science']
- Humans and society [humanities & social science, henceforth 'social science']
  NB: All these subjects are compulsory in lower form secondary education. Dutch, English and Maths are core subjects, which implies they remain compulsory in upper secondary education.

2.1. The details

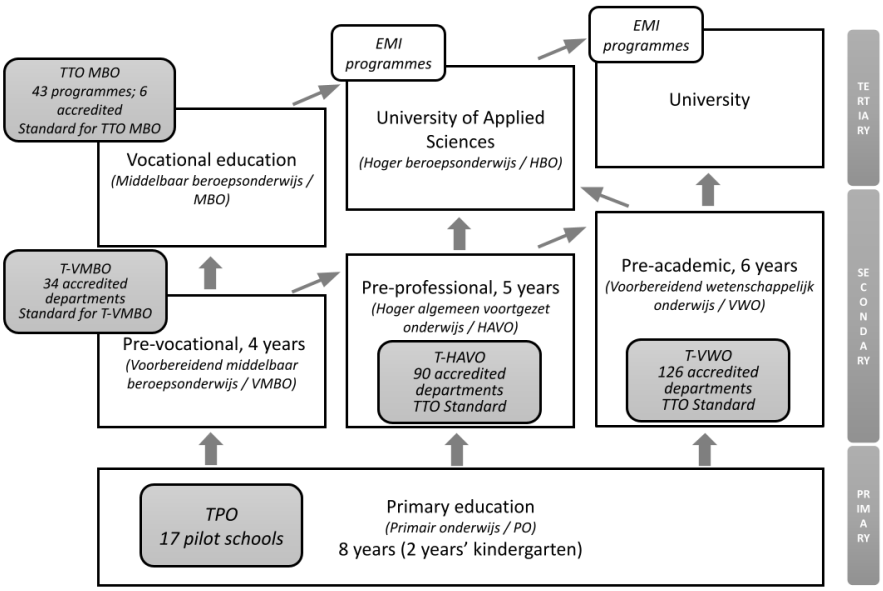


Figure 2. Dutch educational tracks, including bilingual options[2]

Figure 2 outlines the structure of the educational tracks in the Netherlands, including presence and prevalence of accredited bilingual programmes (data from 2021). The Dutch educational system comprises primary, secondary and tertiary/higher education. Education is compulsory from age 5 to age 18 (primary and secondary). After eight years of primary education (age 4-12), pupils are selected for a diversified system of secondary education, based on primary school's advice and national diagnostic tests. Secondary education is subdivided into three tracks, with further subdivisions.

Language of schooling is Dutch (or Frisian as a regional language in primary education). Schools can offer part of their program through English (max. 15% in primary education, min 30% in prevocational education, min. 50% in lower secondary and min. 25% in upper secondary). A limited number of primary schools have received permission to offer 50% of their program through English. For secondary schools with a bilingual program, additional quality assurance criteria apply (see https://www.nuffic.nl/sites/default/files/2020-08/kwaliteitsstandaard-tweetalig-onderwijs-2-0.pdf). Most bilingual schools also offer a 'regular' Dutch-taught program. Core achievement goals are identical for regular and bilingual education, with additional bilingual education goals for proficiency level in English, global citizenship and personal development.

Foreign languages taught are English, French and German. English is compulsory from upper primary until the end of upper secondary education. Some schools also offer Spanish, Mandarin, Arabic,

[2] Source: Mearns T.L., Kampen E. van & Admiraal W. (2023), CLIL in The Netherlands: three decades of innovation and development. In: Banegas D.L. & Zappa-Hollman S. (Eds.), The Routledge handbook of content and language integrated learning: Routledge.

Turkish, Italian or Russian. Schools with high numbers of pupils with other home languages than Dutch may use homelanguages in informal communication, although practices are rather limited so far.

For the Disciplinary Literacy curriculum analysis we have focused on the lower secondary education level. Although the educational system at the secondary level is diversified and selective, the achievement goals are not specified for the educational levels separately, meaning that the same objectives apply to the first three years of pre-vocational (vmbo), general (havo) and pre-university (vwo) tracks. The lower secondary achievement goals are compulsory, but are not tested nationally: it is the schools' responsibility to monitor and assure their program quality and their pupils' achievement level.

Core achievement goals are defined by the Ministry of Education, and developed by the National Curriculum Agency SLO: Kerndoelen - SLO
The current core achievement goals were defined in 2006. Currently, new core achievement goal are developed and may be implemented shortly: Actualisatie kerndoelen | SLO

3. This survey
The curriculum document used for this survey was *Karakteristieken en Kerndoelen: Onderbouw voortgezet onderwijs* (*Characteristics and Core Objectives: Lower secondary education*; SLO, 2006). This curriculum document provides the parameters for the curriculum in the eight core curricular domains for lower secondary education (approximately age 12-15) and applies to the first three years of the pre-vocational, general and pre-university tracks (see Figure 1). The core curriculum is the same for all schools, whether in Dutch-language and bilingual (Dutch-English) streams. See Section 2 for a more detailed account of the status and role of this document.

The original document can be accessed via https://drive.google.com/file/d/1WqVKOHlFIuhqcJGjV0YqCLFfRz1vQihA/view?usp=drive_link. For the purpose of analysis, the document was retrieved from https://slo.nl/publish/pages/4881/karakteristieken-en-kerndoelen-onderbouw-vo.pdf on 24 October 2024. The English translation of the sections referred to in the analysis can be accessed via https://docs.google.com/document/d/1Nt53ips7zTYZyuvY_N4VtCqDurQVGE0R-d0mwpwibFs/edit?usp=drive_link.

Table 3 presents an overview of the sections of the curriculum document analysed for the purpose of this survey. These sections were selected as they addressed the specific subject areas targeted by the COST Action. The sections on the domains Arts and Culture and Movement and Sport were not included in the analysis as they were not the core focus of the action.

Subject domain (details in brackets)	**Pages (original)**	**Pages (English)**	**Analysis document**	**Words analysed (English)**
Dutch *(official L1)*	7-8	1-2	NL_AN_L1DUTCH_lowersec_RdG_TM	596
English *(official first FL; there are no separate goals for other FL)*	8-9	2-3	NL_AN_ENG_lowersec_TM_RdG	473

Maths	9-10	3-5	NL_AN_MATH_lowersec_TM_RdG	582
Natural science *(e.g. biology, chemistry, physics, technology)*	10-12	5-6	NL_AN_SCI_lowersec_GvD_JvD_TM	699
Social science *(e.g. history, geography, social studies)*	12-15	6-8	NL_AN_SOCSCI_lower_JvD_GvD_RdG_TM	866
			Total words analysed	3216

Table 3. Sections of *Characteristics and Core Objectives* (SLO, 2006) analysed in this survey

As a major curriculum innovation is currently under preparation, we decided to analyse only the lower form secondary education curriculum documents, as these are also the core of the COST target group. As soon as the core achievement goals for primary and lower secondary education have been implemented, as well as the final achievement goals for upper secondary, we aim at extending the current analysis. According to recent developments, it is expected that the future documents will have a much stronger focus on the role of language in learning, and therefore on disciplinary literacies, than the actual version from 2006.

4. Survey Results: Data, analysis, findings & reflections

In line with the objectives of this part of the COST CLILNetLE action, the goal of this survey was to examine to what extent aspects of disciplinary literacy (as defined by Nikula et al., 2024, https://phaidra.univie.ac.at/detail/o:2050621) are present in the national curriculum document described above, for five key curriculum areas in lower secondary education. The relevant sections of the document (outlined in Table 3) were analysed using the codebook summarised in Table 4, as provided to all participating national teams:

Code	**Meaning**
CV	Command verbs (i.e. Cognitive Discourse Functions / CDFs)
GG	Genres and text-types
PL	Productive use of language (not CDFs or genres/text-types)
DD	Elements of digital literacy
VV	Visual elements for learning or for sharing knowledge
TT	Subject-specific realia required for undertaking subject-specific hands-on actions
OTH	Anything else relevant to (subject-specific) communication not covered by the above categories

Table 4: Coding scheme provided to all national teams, for use in this survey

Here, we begin by briefly presenting some descriptive statistics pertaining to the numbers of occurrences of the above codes in total and across the different subject areas. After that, we will discuss in more detail the forms taken by each of the seven aspects of disciplinary literacies identified in Table 4.

On the whole, our impression is that the curriculum characteristics and objectives as described in the document included relatively little attention for disciplinary literacies. In total, 120 occurrences of disciplinary literacies were identified in the 3216 words analysed across the five subject areas outlined in Table 3.

Figure 3 displays as percentages the total numbers of occurrences of each of the above aspects of disciplinary literacies. As this illustration shows, command verbs (CV) occurred most frequently, followed by attention for genres or text types (GG), and other uses of productive language (PL). Aspects not addressed by the other codes (OTH) also featured heavily, as will be exemplified later in this chapter. Digital tools (DD), visual aspects (VV) and subject-specific realia (TT) occurred least frequently when all subjects were considered together. At a first glance, this appears to suggest an important role for the linguistic aspects of disciplinary literacies, with digital, visual and practical elements being mentioned less frequently. As is explored below, however, examination of the occurrences per subject area, and more in-depth, qualitative exploration of the curriculum texts reveals that this is not consistently the case.

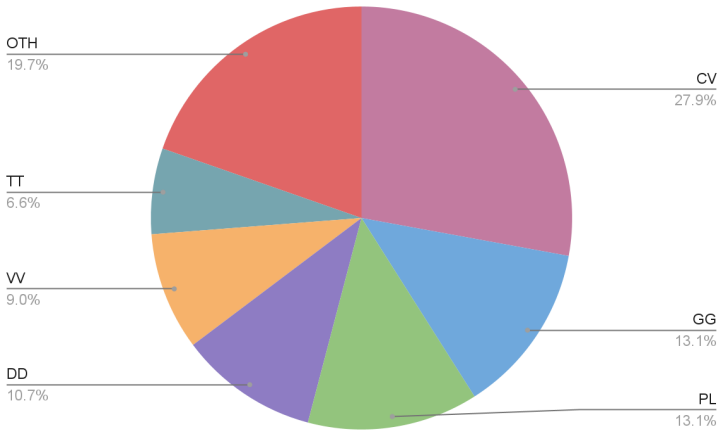


Figure 3. % occurrences of aspects of disciplinary literacies codes across all five subjects

Figure 4 provides a visual summary of the number of occurrences of each of the above codes in each of the five subject-specific sections of the curriculum document presented in Table 3. This provides a richer picture and reveals considerable differences between subjects.

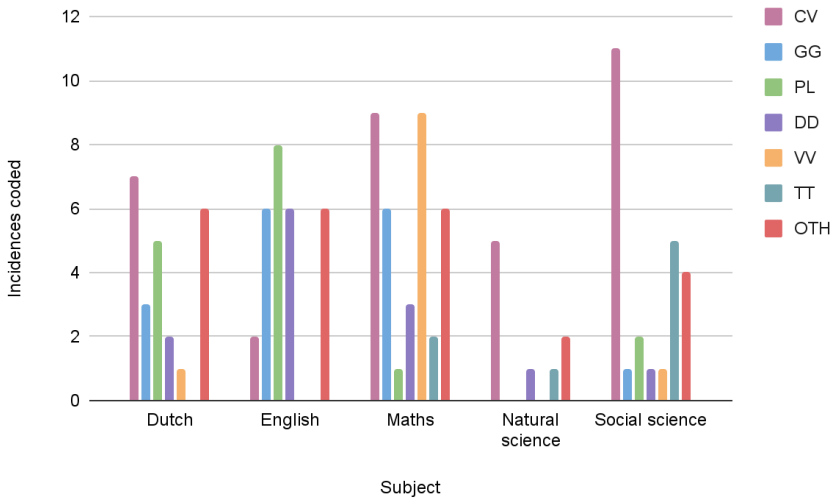


Figure 4. Occurrences of each code per subject

Most notably, Figure 4 shows that the overall distribution across subjects is uneven, with only 9 coded occurrences in total for Natural Science, compared to 36 for Mathematics, 28 for English, 24 for Social Science and 23 for Dutch. Furthermore, each of the codes is distributed differently across the subject areas. The heavy emphasis on command verbs (CV) suggested by Figure 4 stems largely from the Social Science and Mathematics curricula, which contained respectively 11 and 9 occurrences of this code. Genres and text types (GG) were most heavily represented in English and Mathematics (6 each), with few occurrences in the other subjects. Perhaps unsurprisingly, other types of productive language (PL) occurred most frequently in the languages (English: 8; Dutch: 5). The Mathematics curriculum was the source of 9 out of 11 mentions of visual elements of the subject (VV), while most mentions of subject-specific realia (TT) stemmed from social science (5). The languages and mathematics contained the largest numbers of 'Other' aspects we considered relevant to disciplinary literacies (6 each), followed by social science (4). Further reflections on the subject-specific analysis can be found in the analysis documents linked from Table 3. Below, we delve briefly into the findings per aspect of disciplinary literacies.

Command verbs

28% of occurrences of disciplinary literacies were classed by our team as being command verbs (CV), making this the most commonly-used code. Analysing for command verbs as defined in the list of cognitive discourse functions (CDFs - see [...] for an overview) was, however, both enlightening and a challenge. The enlightening aspect was the observation that different subject areas employed CDFs in quite different ways and to different extents. This was also part of the challenge, as the language used in the different curricula was not always comparable. Furthermore, the command verbs used in the curricula, while identified by subject experts as denoting CDFs, were not always easily aligned with the definitions and examples of CDFs in the literature and the coding scheme. For example, on several occasions we encountered command verbs equating to a notion of 'drawing connections', but we did not see an obvious place for 'connect' in the list of CDFs provided. We decided to classify these examples as CDF-categorise. Figure 5 provides an overview of the actual command verbs used in the analysed curricula.

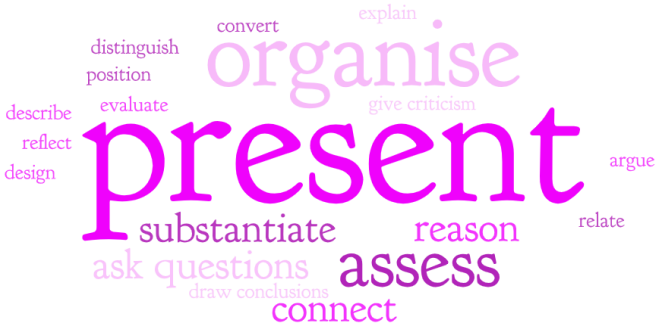


Figure 5. Command verbs in 5 subject curricula combined

Figure 6 quantifies the spread of the seven CDF types across the different subjects. All seven CDFs were observed, although to differing degrees and in different subjects. CDF-categorise was identified in all five subject areas, often in the 'connect' form referred to above. These occurrences were most frequent in the social science and natural science curricula. Also frequently identified was CDF-evaluate, manifested in CVs such as 'assess', 'argue' and 'reflect', which featured in all subjects apart from natural science. CDF-report was identified four times, all of them through the CV 'present' and three of them in the curriculum for Dutch. CDF-explain was identified directly and also in references to giving reasoned opinions or drawing conclusions, in Dutch, mathematics and social science; and CDF-explore related to formulating questions and hypothesising, in the natural and social sciences. CDF-define and CDF-describe were each identified only once, the former in the natural science curriculum (characterising as part of the design process) and the latter in mathematics, where it is used directly in relation to processing data.

Most striking when comparing across subjects is the relative absence of occurrences in the curriculum for English. We interpret the reason for this as being the lack of any concrete content in the characteristics and objectives of English, as described in the analysed document. The goals of English as a subject are almost entirely communicative, and the only content referred to is the possibility to relate texts handled in English to content from other subjects. In this sense, English does not appear to be positioned as a discipline in its own right at all. This contrasts to some extent with Dutch, whose curriculum contained seven occurrences of CV, although it should be noted that three of those referred to giving presentations, with no indication of what those presentations would be about. In addition, we were interested to note that the mathematics curriculum contained the largest number of occurrences of CV, while social science contained the broadest range of CDFs.

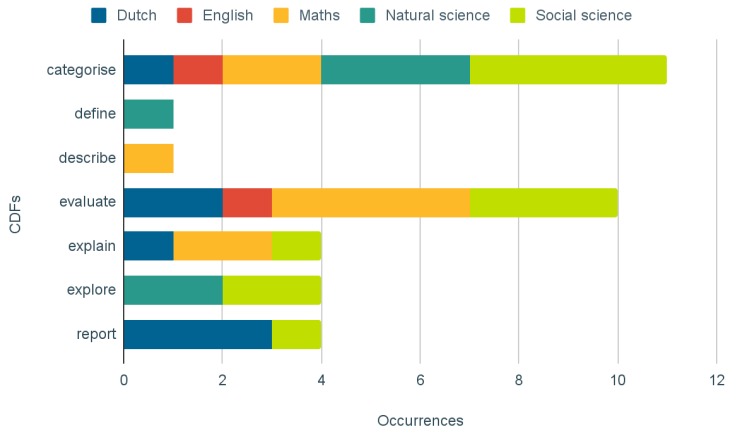


Figure 6. Occurrences of CDFs identified in subject curricula

Genres & text types

13% of the examples coded were related to genres and text types. The examples in Figure 7 show a variety of genres/text types. Interestingly, most seem to relate to informative and expository text, and fewer to persuasive or narrative texts. The only two examples of the latter are stories and poems, mentioned in the curriculum for Dutch. Although the current documents date back to 2006, there is some attention for internet and electronic communication (i.e. email and internet chat).

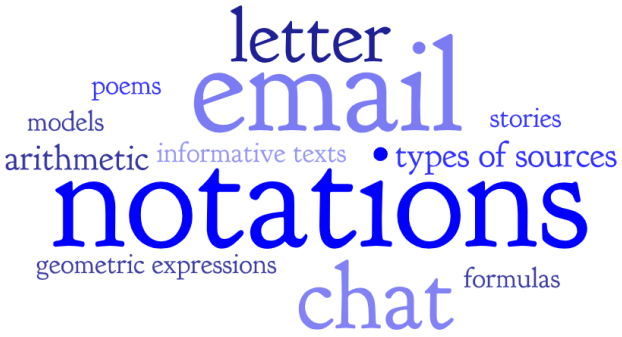


Figure 7. Genres/text types in 5 subject curricula combined

Comparing the different subject areas reveals some notable differences. While the curriculum for English includes quantitatively the most references to genres and text types, the genres it addresses are communicative rather than subject-specific (e.g. letter, email, colloquial language, ask for help). Genres related to subject areas such as language sciences or language arts are not present, nor are creative genres such as poetry and fiction, or non-fiction genres such as informative or persuasive texts. While the curriculum for Dutch also has a largely communicative focus, it does include some of these genres as well. The only text types identified in the curriculum for social science were 'different types of sources' and 'historical sources'; the forms those might take were not mentioned. Natural science does not refer to any genres or text types at all. Mathematics, on the other hand, mentions a range of different forms of presenting and communicating subject-specific knowledge, such as formal and informal notations, and mathematical models.

Other types of productive language

Productive language use not explicitly related to CDFs amounted for 13% of the coded examples. As can be seen in the overview in Figure 8, many of these mentions were fairly broad, for example referring to variations on 'communicating', 'writing' or 'expressing'. Other examples were more specific communicative functions (e.g. 'purchase something') but without the cognitive element required in order to class them as CDFs. Some of the examples coded in this category relate to productive language use only implicitly. We opted to include those incidences (e.g. 'build a basic vocabulary' - English; 'search for information' - Dutch; 'read and analyse maps' - social science) as they are closely linked to productive language: building vocabulary is essential for generation of output, and searching and analysing for information involve formulating inquiries.

Figure 8. Productive language as mentioned in 5 subject curricula combined

It is perhaps not surprising that nearly all mentions of productive language occur in the curriculum for the languages (English and Dutch). As mentioned above, however, these subjects' relatively heavy emphasis on language's communicative functions rather than on its role in cognitive activities appears to reflect the current position of languages in education in the Netherlands.

Elements of digital literacy

11% of all DL mentions were related to elements of digital literacies. Those mentions were rather broad and generic, with the exception of calculation equipment appearing in the mathematics curriculum. In this regard, it is important to remember that the current documents were published in 2006, which could explain the relative lack of attention for digital literacies, and the absence of reference to social media, fake news, AI, etc.

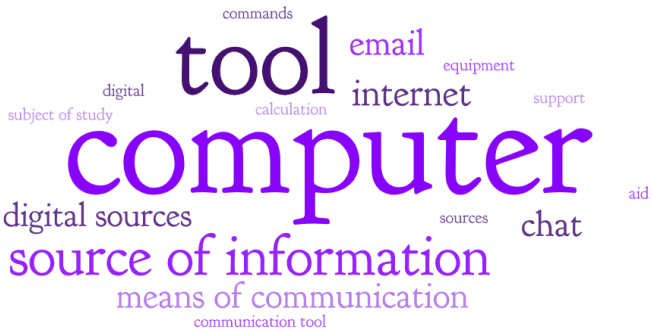


Figure 9. Elements of digital literacy in 5 subject curricula combined

The ways in which digital elements were referred to in different subject areas did differ somewhat per subject. Mathematics, English and Dutch pointed to a range of uses and purposes, including the role of digital equipment as "support, tool, source of information and means of communication" (Mathematics curriculum). English also focused on the communicative tasks associated with the internet and computers, such as writing emails and chatting online. Both Dutch and social science refer to the use of "digital sources'' without further specification. The natural science curriculum did not mention digital elements at all.

Visual elements

Visual elements accounted for 9% of DL mentions. These appeared almost exclusively in the curriculum documents for mathematics (9 out of 11 occurrences), where a range of visual elements (depicted in Figure 10) were identified explicitly as being part of "mathematical language". The only two mentions of visual elements in subjects other than maths were "images" as a means of supporting oral presentations in Dutch, and maps as part of social sciences. The curricula for English and for natural sciences did not mention visual elements at all. The latter surprised us in particular,

considering the importance of diagrams, visualisations and technical drawings in subjects such as biology, chemistry, physics and technology.

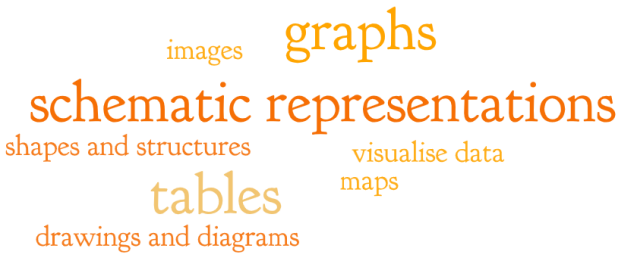


Figure 10. Visual elements of disciplinary literacies in 5 subject curricula combined

Subject-specific realia

Subject-specific realia were present in under 7% of DL mentions, mostly in relation to the social sciences. There, the emphasis was on "sources" in general,[3] although specific equipment, such as atlases and maps, were also mentioned. The learner's "own environment as a source and object of research" was considered by our subject specialist to also constitute realia in the field of social science. The only other mentions of subject-specific realia in the other subject domains were calculation equipment in mathematics, and a "technical product" in the natural sciences curriculum. The language subjects did not address this area at all.

Figure 11. Subject-specific realia in 5 subject curricula combined

Other

The category 'Other' contains a rather broad range of DL mentions that do not - in our view - fit in any of the other categories (see Figure 12). These accounted for a substantial proportion (20%) of the occurrences we identified, and thus warrant further consideration.

The most prominent themes that emerged within the 'Other' category are presented in Table 5. The only multilingual element was the mention of "the influence of English on the Dutch language", in the curriculum for English. The language curricula also did not refer to intercultural communication or linguistic variety, nor did they mention any subject-specific areas of content. These are aspects of the Dutch and English curricula we expect to change considerably in the upcoming curriculum renewal.

[3] Note that the same mentions of sources also appear in the category "genres". We considered both categories to be fitting in this case.

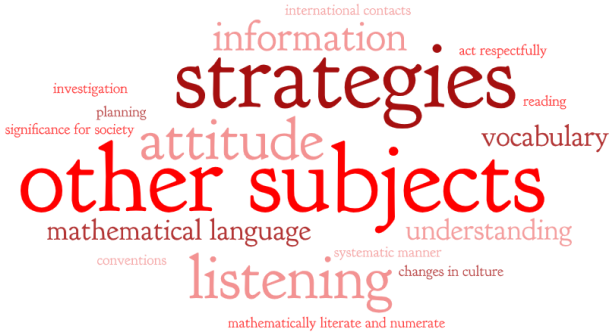


Figure 12. 'Other' elements relevant to disciplinary literacies in 5 subject curricula combined

As a future step, we would suggest comparing the mentions in the 'Other' category among the national teams. It is possible that other teams have assigned similar items to other categories, which could have implications for our understanding of those categories and affect the outcomes of future analyses. Alternatively, some of the sub-themes in the 'other' category may indicate other aspects of disciplinary literacies that are not addressed in the current conceptualisation.

Theme	**Examples**	**Subjects**
Cross-curricular connections	"studying English texts that tie in with the content of and are used in other curriculum areas" "skills that apply to both subjects (reading and listening strategies [...])" in English and Dutch	English
	"Proficiency in the Dutch language is indispensable when acquiring content and skills in all learning areas" "using texts and contexts from other domains in Dutch language education and consciously working on language education in education in other domains"	Dutch
Subject-specific culture / thinking	"build up a repertoire of ready knowledge, insights, routines and attitudes"	Maths
	"acquiring a critical and investigative attitude" "make a technical product in a systematic manner"	Natural science
Other aspects of language learning and language using	"listening and understanding English" "use strategies to expand his English vocabulary"	English
	"drawing up speaking and writing plans for communicative actions" "learns to adhere to conventions (spelling, grammatically correct sentences, word use) and learns to see the importance of those conventions" "use strategies to expand his vocabulary" "The core of the subject consists of acquiring, processing (OTH) and presenting information (CV)"	Dutch
	"understand the mathematical language of others"	Maths

Explicit mention of subject-specific literacy / language	“develop their skills in the 'language of mathematics' and become increasingly 'mathematically literate and numerate'”	Maths
Social/Global significance of subject	“learns what role English plays in different types of international contacts”	English
	“to conduct a simple investigation into a current social phenomenon” “learns about similarities, differences and changes in culture and philosophy of life in the Netherlands” “learns to see the significance for society of respect for each other's views and ways of life” “learns to act respectfully when dealing with sexuality and diversity within society, including sexual diversity”	Social sciences
	“develop the ability to recognize, interpret and use mathematics-related information in different situations in their current and future lives”	Maths

Table 5. Themes emerging in the ‘Other’ category

General conclusions

On the whole, we noted that there was generally little attention for disciplinary literacies. It struck us that Mathematics was by far the strongest in this respect, with CDFs playing a prominent role in the characteristics and objectives, and subject-specific literacy being referred to explicitly as a characteristic of the subject. We also saw that other elements from the codebook (e.g. digital literacy) were positioned alongside the explicitly linguistic elements, suggesting a similar understanding of disciplinary literacies to that employed in the COST CLIL NetLE Action (Nikula et al, 2024).

Beyond the strong example of mathematics, our general impression is that ‘content’ subjects (natural and social sciences) are characterised as focusing on content-learning, and ‘language’ subjects (Dutch and English) as focusing on development of general communicative skills, unrelated to subject-specific content (although Dutch does briefly mention cross-curricular applications). Where the language curricula (mostly English) do mention content in the form of literature, it is addressed without mention of related disciplinary literacies. It could be valuable for all subjects to follow the example of Mathematics in integrating language and content objectives, or even for language and content subjects to learn from each other in general.

As explained in Sections 2 and 3, there is no official national curriculum in the Netherlands in terms of content or pedagogy, based on the belief that teachers and schools should be allowed the professional freedom to approach their subject as they see fit. The characteristics and core objectives analysed here are a general framework used to guide and direct that process in a direction that will align with the learning outcomes as stipulated in the final examinations. This can lead to the objectives being broad and non-specific. However, we do not think that this fully explains the lack of attention to disciplinary literacies for the majority of subjects. Indeed, it would arguably be more straightforward to focus on subject-specific (communicative) skills and approaches and allow teachers to select relevant content through which to apply them, as in the International Baccalaureate.

Finally, it is important to note that this analysis took place just as new curriculum goals are about to be published (in the course of 2024). We would be very interested to repeat this exercise with the new curriculum, once it has been finalised. We hope that it will include more attention to disciplinary literacies than the old curriculum, including attention for multilingual awareness and practices.

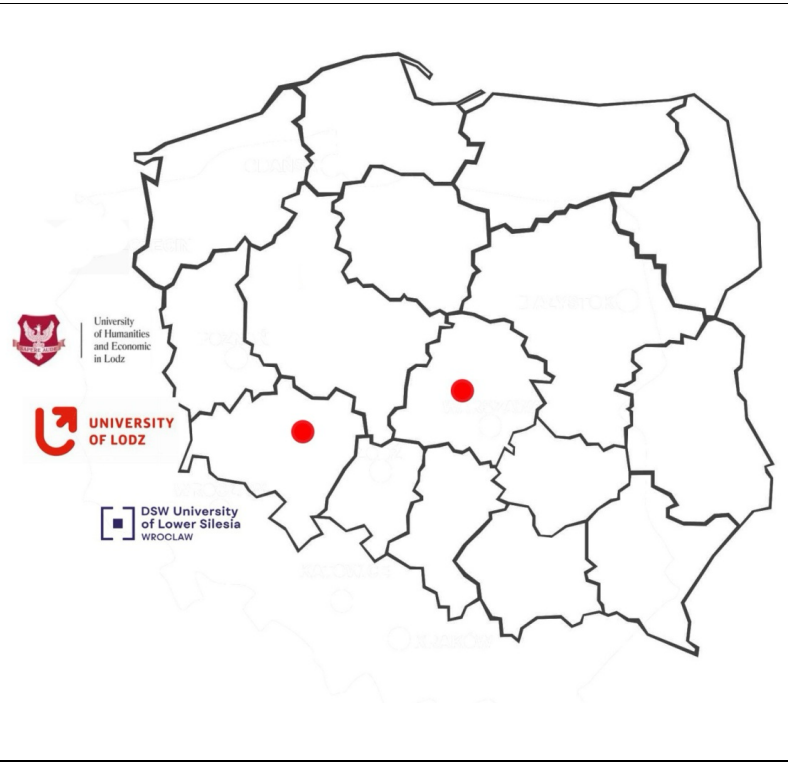
Poland National Report

1. Team & Process

The five members of the Polish National Curriculum Analysis Team are shown in Table 1.

Table 1. The Italian National Curriculum Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse
Barbara **Muszyńska*** University of Lower Silesia (Wrocław)	Language Specialist and content and language curricula designer: Expertise in CLIL implementation; PhD in bilingual curricula evaluation (Córdoba, Spain); Formerly Primary School EFL Teacher;
Agnieszka **Borowiak** University of Humanities and Economics in Lodz (Łódź)	Language Specialist: teacher trainer and researcher; expertise in the methodology of teaching foreign languages and CLIL implementation; PhD in linguistics; experience in teaching English across all levels;
Joanna **Leek** University of Lodz (Łódź)	Language Specialist: Upper secondary bilingual curriculum specialist, Translanguaging within International curriculum. Specializes in implementing translanguaging within international curricula; formerly CLIL teacher: experience in integrating content and language learning methodologies.



*POLAND National Curriculum TEAM LEADER

The PL-TEAM was coordinated by Barbara Muszyńska who, in contact with the Polish team located the National Ministry of Education curriculum documents. The national curricula are available online in open access. All of the team members chose which subject curricula they would translate into English and analyze. The DeepL tool was used for translations, which were later reread by the team members responsible for the curricula analysis. Every team member was responsible for the initial analysis of the chosen curricula. After this process was completed, the analyzed documents were reread by other team members and suggestions made. The group met online regularly to discuss any discrepancies and make joint decisions.

2. National School System

Figure 1 is a schematic illustration of how the Polish school system is organized from preschool into tertiary-level instruction.

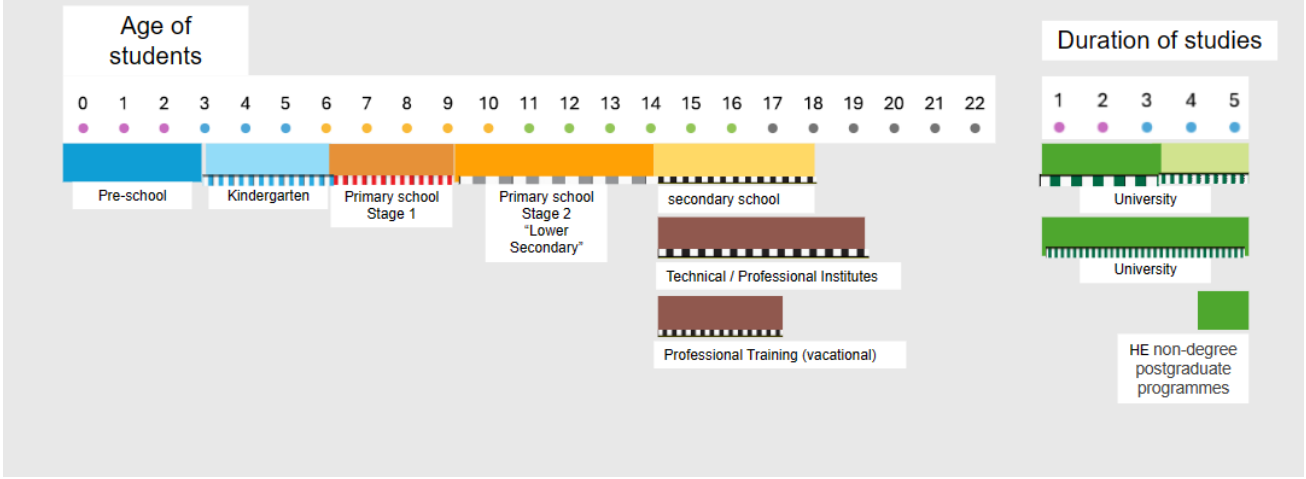
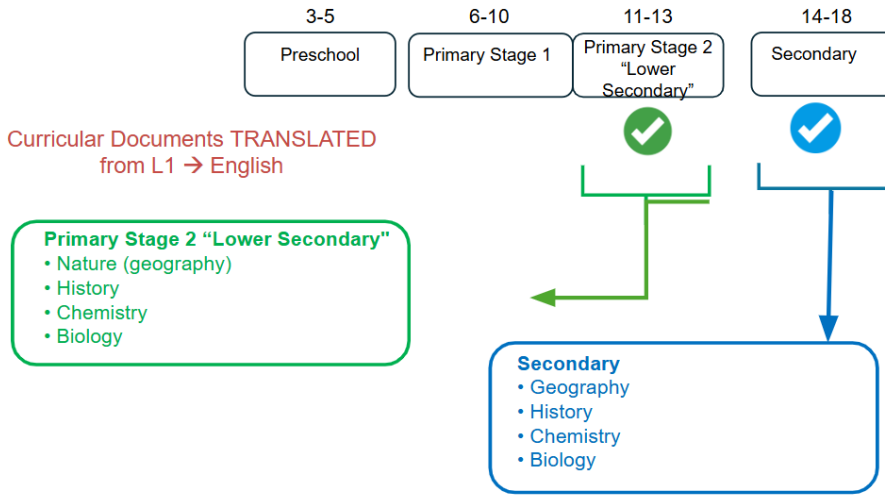
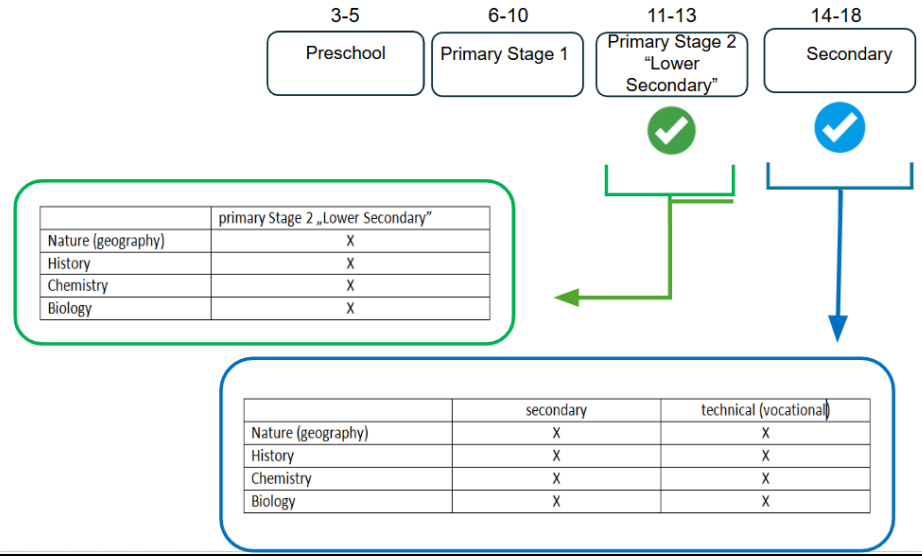


Figure 1. Organization of the Polish school system

The Polish school system consists of pre-school education 0-3, which is optional. Compulsory education starts at the age of 5 (last year of kindergarten), which is called 'Grade 0'. This year can be offered by kindergartens or primary schools. Compulsory education ends in secondary school at the age of 18. Students aged 14 can choose three educational paths, two of which end with A-Levels, the secondary school one and the technical one. The third one, Professional training (vocational) does not end in A-Levels. It is a preparation for a specific profession. The school system in Poland is the same throughout the country.
In Poland, bilingual education is possible in year 7 and 8 of the primary school and in secondary school, in all school types. The government decides on what subjects can be taught in a foreign language in bilingual schools. The organization of the bilingual programme, including its curriculum, is up to the schools. There are no text books, and no educational materials for bilingual schools. There are also IB schools in Poland, they have their own programme and at the end of which students can take an IB exam. However, these can be organized only by secondary schools.

3. The Survey

Figure 2A illustrates which Polish curricular documents were translated into English and Figure 2B illustrates which of these were analyzed with the coding system described in Section 1.

Figure 2A. Polish curricular documents which were translated into English.	
Figure 2B. Curricular documents which were surveyed for mentions of *productive* disciplinary literacies, as described in Section 1.	

Original L1 Documents can be found in (LINK TO FOLDER), the English translation of these documents can be found in (LINKLINK TO FOLDER) and the analyzed documents can be found in (LINK TO FOLDER).

4. Survey Results: Data, analysis, findings & reflections

The following data consists of the entire curricula chosen for the analysis, as shown above.

The references to command verbs (CV), genres (GG), productive use of language (PL), digital literacy (DD), visual elements (VV), subject-specific realia (TT) and other (OTH) were analyzed in all of the documents.

The secondary school level curricula mirror the structure of the upper primary ones.

Overall, the findings indicate that although the development of academic language and disciplinary literacies is not explicitly stated as a goal in any of the curricula, these curricula indirectly include elements that could contribute to building these skills alongside content learning. However, the document does not explicitly mention "the mastery of disciplinary discourse." There is also no mention of bi/multi/translingual practices in any of the documents analyzed.

There is evidence of “focus on vocabulary” rather than “focus on discourse”. This illustrates that the curriculum writers have a “language” perspective on learning, not a “literacy” perspective. What’s more, all of the curricula analyzed are dominated by receptive rather than productive language skills and language use. In general, there is no mention of how to use language to create meaning or strategies to develop students’ reading and writing skills in the context of subject content learning. There are no differences made between spoken and written language use. Some parts of the curricula mention the development of team work and thinking skills but no systematic evidence in the area of sense-making (Biesta et al. 2015).

There’s very little mention of students’ ability to use the subject specific language in different situations/contexts, etc. and the parts of the curricula which mention this are written in general terms. There’s no critical dimension of DL mentioned in the documents, nor is there mention of any text analysis, etc.. There is no explicit mention of how language plays a role in students’ ability to attain content-concept-related notions. There’s no mention of any genres or students’ awareness of genres.

The curricula analyzed place strong emphasis on content knowledge, scientific concepts, and skills related to content knowledge. They outline specific topics, processes, and phenomena that students should learn, understand, and explain. All of the curricula prioritize vocabulary acquisition over developing disciplinary discourse practices or genres specific to subject content learning. They place great emphasis on receptive skills, such as observation, recognition of structures and processes, and interpreting diagrams, microphotographs, and other visual representations. The focus is primarily on content knowledge, thinking skills, and scientific inquiry methods, with limited attention given to productive language use or specific text types and genres related to content learning. Specific guidance on building students' disciplinary literacies is lacking.

Table 1 below presents the break-up of different categories based on the use of coding in different subjects in the analyzed curricula.

	CV	GG	PL	DD	VV	TT	OTH	TOTAL
PRIMARY								
geography	86	0	29	25	66	116	71	393
history	170	0	43	13	18	4	95	346
chemistry	68	0	49	0	3	10	0	130
biology	132	3	26	3	3	1	1	169
SECONDARY								
geography	331	4	389	72	28	86	92	1002
history	501	0	57	14	14	0	37	623
chemistry	264	0	72	10	15	18	1	380
biology	115	0	55	2	2	8	1	183

Figure 1. Break-up of disciplinary literacy types across different subjects.

Table 2 below provides the overall number of coded instances of productive DLs across the analyzed curricula at two educational levels.

	CV	GG	PL	DD	VV	TT	OTH
primary	456	3	147	41	90	131	167
secondary	1211	4	573	98	59	112	131
TOTAL	1667	7	720	139	149	243	298

Table 2. Coded instances of productive disciplinary literacies according to educational level.

As shown above, the Polish curricula are dominated by having students perform verbal actions based on thinking skills (CV). The reference to genres is practically nonexistent in all of the analyzed documents. When it comes to subject-specific realia (TT) most of the occurrences can be found in geography and chemistry. The visual elements (VV) are mostly highlighted in the geography curricula on both educational levels.

The documents extensively utilize command verbs. In this area, verbs belonging to the LOTS category prevail. This may indicate that teachers focus more on activities which include basic thinking skills. The main aim may be to gather information rather than to process it (HOTS). There is a lot of emphasis on “to learn about..:”. This phrase indicates a focus on acquiring knowledge rather than deeply processing or applying it. The curriculum draws teachers’ attention towards thinking skills in students, e.g. *naming, describing, recognizing (CV),* and the same verbs are used throughout the document (LOTS). While in the area of language production only two verbs are mentioned: listing and giving examples *(PL)*. This suggests a narrow scope for expressing and developing ideas.

In contrast with history and geography, curricula for biology or chemistry place a strong emphasis on developing practical skills, conducting experiments, and applying theoretical knowledge to problem-solving. This involves CDFs such as "applying," "demonstrating," "testing," and "experimenting," which are pivotal in scientific learning. The frequent use of command verbs and productive language verbs provides clear guidance on the expected cognitive processes and practical abilities students should acquire. However, as with the other curricula analyzed, they lack explicit mention of developing disciplinary literacies or academic language proficiency. This refers to specific ways of reading, writing, communicating that are unique to the given discipline. There is no reference to specific genres, text types, or strategies for enhancing students' reading, writing, or communication skills within the context of chemistry. There is a focus on developing skills such as analyzing information, drawing conclusions, making hypotheses, interpreting results, and formulating generalizations, which require strong language and literacy skills. The curricula mention the use of information and communication technologies (ICT) for acquiring and processing information, which may involve reading, writing, and comprehending digital resources. However, there is a need for more detailed guidance on how ICT can be integrated to support cognitive functions like researching, analysing, and presenting scientific information. The digital dimension *(DD)* and visual elements *(VV)* are mentioned only briefly, without detailed guidance on their integration or creation. While the curriculum covers essential content knowledge and practical skills, it does not explicitly address the development of disciplinary literacies or the mastery of disciplinary discourse.

In sum, the analyzed Polish curricula show a strong emphasis on basic thinking skills (LOTS) and verbal actions (CV), emphasizing information acquisition over deep processing (HOTS). There is little emphasis on how language can be used to create meaning or develop reading and writing skills within subject learning. The focus appears to be primarily on content acquisition and application rather than on fostering students' ability to engage with and communicate disciplinary knowledge effectively through various modes and genres.

SPAIN (Madrid) - Report

SP(MAD)_CURR_BIOGEO_lowersec_12-15_SP(MAD)

1. Team

Table 1. The Madrid (Spain) Curriculum Analysis Team

Members & Affiliation	Interest in COST and Disciplinary Discourse	
Ana Llinares (Universidad Autónoma de Madrid)	Applied Linguist: Expertise in CLIL. COST: Vice-Chair, member of WG1, 2 and 3	
Tom Morton (Universidad Autónoma de Madrid)	Applied Linguist: Expertise in EFL, CLIL, EMI. COST: member of WG1	

2. National and Regional School Systems

The Spanish school system consists of pre-school education (Educación Infantil) from ages 0-6, which is optional. Compulsory education starts at age 6 with primary school (Educación Primaria) until age 12. This is followed by four years of compulsory secondary education (Educación Secundaria Obligatoria) until age 16. Students can then pursue an optional two-year Bachillerato (high school) program, which prepares them for university studies, or enrol in vocational training (Formación Profesional) for specific careers. Throughout the system, there are both public and private school options available. The 17 Autonomous Communities in Spain have responsibility for Education although they each follow this general system. There are regional differences in the curricula for specific subjects. Thus, this report focuses only on the subject of Biology and Geology in the curriculum for lower-secondary in the Comunidad de Madrid (years 7-10).

In the Comunidad de Madrid, around half of the state primary and secondary schools follow a bilingual programme, where up to 50% of the curriculum is taught through a foreign language (mostly English). At secondary level, there are two bilingual streams, one with a higher exposure to bilingual education ("Sección") and one with lower exposure ("Programa"). Students on entering secondary bilingual schools are assigned to one of these streams based on the results of an English test (usually the Cambridge KET or PET). Students in bilingual streams follow the same curricula as their non-bilingual counterparts but in a foreign language (mostly English). That is, there is no separate curriculum for subjects taught in English. The subject of Biology and Geology is taught in the foreign language in the high-exposure stream and in the first language (Spanish) in the low-exposure stream. This subject is taught in years 7, 9 and 10, corresponding to the 1st, 3rd and 4th years of Compulsory Secondary Education (1º ESO, 3º ESO y 4º ESO).

3. The Survey

The survey was conducted on the Comunidad de Madrid curriculum for lower-secondary in the subject of Biology and Geology. Figure 1. below shows the context with the specific age group involved.

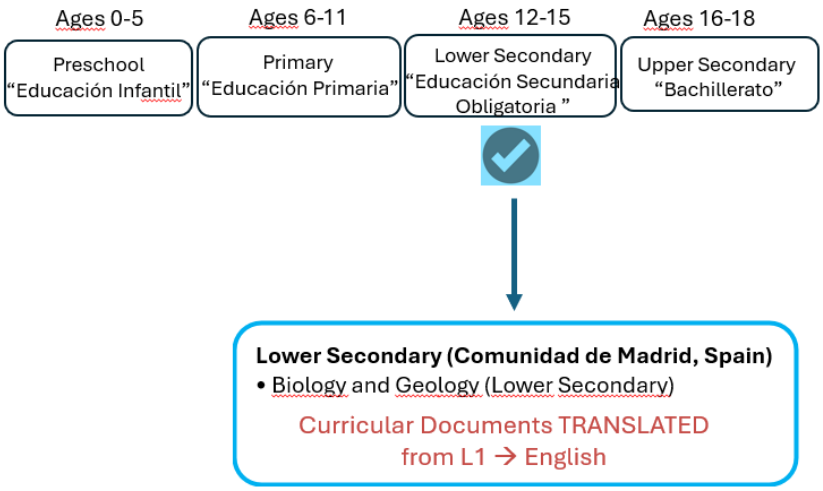


Fig 1. Context for the survey

4. Survey Results: Data, analysis, findings & reflections

The survey analysed a total of 6,700 words corresponding to the introduction to the curriculum document for biology and geology in lower secondary (pages 9 and 10) as well as the specific curriculum for biology and geology for years 7, 9 and 10 (1º, 3º and 4º ESO).

Regarding the introduction, the text refers to "Alfabetización científica" (Scientific literacy) twice in the first two paragraphs of the curriculum for biology and geology. This can be interpreted as a declaration of intent where this approach is considered key.

We analysed the references to command verbs (CV), genres (GG), productive use of language (PL), digital literacy (DD), visual elements (VV), subject-specific realia (TT) and other (OTH) in the curriculum.

For the first category we analysed the presence of Cognitive Discourse Functions (Dalton-Puffer, 2013) in the curriculum, not only those realised through performative verbs. In other words, we also coded nominalisations (e.g. *Description* as well as *Describe*). The total number of references to literacy features (following the agreed descriptors) were 106. See table. That represents 15,37 instances per 1000 words.

Table 2 shows the distribution of these categories and their frequency per 1000 words:

	CV	GG	PL	DD	VV	TT	OTH
Number of instances	41	0	11	8	6	8	32
Instances per 1000 words	6.1	0	1.64	1.19	0.89	1.19	4.77

Table 2. Frequency of the categories representing types of disciplinary literacy/ies

The next sections focus specifically on each type of literacy:

4.1. Command verbs or CDFs, genres and other instances of productive language

In the analysis of command verbs (CV) we not only coded instances realised through verbs but any references to the students' production of Cognitive Discourse Functions. Table 3 shows the distribution of the 7 CDFS (Dalton-Puffer, 2013; Evnitskaya & Dalton-Puffer, 2023):

CDFS	Define	Describe	Report	Categorise	Explain	Evaluate	Explore	TOTAL
Number	1	0	2	4	8	16	10	41
percentage	2.4%	0	4.8%	9.7%	19.5%	39%	24.3%	100%

Table 3. Frequency of CDFs

The distribution of the CDFs that are expected to be addressed by biology and geology students in lower-secondary education shows higher percentages in high-order types of CDFs such as *Explore* and *Evaluate*. Unexpectedly, perhaps, the presence of *Describe* and *Define* is either non-existent or very low. The presence of *Explain* and *Categorise* as the third and fourth most frequent CDFs aligns with the way in which disciplinary knowledge is presented in biology and geology, where explanations and classifications are key. In the case of schools participating in the Comunidad de Madrid bilingual programme, where students study biology and geology in English (L2) in the high-exposure strand and in Spanish (L1) in the low-exposure strand, a recent study by Evnitskaya & Llinares (2022) on classroom interaction in two groups from different strands taught by the same teacher, showed that the CDF *Evaluate* was frequent but only in the high-exposure group, not in the low-exposure one. In other words, the curriculum seems to be applied differently (at least, by this teacher) in the different groups, where the high-exposure students were exposed to a more evaluative approach to content, in spite of the challenge of being taught in the L2, in contrast with the focus on more factual CDFs in the lower--exposure group, where the language of instruction was students' L1 (Spanish). Interestingly, *Describe* was one of the most frequent CDFs in both groups, which contrasts with the absence of this CDF in the curriculum analysed (see Table 3), at least from the point of view of students' production. In other words, although the curriculum gives relevance to higher-order thinking CDFs (*Evaluate* and *Explore*), teachers may not necessarily address scientific content in that way, or they may do it differently depending on the group. It must be taken into account that teachers tended to perceive the students in the high-exposure strand not only better at English but in their general academic competence (Hidalgo McCabe, 2022).

We did not find any reference to genres (GG) in the curriculum, which aligns with Dalton-Puffer's (2013) justification of developing the CDF model, as teachers at secondary school level in the Austrian context analysed seem to work with *definitions*, *explanations or evaluations, etc.* in the classroom, but they did not work with staged texts or genres. The same applies to the Spanish lower-secondary school curriculum, at least in the subject of biology and geology.

Regarding other uses of productive language (PL), 5 of the 11 instances referred to "posing questions", and from the context it is assumed that this would involve oral production. The next most frequent type was "proposing" (3 instances) in which students are expected to use language productively to propose actions such as healthy habits. Other references (1 each) to language production referred to "group discussion", "creating a product", and "analysis of concepts".

4.2. Digital literacy, visual elements and subject-specific realia

Digital literacy (DD), visual elements (VV), subject-specific realia (TT) were included in the curriculum. Digital literacy had 8 mentions, and these were variously referred to, at quite a general level, as the use of digital resources (3), virtual spaces (2), technological tools (2), and digital content (1). As for visual elements (VV), the 6 mentions were distributed among video, models, diagrams, graphs, tables and symbols. Subject-specific realia (TT) were mentioned in general terms with references to "instruments" and "tools" (3), more specific items such as microscope (1), and references to models and experiments, and use of spaces such as labs (1 each).

4.3. Other types of literacy

Many references to literacy were not clearly related to production and, thus, they were classified as "Other". For example, "The importance of organ donation will be studied" does not specifically relate to production. Although it is implicit that the students will *evaluate* the content ("importance") it is not clear if they will do it productively. Another example is "Study of the functioning and anatomy of the digestive and other systems", where the students would be expected to *explain*, *categorize* and *describe*, but again it is not clear if they will produce these CDFs or read about them. The curriculum was full of references related to "analysing" and "problem solving" but these were not explicitly related to production.

> A whole section (2.2) was dedicated to reading. Although this is not a "productive" skill, it is an essential component of disciplinary literacy. This can be seen in criteria D and E, in which there is mention of navigating and extracting information, which can also be seen as important skills in dealing with texts. Also, the use of technological tools, while involving disciplinary literacy skills, does not necessarily imply language production.

References

Dalton-Puffer, C. (2013). A construct of cognitive discourse functions for conceptualising content-language integration in CLIL and multilingual education. *European Journal of Applied Linguistics, 1*(2), 216-253.

Evnitskaya, N., & Dalton-Puffer, C. (2023). Cognitive discourse functions in CLIL classrooms: Eliciting and analysing students' oral categorizations in science and history. *International Journal of Bilingual Education and Bilingualism*, *26*(3), 311-330.

Evnitskaya, N., & Llinares, A. (2022). (In) equity in CLIL programs? Classroom interaction and the development of higher order thinking skills across bilingual strands. *AILA Review, 35*(2), 227-249.

Hidalgo-McCabe, E. (2022). Language testing and the role of CLIL exposure in constructing student profiles: Stakeholders' views on streaming in the transition from primary to secondary education. *AILA Review, 35(2)*, 250-274.

2.5. SUMMARY OVERVIEW TASK-1: SURVEY OF CURRICULAR DOCUMENTS

COST Action 21114 "CLILNetLE: CLIL Network for Languages in Education" recognizes that the explicit teaching of academic language and discipline-specific discourse is crucial for not only successful learning while in school but also facilitates school-leavers' subsequent entry into and success in chosen professions and/or studies. The survey question we sought to answer is, therefore, **"do official national/regional curricular documents make explicit to teachers that they must build their students' academic language and discipline-specific literacy/ies?"** The Codebook and Survey Template made it possible for 28 researchers from ITC and non-ITC countries to conduct exploratory surveys of their respective curricular documents, and working together, we collectively pored through a corpus totalling ca. 404,300 words to codify for "mentions of *productive* disciplinary literacy/ies".

It should be noted that we are still in in the early stages of scrutinizing and analysing the corpus of the national curricula which were surveyed and reported on in the eight chapters of the previous section. This concluding section only wishes to briefly highlight three points: (1) the answer to the survey-question delineated above is "not enough"; (2) the survey tool requires some collaborative polishing; however, in its current state, it already stimulates reflections and conversations around productive DL; (3) concrete next steps are crucial for tweaking future curricular documents so they explicitly foreground the need to build students' *productive* DL skills. Below, excerpts from the National/Regional Reports of Section 2.4 are presented to address these three points: source country/region quoted is indicated in brackets.

1. So, "do official national/regional curricular documents make explicit to teachers that they must build their students' academic language and discipline-specific literacy/ies?" (survey question). The short answer seems to be: **Not always, and not enough, sometimes delimiting "language" to only "vocabulary" or "terminology", and often without concrete suggestions:**

- It is true that schematic cross-references are made in each of the subject curricula to the Eight General Didactic Principles of the general part (two of them being digital education and language education), as this is a stipulation of the National Curriculum as a whole. However, these references are stated in a very summary fashion and specifications as to what these principles mean in the context of the individual subject are missing. It looks as if the assumption were that subject teachers have deep knowledge and awareness of the language requirements of their subject and so can smoothly implement the principles of language education in their pedagogical actions without any guidelines being formulated in their subject's curriculum. (AT)

- The National Curriculum for Biology mentions the word "languages" 19 times with examples such as:

- *explains clearly and accurately, orally or in writing, the meaning of new terms (words, concepts)* ***using appropriate language and vocabulary****;*

- *In order to analyse and evaluate the results during the study of phenomena and laws in the natural sciences,* ***the student must develop communication skills and use the language and terminology of science correctly****;*
- *In addition, in presenting explanations or clarifying his/her solutions, he/she will* ***be aware of the importance of correct use of language and terminology*** *in science and technology.* (AL)

- Beyond the strong example of mathematics, our general impression is that 'content' subjects (natural and social sciences) are characterised as focusing on content-learning, and 'language' subjects (Dutch and English) as focusing on development of general communicative skills, unrelated to subject-specific content (although Dutch does briefly mention cross-curricular applications). Where the language curricula (mostly English) do mention content in the form of literature, it is addressed without mention of related disciplinary literacies. It could be valuable for all subjects to follow the example of Mathematics in integrating language and content objectives, or even for language and content subjects to learn from each other in general. (NL)

- The curricula analysed place strong emphasis on content knowledge, scientific concepts, and skills related to content knowledge. They outline specific topics, processes, and phenomena that students should learn, understand, and explain. All of the curricula prioritize vocabulary acquisition over developing disciplinary discourse practices or genres specific to subject content learning… The focus is primarily on content knowledge, thinking skills, and scientific inquiry methods, with limited attention given to productive language use or specific text types and genres related to content learning. Specific guidance on building students' disciplinary literacies is lacking. (PL)

2. **The survey tool was challenging, prompting researchers to collaboratively delve into and discuss issues surrounding DL**, thereby establishing a heightened and sometimes new level of interest in the curricular document(s) underlying the instructional system they are part of:

- Throughout the National Curricula analysis process, both team members worked together in a collaborative manner. All the analyses presented in the text in the chapters and the summary conclusions of the curriculum analysis are the result of a collaborative process of sharing observations and insights. (LT)

- Despite the fact that the task was interesting and valuable, some challenges were faced during its completion, and it also sparked numerous questions and prompted extensive reflection. The coding process involved some challenges that had to do, for example, with the fact that it was not always straightforward to differentiate between different categories provided in the coding key. Agreement was reached by shared discussion between the researchers and joint decisions […] Considering the long experience in teaching and the research interest in EFL, and the methods of teaching and learning, working with the national curriculum was not a new task. What was new in fact was the focus on disciplinary literacies and how the curriculum […] suggests

the development of disciplinary literacies. The detailed analysis on command verbs, students' productive use of language, genre types, digital literacy elements, subject specific realia and visual elements, made me reflect on what the curricula offers and how it helps the academic achievements of students. (AL)

- The coding process involved some challenges that had to do, for example, with the fact that it was not always straightforward to differentiate between different categories provided in the coding key. Agreement was reached by shared discussion among coders and joint decisions, but we are aware that in other country teams decisions might have been taken differently - cross-country joint reflection is therefore needed as an important step for refining the coding instrument. (FI)

- This was also part of the challenge, as the language used in the different curricula was not always comparable. Furthermore, the command verbs used in the curricula, while identified by subject experts as denoting CDFs, were not always easily aligned with the definitions and examples of CDFs in the literature and the coding scheme. For example, on several occasions we encountered command verbs equating to a notion of 'drawing connections', but we did not see an obvious place for 'connect' in the list of CDFs provided. We decided to classify these examples as CDF-categorise. (NL)

- Many references to literacy were not clearly related to production and, thus, they were classified as "Other". For example, "[t]he importance of organ donation will be studied" does not specifically relate to production. Although it is implicit that the students will *evaluate* the content ("importance"), it is not clear if they will do it productively. Another example is "[s]tudy of the functioning and anatomy of the digestive and other systems", where the students would be expected to *explain*, *categorize* and *describe*, but again it is not clear if they will produce these CDFs or read about them. The curriculum was full of references related to "analysing" and "problem solving" but these were not explicitly related to production. (ES-Madrid); Personal communication further revealed that "we [the ES-Madrid team] spent so much time discussing how to classify these instances…"

3. **Explicit and concrete next steps are crucial:** Official curricular documents serve to guide teachers' classroom practice and publishers' choice of content. Since the development of disciplinary literacy/ies seems to be somewhat akin to foreign language learning, we should identify how future curricular documents might be tweaked to make *explicit* the fact that students need *explicit* and concrete instruction for building productive DL skills:

- Teacher education programmes in Austria may include some general input on language in education….but the subject-specific PCK, pedagogical training etc. do not systematically address the role of language for the learning of specific subject A/B/C….Thus, a rehaul of the Austrian national curriculum would need to take place in order to inscribe the Eight General Didactic Principles (Principle 7: "Language-sensitive subject teaching takes place in all subjects"; Principle 2: "Teachers offer digitally enhanced instruction and use innovative teaching methods") into each

subject curriculum. Such concretization and explicitness would be necessary in order to make an implementation of language-sensitive subject teaching more likely. If language and more generally literacy-sensitive teaching were made explicit and linked to subject specific learning goals in each of the subject-curricula, the officially commissioned teaching materials and textbooks would have to adapt and adopt explicit literacy elements. (AT)

- Below (Figure 9A) is a segment of the curriculum which clearly states that, at the end of their studies, students should be able to use Italian to express themselves "with clarity and propriety", adapting to the circumstance at hand (GG) to achieve various *productive* communicative objectives (PL, CV). While this excerpt already makes explicit reference to students' ability to use language effectively, the modified excerpt (Figure 9B) illustrates how, with only four more words, the curriculum could make even more explicit the need to build students' *productive language skills*. (IT).

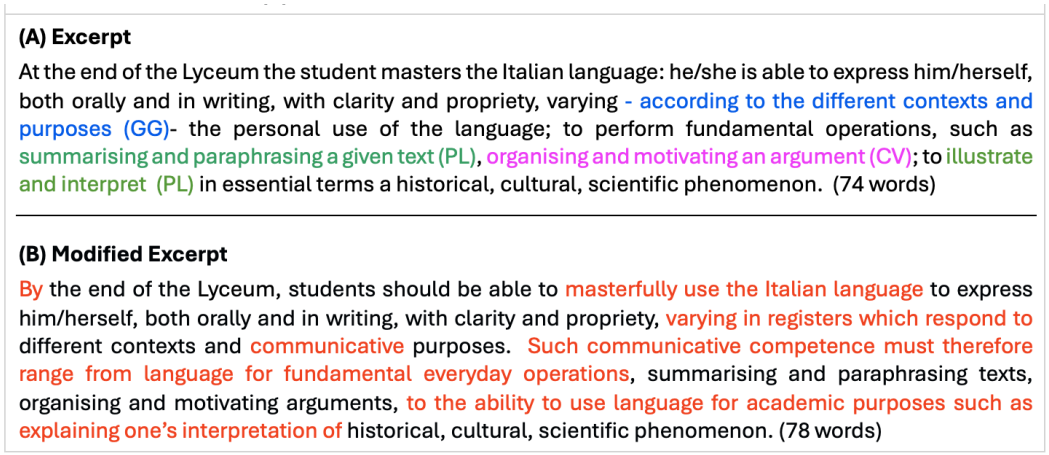


Figure 9. Rewording curricular documents towards disciplinary literacy/ies: An example

An excerpt from the Italian curriculum surveyed, illustrating instances of productive disciplinary literacy/ies as they appeared within the document and coded as per the Codebook (A) and how the same indications could be reworded so to draw attention to the need to explicitly cultivate students' ability to use language to communicate their knowledge and thinking in age- and discipline-appropriate ways (suggested modifications highlighted in red).

- The current Biology curriculum derives from 2017 and the History curriculum from 2019. The main difference between these curricula and the previous one is that now the curriculum focuses on competences and learning outcomes rather than objectives. The curriculum has not been renewed ever since but considering that the usual cycle for renewing the entire curriculum in most countries is around 10 years, we are hoping that the new version of the curriculum would have more emphasis in the disciplinary literacy elements as well as the language expected by the students to achieve academic proficiency in all subjects. (AL)

- Finally, it is important to note that this analysis took place just as new curriculum goals are about to be published (in the course of 2024). We would be very interested to repeat this exercise with the new curriculum, once it has been finalised. (NL)

Participation in this exploratory survey has piqued the interest of WG3 Researcher who were involved, resulting in some transnational collaborations between young researchers from ITC countries who wish to polish the survey tools, revisit the preliminary results, and conduct additional surveys, which they hope will garner results that will also raise the interest of curriculum writers, education boards, publishers, and teachers.

SECTION 3. TEACHERS' EXPECTATIONS OF DISCIPILNARY LITERACIES (TASK-2)

3.1. INTRODUCTION TO TASK-2

While TASK-1 sought to "overview curricular demands of bi/multilingual disciplinary literacies" by surveying official curricular documents for mentions of productive disciplinary literacies, TASK-2 intended to undertake the same overview by surveying teachers' expectations of students' productive disciplinary discourse, i.e. using what teachers expect from students as a proxy for gauging "curricular demands of disciplinary and academic literacies" (MoU). However, as explained in the Introduction, "disciplinary literacy/ies" is often elusive, especially for subject-specialists and especially when it regards *productive* disciplinary discourse, i.e. the ability to communicate knowledge of discipline-specific notions accurately, using discipline-accepted ways of "*languaging*". Indeed, as shown in Figure 2 in the Introduction, imprecise discourse regarding a given topic leads one to suspect an imprecise understanding of that topic.

The challenge, however, is that, while subject-specialists typically have no problem listing the discipline-specific topics they would like their students to learn and would also not struggle to identify which text among many explains the concepts through more accurate and *discipline-appropriate* ways, subject-specialists do not feel that they are in the position to teach the language, i.e. the disciplinary-discourse, that they themselves expect from their students. In fact, when presented with poorly written texts produced by their students, subject-specialists often believe that "this is a language problem and language is not my business" (Smit & Dafouz, 2012). Therefore, as mentioned in Section 1.2, directly asking most subject-specialists to delineate their expectations of students' discipline-specific literacy/ies, and especially "disciplinary discourse", risks the production of unreliable information. At the same time, we wished to gain insight into teachers' expectation(s) of students' discipline-specific literacy/ies, and in particular, we aimed to examine the following question: "What kind of language and/or discourse features do teachers expect their students to *produce* when asked to verbalize discipline-specific notions learnt?".

To gain insight into the language and discourse features teachers expect students to produce when communicating on discipline-specific or academic topics, it was necessary to develop a survey protocol which all researchers in WG3 could use to "Survey Teachers' Expectations of Disciplinary Literacy/ies" across all grade levels and Key Subjects specified in Table 3, and within all members' respective educational realities. The section below briefly describes two research tools developed through this Action. The first is a protocol for eliciting teachers' expectations of disciplinary discourse without needing to ask them to do so explicitly, thereby generating a corpus on "teachers' expectations of students' writings". The second is a survey protocol which allowed WG3 Researchers to then analyse the occurrence of cognitive discourse functions (CDFs) within these elicited texts, thereby providing us insight into the types of CDFs teachers expect their students to adopt when making meaning and showing understanding. Such an analysis might then also shed light on *how* teachers at various levels and in different subjects expect their learners to *realize* these CDFs; i.e. what linguistic features are used to verbalize one's cognitive engagement with subject-specific content. The ability to clearly delineate the features of language and

disciplinary discourse which teachers *implicitly* expect from their students is the first step towards helping teachers design instruction which *explicitly* builds their students' academic and disciplinary discourse skills. As explained above, this part of the survey (Part-2; TASK-2) allowed us to gain insight into the discourse and language features that primary, lower-secondary, upper-secondary as well as first-year tertiary-level instructors expected from their students, thereby meeting the objective of "[addressing] the transition across educational levels (primary-secondary-tertiary education)" (MoU, p.18).

3.2. METHODOLOGY

Details of the "Teachers' Expectations Elicitation Protocol" are described in the Appendix (TOOL-2), as are those of the "CDF-Based Coding & Analysis Guide" used for analyzing and reflecting on these Teachers' Expectations (TOOL-3).

3.2.1. PROCESS DESIGN: PROTOCOL FOR ELICITING TEACHERS' EXPECTATIONS

In the first phase of TASK-2, WG3 Researchers used the Teachers' Expectations Elicitation Protocol to gain insight into the type of disciplinary discourse they expect from their students, without, however, asking teachers for their expectations directly, an approach which has been explained earlier. In brief, the process was as follows (for details, see Appendix 1, TOOL-2):

1. WG3 Members contacted potential teacher-contributors who were teaching at any level from primary to first-year tertiary.
2. These teacher-contributors could be from any of the "Key Action Subjects" delineated in Table 3, i.e. Mathematics, Science, History, L1 and First-FL, as well as subjects falling within these very general academic fields.
3. Teacher-contributors were asked to find five or more non-textual semiotic elements (e.g. graphs, images, authentic texts, etc.) about a topic of their choice which they could imagine using at an exam to evaluate their students' understanding of said topic.
4. Each teacher-contributor was then asked to generate, in writing, a text which they would expect a "good student" to produce if such a semiotic element were indeed used to evaluate this student's understanding of the topic associated with the semiotic. Different criteria regarding text length were used, depending on the age-group of learners the respective teacher-contributor teaches.

3.2.2. INSTRUMENT OF ANALYSIS: CDF-BASED CODING & ANALYSIS TOOL

Texts generated through the Teachers' Expectations Elicitation Protocol were then analyzed to understand the type of language and discourse features teachers expect their students to produce to make-meaning and show understanding. For this, two WG3 Researchers, Silvia Minardi (IT: herein SM-IT) and Silvia Rieder-Marschallinger (AT: herein SRM-AT), who are experienced with using Cognitive Discourse Functions (Bauer-Marschallinger, 2022; Minardi, 2020) to delineate instances and evolution of communicative functions within complex texts,

were invited to lead the analyses. SM-IT and SRM-AT developed the CDF-Based Coding & Analysis Tool presented in the Appendix (TOOL-3).

In short, this CDF-Coding & Analysis Tool allows researchers to systematically identify the communicative function of sentences and/or phrases as they appear in complex text or discourse (Dalton-Puffer, 2013; 2016; Dalton-Puffer & Bauer-Marschallinger, 2019). While CDF-based coding and analyses have been used to understand the communicative functions in textbooks and students' work (see chapters in Hüttner & Dalton-Puffer, 2024), it has not, to date, been used to delineate the types of communicative functions which teachers expect of their students. With the corpus of text collected through the aforementioned Teachers' Expectation Protocol, it was possible to use the CDF-Based Coding & Analysis Tool developed by SM-IT and SRM-AT to gauge which CDFs teachers expect to see in their students' written texts. Moreover, this type of analysis facilitated insights into the features of disciplinary literacy/ies in a way that also brings to light how teachers expect learners to construct content across different educational levels and within various disciplines. The coding and analysis tool outlines several steps and guidelines for each stage of this process, which also provides space for reflection, for example, to include tentative assessments as to whether the researchers assume these expectations to be realistic for the target age-group. Considering that no shared coding software could be used (see Section 2.2), this tool offers suggestions on how to conduct such an analysis using text-processing software, such as Microsoft Word.

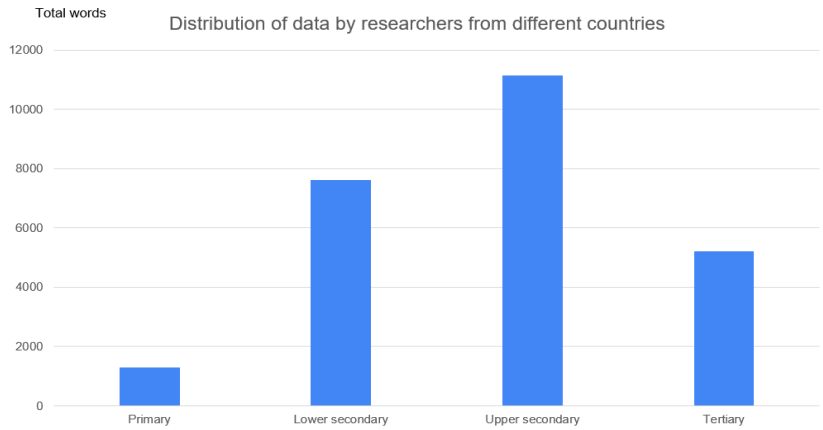
3.3. RESULTS TASK-2: DATA AT A GLANCE

As shown in Table 7, nine WG3 Researchers undertook the TASK-2 survey, generating a corpus of more than 25200 words of texts which 50 teachers from six countries had produced to show what they expect their students to write.

Table 7. TASK-2 elicited texts from 50 teachers across nine countries

WG3 Researchers from the following ITC and non-ITC countries undertook TASK-2, eliciting teachers' texts. Researchers then analyzed their teachers' texts using either the CDF-Coding Tool (*) or another approach to understanding teachers' expectations of productive disciplinary discourse (+). Each Researcher's Report can be found in the chapters in Section 3.4.

	WG3-Researchers (initials)	**Number of teachers involved**	**Word count**
Albania	Cungu* (JC-AL) Hoxha* (MH-AL)	5 7	6409
Austria	Rieder-Marschallinger* (SRM-AT)	5	1907
Italy	Lopriore+ (LL-IT) Minardi* (SM-IT)	2 4	4998
Serbia	Bakić-Mirić+ (NBM-RS)	10	3140
Slovakia	Štefková* (JS-SK)	7	2072
Turkey	Adadan* (EA-TR) Kurt* (YK-TR)	6 4	6745
	TOTAL	**50**	**25271**



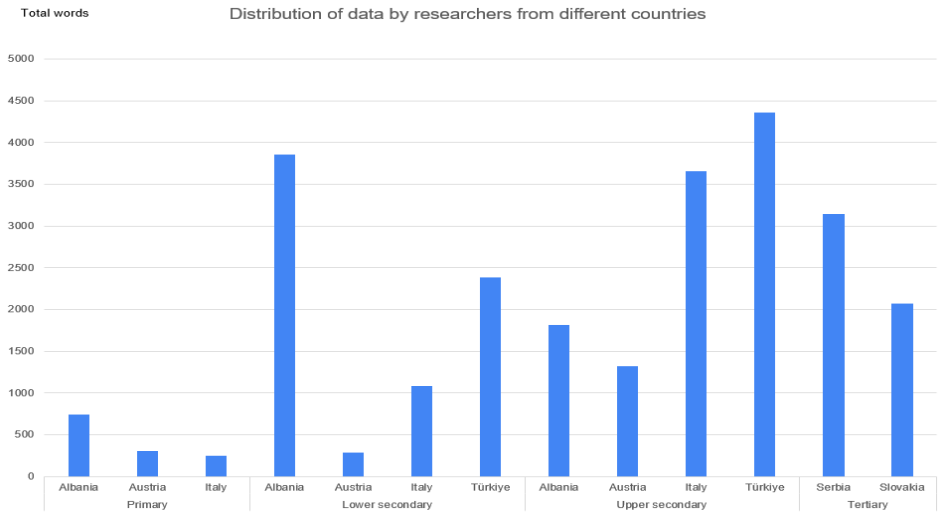


Figure 10. Distribution of teachers' expectation data by education level (top) by country (bottom)

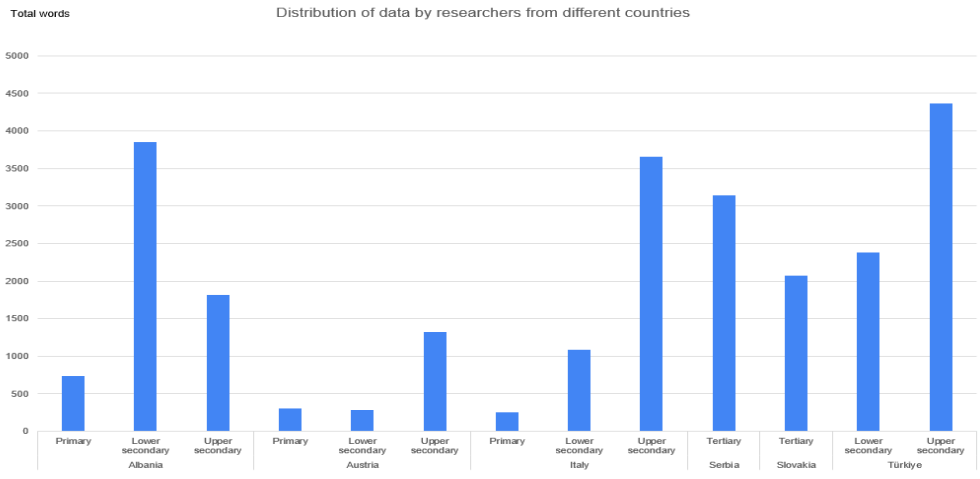


Figure 11. Range of education-levels of teachers' expectations texts collected in each country

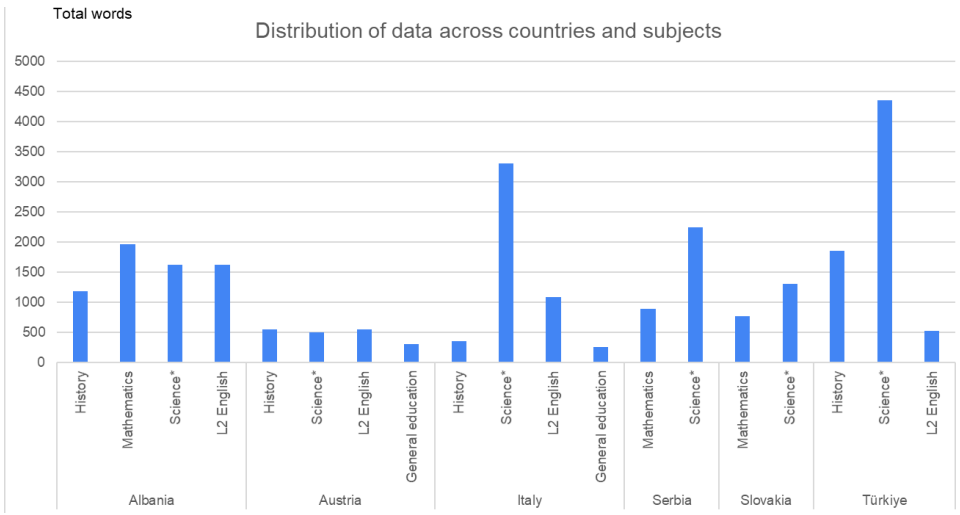


Figure 12. Distribution of teachers' expectation data by subject and country

NOTE: Some "country data" represents the work of more than one WG3 Researcher; "Science" includes all science-related subjects; "General education" usually regards texts generated by teachers of young learners, regarding subjects such as "civics", etc.

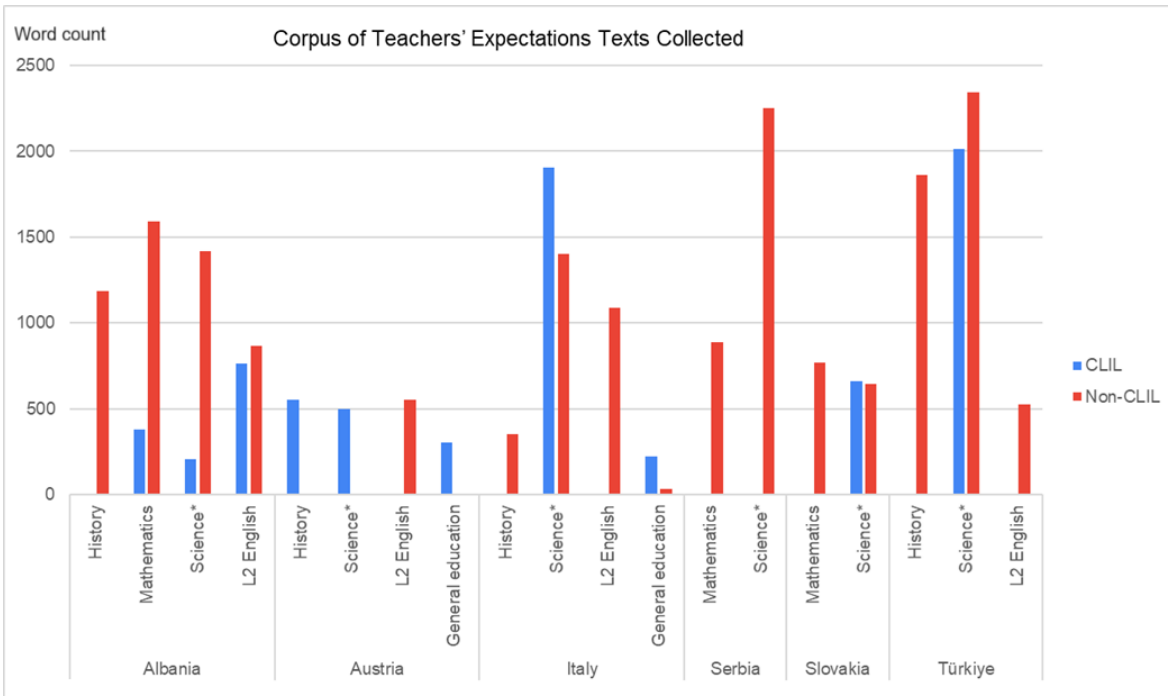


Figure 13. Distribution of data by subject, country, and in CLIL or non-CLIL contexts

3.4. SURVEY OF TEACHERS' EXPECTATIONS: ANALYSES AND REFLECTIONS

This Section presents the survey analyses and reflections of WG3 Members who chose to undertake TASK-2, using "Teachers' Expectations" of students' writings as a proxy for delineating "curricular demands of academic/disciplinary discourse". Contrary to the Reports in Section 2.4, which were authored by multiple members of national/regional teams, the chapters in this Section are authored by individual WG3 Researchers.

The nine Chapters in this Section are organized as follows. Chapters 3.4.1 and 3.4.2 are authored by SM-IT and SRM-AT, respectively, as an illustration of how CDF-experts approach the coding and analyses of CDFs within complex texts in Science (specifically, physics and maths) (SM-IT) and History and General Studies (SRM-AT). Chapters 3.4.3 to 3.4.7 are authored by WG3 Researchers who used the CDF-Coding & Analysis Tool (Appendix, TOOL-3) to survey texts from their own teacher-contributors, who ranged from primary-level EFL teachers to tertiary-level science teachers, and are organized in alphabetical order of country and then researchers' surnames. Finally, researchers authoring the last two chapters (3.4.8 and 3.4.9, indicated with (+) in Table 7 above) did not use the CDF-Coding & Analysis Tool but worked through their teacher-contributor-texts using more general guiding questions for analysis and reflection, thereby providing an overview of and reflection on the Teachers' Expectations Elicitation Tool itself (TOOL-2), along with insights gained concerning expectations that "their" subject teachers seem to have regarding discipline-specific knowledge and language.

NOTE: As with the chapters in Section 2.4, these nine chapters are inserted within the body of Deliverable-7 *proper*. Here too, the page-numbering of the document pertaining to the Deliverable *proper* continues with "*page*/D7" while those of the Chapters are coded accordingly, e.g. page 5 of the chapter written by SM-IT is numbered "5/SM-IT". This organisation allows these authors to continue their pursuit of interesting issues which have emerged through this exploratory survey and subsequently update their chapters. To access the survey of each author, click on the range of pages indicated. After these nine chapters, readers will return to the page which follows this one, within the Deliverable *proper*.

CHAPTER 3.4.1. ITALY (1) (NON-ITC)

(Silvia M (SM-IT) 12 pages)

CHAPTER 3.4.2. AUSTRIA (NON-ITC)

(Silvia RM (SRM-AT) 10 pages)

CHAPTER 3.4.3. ALBANIA (1) (ITC)

(Jonida Cungu (JC-AL) 7 pages)

CHAPTER 3.4.4. ALBANIA (2) (ITC)

(Merita Hoxha (MH-AL) 6 pages)

CHAPTER 3.4.5. SLOVAKIA (ITC)

(Jaroslava Štefková - 9 pages)

CHAPTER 3.4.6. TURKEY (ITC)

(Emine Adadan 6 pages)

CHAPTER 3.4.7. TURKEY (ITC)

(Yavuz Kurt 6 pages)

CHAPTER 3.4.8. ITALY (2) (NON-ITC)

(Lucilla Lopriore (LL-IT) 8 pages)

CHAPTER 3.4.9. SERBIA (RS)

(Natasa Bakić-Mirić 4 pages)

Teachers' expectations in Italy: analysis of a Physics teacher's expectations

Silvia Minardi

Liceo Statale "Quasimodo" – Magenta (Milan)

1. Introduction

What follows is an analysis of what an Italian high school Physics teacher expects a "good" learner might write when responding to a visual input. As presented in Section 3.2 teachers were asked to choose semiotic resources they might be using in their lessons and then to write what they would expect a good student would produce when using that semiotic resource, for example in a test.

2. The participants

I collected 20 distinct samples of semiotic resources from four teachers. Table 1 provides details on the teachers, including the educational level they teach, the subject from which the data was gathered.

Table 1. Metadata on teachers and their semiotic resources

Teachers	**GG**	**FB**	**ET** **Elena Tampellini**	**AP** **Alessandra Petazzi**
Level	Primary	High school	High school	High school
Years of teaching experience	32 years	9 years	32 years	32 years
CLIL teacher	yes	yes	yes	yes
Semiotic resources				
Number of semiotic resources	5	4	6	6
Subject(s) involved	4: Science (CLIL) 1: EFL	History (non CLIL)	Chemistry (CLIL)	Physics (CLIL)
CLIL materials	yes	no	yes	yes

The four CLIL teachers all have extensive teaching experience with the exception of FB. GG, serving as a primary school teacher, has dedicated the past eight years to CLIL, benefiting from diverse professional development initiatives. The semiotic materials she has contributed primarily pertain to scientific subjects, with one exception focusing on EFL.

FB is a teacher specializing in Content and Language Integrated Learning (CLIL) for history and philosophy at the high school level. Proficient at a B2 level in English, FB derives her semiotic resources from an Italian coursebook, with a particular emphasis on content related to "Fascism in Italy", a topic usually covered in the final year History curriculum in Italian high schools. FB shares the same institutional affiliation, but our teaching assignments and classes do not overlap. As regards the resources, FB is the only one who has provided non-CLIL materials. ET (Elena Tampellini), a chemistry teacher in a vocational high school, possesses an English proficiency level of C1. She assumes

responsibility for coordinating the continuous professional development (CPD) initiatives among a network of CLIL educators in the area where she works. The semiotic materials she contributed are sourced from her instructional materials for IGCSE courses. AP (Alessandra Petazzi), specializing in Mathematics and Physics instruction at a liceo scientifico in Italy, has five years of CLIL teaching experience. Possessing a B2 English level, she primarily shares resources pertinent to Physics. Her contributions include materials from websites as well as a resource generated using the widely-utilized application, GeoGebra.
Engaging with these professionals was facilitated by my involvement as a trainer in various CLIL courses over time, which is where I met all of them.

2.1. Alessandra Petazzi

The decision to focus on the semiotic resources provided by Alessandra Petazzi (AP) stems from my previous PhD research studies (Minardi, 2020) on the use of language for learning in Physics. I met Alessandra Petazzi in 2023 when I was a trainer in a CLIL course in Como. When it was time to collect semiotic resources from teachers, I immediately thought AP might give an important contribution. She provided six different SRs (Semiotic Resources):

1. SR 1 comprises two graphs depicting (a) the Maxwell-Boltzmann distribution of molecular speeds, and (b) the most probable, average, and root-mean-square speed.
2. SR 2 features an image elucidating Boyle's law, illustrating the behavior of ideal gases under constant temperature conditions.
3. SR 3 is quite complex, including an image of a thermodynamic system alongside four distinct graphs illustrating prevalent processes within such systems.
4. SR 4 encompasses three functions, requiring learners to discern if they illustrate the Extreme Values Theorem (EVT).
5. SR 5 offers three examples of discontinuous functions.
6. SR 6 includes a probability line depiction.

Except for SR 2, each resource contains over 200 words, while SR 2 comprises 189 words. The initial three SRs target 17-year-old students, whereas the latter three are tailored for 18-year-old students, all requiring a proficiency level of English equivalent to B1/B2.
Alessandra and I had a chance to discuss what we were doing and the nature of the data we were collecting on different occasions. Following one of these discussions, Alessandra proposed the idea of having her students describe the SRs after she had already given me her own texts. Consequently, for three of the SRs incorporated into the dataset, we obtained student-generated versions, which offer invaluable insights into the ways Cognitive Discourse Functions (CDFs) are intended by the teacher and used by the students.

3. The process

The teachers I reached out to responded diversely when requested to furnish examples of Semiotic Resources (SRs) accompanied by a text reflective of what they would anticipate from a good student. Some teachers, such as ET and AP, expressed interest in involving students directly in the task. ET preferred this approach, believing that analyzing student-generated versions would offer richer insights compared to scrutinizing texts produced by teachers themselves. On the other hand, AP suggested engaging three different students to utilize the SRs she had previously responded to, aiming to explore and contrast the variations between teacher and student texts. Conversely, certain teachers, after providing SRs, opted to elucidate how they would implement each SR in their

teaching practices, omitting the creation of student-like texts, which were consequently excluded from the dataset. FB inquired if she could provide SRs typically used in history lessons conducted in the language of schooling rather than in CLIL settings. Our discussions often revolved around the role of language in learning, with FB demonstrating consistent interest in my research on whether and how CLIL teachers change the way they teach their own subject in the language of schooling. GG stands out as the sole primary school teacher whose SRs were incorporated into my own dataset. I had reached out to other primary school teachers, but with limited results. One teacher expressed skepticism regarding the utility of crafting a student-like text, while another provided SRs containing descriptions of classroom procedures for utilizing the resources. In one instance, the requirement to use English was an obstacle, despite my offering to translate texts originally produced in Italian.
In total, I reached out to 12 teachers, yet only four of them responded and provided usable SRs.

4. The findings

Using the table proposed in the coding manual (see chapter 3.2 and Appendix, Chapter 4.3) the first step in my analysis refers to the distribution of the different CDFs in the six SRs analysed. For each SR the table below specifies if it contains a specific CDF episode (EP).

Table 2. Overview of coded CDFs

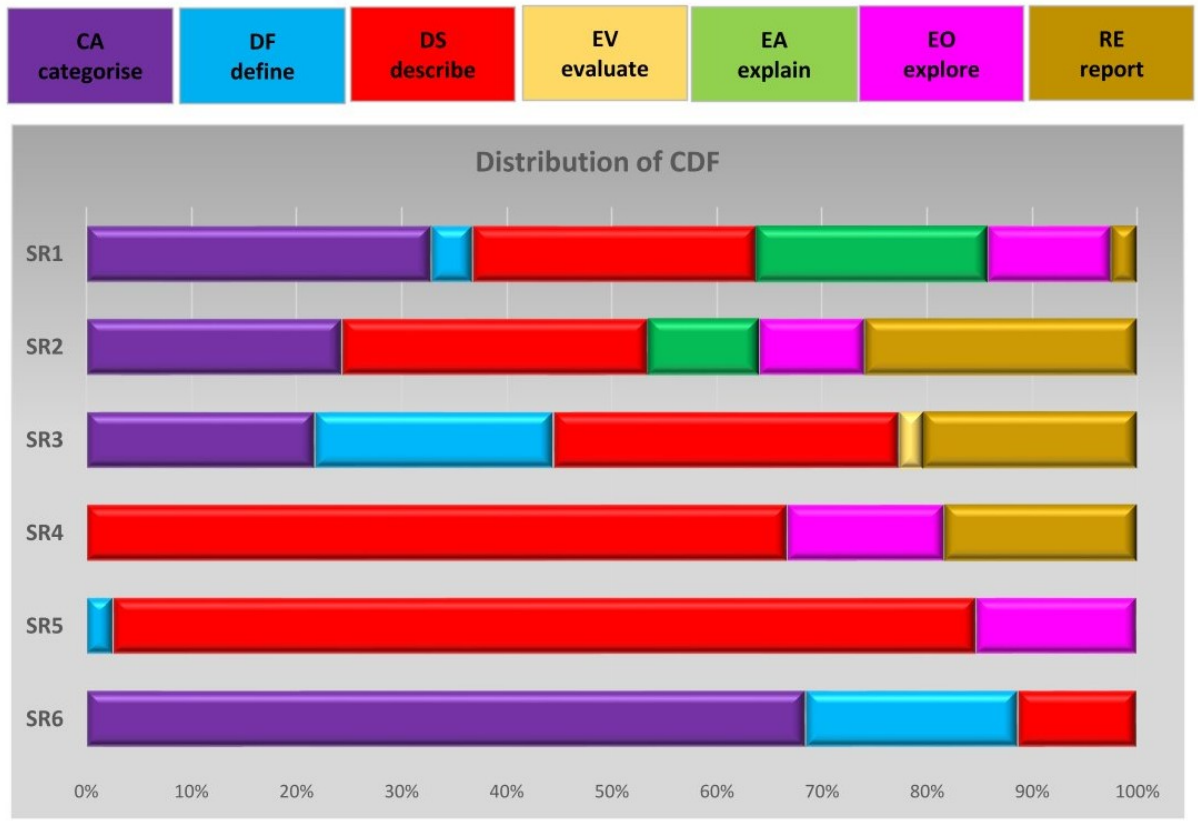
	SR1	SR2	SR3	SR4	SR5	SR6
CATEGORIZE	**EP**	✓	**EP**	✓	**EP**	**EP**
DEFINE	✓		✓		✓	✓
DESCRIBE	✓	✓	✓	✓	✓	✓
EVALUATE			✓			
EXPLAIN	✓	**EP**		**EP**		✓
EXPLORE		✓		✓	✓	
REPORT	✓	✓	✓	✓		

All the SRs within the analyzed dataset can be coded as episodes of the “categorize” CDF with the only exceptions of SR2 and SR4. They all fall under the broader category of “compare and contrast” as they align with the definition of “compare and contrast” in the coding manual (See Section for Science), which defines such texts as those that “put two or more objects, facts [...] together and state in what ways they are similar or dissimilar.” SR2 and SR4 have been coded as containing an “explain” CDF episode.
To facilitate the comparison and contrast of objects and facts, various cognitive discourse functions (CDFs) are employed within the texts. Notably, the CDF “describe” is consistently present across all SRs at a fundamental level, which can be attributed to the inherent nature of the texts, wherein each text provides a description of the content represented within the respective SR. These representations encompass graphical depictions, such as graphs (SRs 1, 4, 5), or visual elements, such as images (SRs 2, 6). SR3 stands out as it incorporates both an image and four distinct graphs, further underscoring the multifaceted nature of the comparative and contrasting discourse within the dataset.
SR2 is an example of an “explain” CDF episode: the image is used to explain Boyle’s law by depicting the same container but in two different states. The fact that SR4 is not a “categorize” CDF episode depends on the nature of the SR itself, which is used to assign a specific task to learners, i.e., “explain

whether the following functions satisfy the EVT or not". The text which has been produced by the teacher is in this case an "explain" CDF episode.
The "describe" CDF is present in all SRs. The way objects or phenomena are compared and contrasted or explained always implies a process of visualization and the description of what the SR shows. This aligns with previous findings (Minardi, 2020: Kröss, 2014): describing a fact or an object is an important component of any Physics lesson.

Figure 1 shows how the CDFs are distributed in the six SRs. What comes out is the difference between the first three SRs where 5 or 6 different CDFs are used to respond to the visuals presented while in the last three SRs only three CDFs are being used. We can hypothesise this depends on the kind of visuals which was chosen by AP: SR4 and SR5 contain functions and SR6 a graphic representation of a "probability line".

Figure 1. Distribution of CDFs in AP's semiotic resources.



What follows is a detailed analysis of each SR.
Semiotic resource 1
The text refers to two graphical representations: one delineates the Maxwell-Boltzmann distribution, showcasing the molecular speeds of a particular gas across varying temperatures, while the other illustrates the disparities between the peak, mean, and root mean squared (rms) values of molecular speeds (AP, SR1).

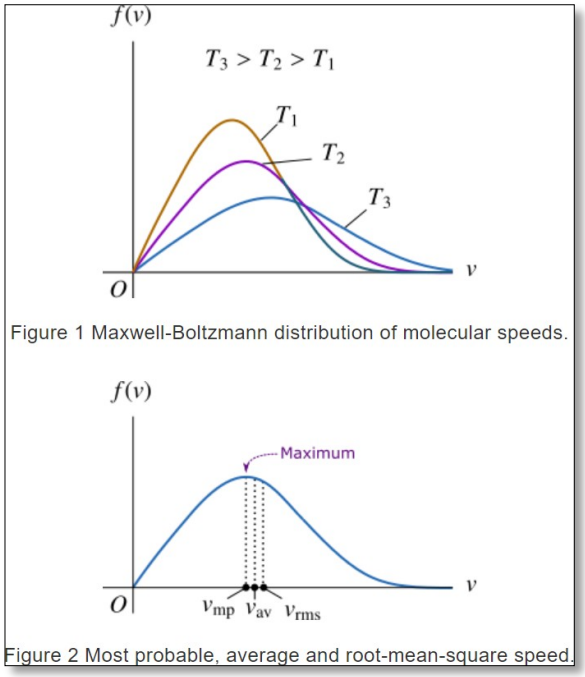


Figure 2. AP – Semiotic Resource 1.

Excerpt 1:

[CA (DS: This picture shows the distribution of molecular speed of an ideal gas. On the x-axis there are the speed values; on the y-axis there are the percentages of molecules with the same speed value. In figure one we can see that the peak value, which is related to the most probable speed value, (EA: depends on the temperature of the gas, (RE: according to the formula $< v > = \sqrt{\frac{3RT}{MM}}$*.*
(EA: The higher the temperature is, the higher the most probable speed value is and the lower the peak is. (EO: In fact, the area under the function must be the same for each temperature asit represents all the molecules of the gas (100%).)

(CA/DS: In figure two we can see the difference between the peak value, the mean value and the so-called root mean squared (rms) value of molecules speed. The first one is the most frequent value of molecular speed. The second one is the average (arithmetic mean) of the molecular Speeds).
(D F : The last one is defined by the formula $< v > = \sqrt{\frac{\sum n \ i=1 \ (vi)2}{n}}$*) as it is obtained by calculating the mean kinetic energy of the gas particles. It always happens that the peak value speed is less than the average speed, which is less than the rms speed]. (Teacher AP)*

Interestingly, while the text explains the phenomenon of how speed alters with temperature, it omits explicit mention of the colors used to distinguish the three lines on the graph illustrating this relationship. Instead, to explain the phenomenon, the text opts to report a formula ("according to the formula..."). In the subsequent segment of the text, the focus shifts to delineating the distinctions between the peak, mean, and rms values of molecular speeds. To facilitate comprehension of these variances, the text frequently employs comparative and superlative forms, such as "the peak value speed is less than the average speed, which is less than the rms speed." This discourse strategy serves to elucidate the nuanced differences in molecular speeds and effectively supports the aim of comparative analysis and contrast within the discourse.

The discourse seamlessly integrates various languages of physics, including verbal, mathematical, and visual representations. Each linguistic modality is selected to best convey the intended explanations (part 1 of the text) and facilitate comparisons and contrasts (part 2 of the text).
From a linguistic perspective, the text serves the purpose of mediating, as it employs diverse modes of representation to elucidate the phenomenon under discussion. A graphical representation (fig.1) illustrates the fluctuation of molecular speeds in response to temperature changes, offering a visual depiction of the phenomenon. Within the text a formulaic representation supplements this visual depiction, providing an alternative conceptual framework for explaining the phenomenon, i.e by showing the relations of cause and effect in the phenomenon under observation. In the latter part of the text, the focus shifts to comparative and contrasting analysis, facilitated by an examination of the peak, mean, and rms values of molecular speeds. These values, elucidated in a second graph (fig.2), serve as points of comparison, allowing for a nuanced exploration of the variations inherent in molecular speed.

Semiotic resource 2
In order to explain Boyle's law SR2 shows "a container in two different states", which are compared throughout the text. The paragraph initially reports Boyle's law ("the picture refers to Boyle's law"), then it describes the different parts of the container and the objects visible in the SR ("a manometer and a thermometer are shown") and, finally, compares the conditions of the container ("we can see that temperature is the same during the process, while pressure and volume change […] in the first state volume equals 4L and pressure equals 1atm; in the second one volume equals 2L and pressure equals 2atm") before drawing a conclusion ("we can state that the product between pressure and volume is constant: in fact, its value is 4L atm"). Apparently, this SR could be coded as a "categorize" CDF episode. In fact, the comparison between the two different states of the same container portrayed in the SR serves the purpose of explaining Boyle's law. In the coding manual, the CDF "explain" was specified as follows "I tell you about the process of seeking relationships among scientific facts, for example by looking for causes and effects. Providing evidence is an essential part of an explanation". In the SR under exam the law is explained through a comparison between the states of the same container, which change ("effect") as a consequence of a variation in pressure and volume ("cause") while temperature remains the same.
Linguistically, the text generated by AP employs two distinct strategies to illustrate the differences between the two states of the container: firstly, by highlighting the constancy of temperature amidst the changing pressure and volume ("the same... while…"); secondly, by presenting a direct comparative framework ("in the first state…; in the second one…").
In the description of the container two linguistic elements frequently occur. The first is a frequent use of the passive: "the container is graduated", "it can also be heated or cooled", "a manometer and a thermometer are shown". The second is the use of "we" in sentences such as "we can see", "we can measure", "we can suppose", "we can state". In all these cases a passive form would have also been possible.

Semiotic resource 3
The scenario depicted in SR3 entails a multifaceted visual with an image labelled "thermodynamic systems" and four graphs denoted as "thermodynamic processes." The three thermodynamic systems are designated as "open," "closed," and "isolated," while the four graphs refer to the

"isobaric" (constant pressure), "isochoric" (constant volume), "isothermal" (constant temperature), and "adiabatic" processes.

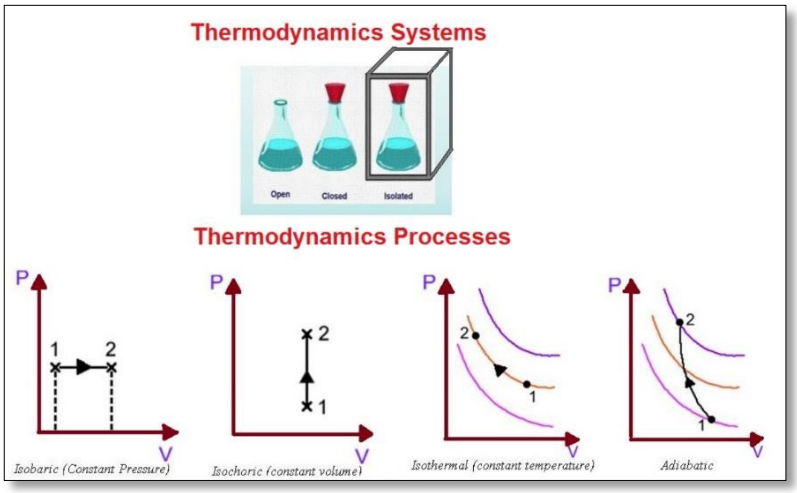


Figure 3. AP – Semiotic Resource 3.

Initially, the SR is described as showcasing the primary characteristics of a thermodynamic system and the prevalent processes associated with it ("the picture shows the main characteristics of a thermodynamic system[1] and the most frequent processes we can study about a thermodynamic system"). The whole text can be classified as a "categorize" CDF episode as it classifies the three types of thermodynamic systems based on their interactions with the surroundings (first part of the SR) and four distinct processes or behaviours typical of a thermodynamic system (second part of the SR). Within SR3, there exists the sole example in AP's dataset of an "evaluate" CDF. When introducing the four primary processes, AP asserts "The most interesting processes are", thus expressing an opinion without providing justification.

The classification of the four processes by AP follows a symmetrical discourse pattern: initially, a definition is presented, followed by a specific reference to a law, with the exception of the adiabatic process, which lacks a direct reference to a specific law.

The text concludes with a recapitulation of the image description. The last sentence introduces new terms when referring to processes: "isobaric expansion," "isochoric transition," "isothermal compression," and "adiabatic compression." While providing a more precise and specific delineation of the depicted phenomena, the text may aim to enhance clarity and conciseness. However, it is notable that in the definitions of the four processes, the term "transitions" is consistently used ("they are transitions that happen at a constant…" for the first three; and "they are transitions with no exchange of heat between the system and the surroundings" for the last one). This recurring usage may reflect AP's anticipation of learners' potential confusion regarding technical terminology related to thermodynamic systems.

From a linguistic point of view, the "categorize" CDF element in the first part of the text exhibits a sentence structure which is very similar:

[1] The first three images do not in fact show "the characteristics of a thermodynamic system". They show how to classify thermodynamic systems according to the type of exchange between the system and the surroundings. That is the reason why we have coded this text as a "categorise" CDF episode. It might be interesting to see if AP wrote that sentence as she expects learners to use the term "characteristics" instead of "types".

Excerpt 2:
[CA: A thermodynamic system can be:
- *Open, when it can exchange **both** matter **and** energy with the surroundings.*
- *Closed, when it can exchange **only** energy (heat and work) with the surroundings.*
- *Isolated, when it can exchange **neither** matter **nor** energy with the surroundings.]*

The comparison is linguistically made by using "both … and…", "only" and "neither … nor…". However, it is not clear why AP thinks it is important to specify "heat and work" in brackets after the word "energy" for the closed type only.
Similarly, the "categorize" CDF in the second part of the text follows a consistent discourse pattern, comprising two distinct CDFs: "define" and "report."

Excerpt 3:
[CA (EV: The most interesting processes are):
- *(DF: Isobaric processes. They are transitions that happen at a constant pressure.) (RE: In these processes absolute temperature and volume are directly proportional) (according to Charles' law);)*
- *(DF: Isochoric processes. They are transitions that happen at a constant volume.) (RE: In these processes absolute temperature and pressure are directly proportional (according to Gay Lussac's law);)*
- *(DF: Isothermal processes. They are transitions that happen at a constant temperature.) (RE: In these processes pressure and volume are inversely proportional (according to Boyle's law);)*
- *(DF: Adiabatic processes. They are transitions with no exchange of heat between the system and the surroundings).*

(DS: The four transitions sketched in the picture are respectively: an isobaric expansion, an isochoric transition, an isothermal compression, an adiabatic compression.

The "define" section adheres to the aforementioned pattern, while the "report" portion consistently appears within brackets and is introduced by "according to … law."

Semiotic resource 4
This SR outlines an instructional scenario where students are tasked with evaluating whether three given functions satisfy the Extreme Value Theorem (EVT). The text first reports the EVT and then proceeds to analyze the three different functions using various CDF elements.
None of the three functions meet the criteria outlined in the EVT. Each analysis begins with a statement indicating that the function under consideration does not fulfill the EVT theorem's requirements. The subsequent discussion examines the function's characteristics, particularly regarding maximum and minimum values.

As to the language dimensions involved, all the three elements
- start in the same way "the […] graph shows a function that does not fulfil the hypotheses of the EVT theorem:" in which the colon is used to announce a sentence containing an explanation ("the function is not continuous" for graphs 2 and 3 and "the function is continuous on a half-open interval" for graph 1);
- describe the properties of the function in terms of maximum and minimum values;

- contain an example of an “explore” CDF element. The text gives “an explanation for why something happens” (cf. coding manual). For the first and third graph, the “explore” CDF element is introduced by “as”. The second graph has a different level of complexity, which obliges the teacher to use a double “explore” CDF element, one introduced by “nonetheless” and the second taking the form of a reformulation (“this means that…”);
- the use of “also” in the description of the third graph (“this function also represents a counterexample”) allows coding these three descriptive texts as performing three “categorise” CDF elements. This approach allows for individual assessments of each graph while identifying commonalities and differences among them. Each graph is analyzed in isolation to address the task prompt effectively and discern the unique elements they exhibit.

Semiotic resource 5

This SR serves the purpose of comparing and contrasting three non-continuous functions. The text starts by defining a non-continuous function using a register which clearly belongs to everyday language (“it is impossible to sketch their graphs without picking up the pen from the sheet”). This sets the stage for introducing the “categorise” CDF episode by suggesting that all three functions exhibit “different points of discontinuity”.

In order to categorize the three functions, the text uses:

a. “describe” CDF elements, offering detailed descriptions of each function and discussing their characteristics and discontinuities;
b. “explore” CDF elements, trying to give reasons for each function's non-continuity.

When presenting the first function the text contains a greater variety of CDFs than in the other parts.

Excerpt 4:

[CA: (DS: In the picture we can see three functions that are not continuous in their domain). In fact, (DF: itis impossible to sketch their graphs without picking up the pen from the sheet.) (DS: The functions present different points of discontinuity).
*(EO: The first function **seems to** be a homographic function), (DF: a particular kind of equilateral hyperbola). (DS: Its domain is $\mathbb{R} \setminus \{-3\}$, where −3 (negative three) is the root of the denominator. The function has a point of discontinuity at $x = -3$: at this point there is a vertical asymptote). (EO: **It is possible to verify that** the limits of the function as x approaches −3 (negativethree) both from the left and the right side are infinity).*
(DS: The second graph shows a function that is not continuous at $x = 1$, although its domain is $\mathbb{R}$. The limit of the function as x approaches 1 from the left side equals 3. The limit of the function as x approaches 1 from the right side equals one. The function value at $x = 1$ equals one. So we can say that there is a jump at $x = 1$.
The third graph shows a function that is not continuous at $x = -2$. The domain of the function is $\mathbb{R} \setminus \{-2\}$. There is a hole at $x = -2$ as both the limits of the function as x approaches −2 (negative two) from the left and the right side equal two, but the function does not exist at $x = -2$)] .

For the first function, the text employs a “define” CDF element by identifying it as a homographic function, a specific type of equilateral hyperbola. From a linguistic perspective, the „explore“ CDF

element is expressed by phrases like „seems to be“ and „it is possible to verify that“, indicating tentative explanations for why something happens the way it does.
For functions 2 and 3 the text highlights each function's specific domain, an essential textual element, by using symbolic representations (e.g., $\mathbb{R} \setminus \{-2\}$).

Semiotic resource 6
This SR contains an image, showing a line called "a probability line".

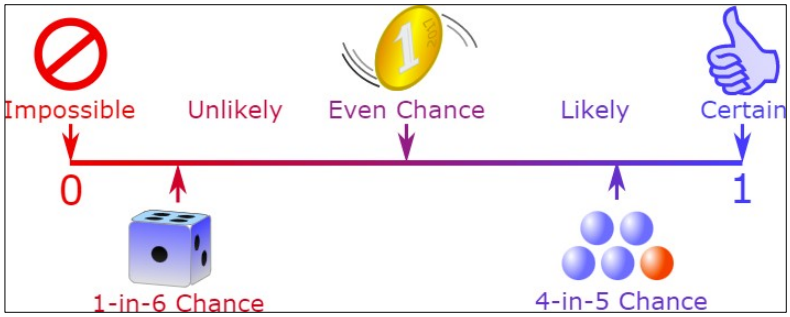


Figure 4. AP – Semiotic Resource 6.

After defining the notions of "probability" (in two sentences in which the latter uses a more academic register) and "outcomes", the whole text is used to describe the line so as to classify events from impossible to certain with all the differences in between, i.e. "unlikely", with an "even chance" to happen, "likely".

> *Excerpt 5:*
> *[CA: (DS: In the picture we can see a probability line. It shows the main characteristics of probability.)*
> *(DF: Probability gives a measure of how likely an uncertain event is to happen. It is often defined as the ratio of favourable outcomes to the total number of outcomes of an event. Outcomes are equally likely results that produce the event.)*
> *(DS: Probability values span from zero to one), so we can say that they are represented by real numbers. (DS: The probability of an impossible event equals zero (the event never happens), while the probability of a certain event equals one (each outcome is favourable). Any other event has a probability between zero and one, as only some outcomes are favourable.*
> *An event is unlikely when its probability is a number close to zero.* ***For example****, rolling a one with a six-sided die is quite an unlikely event (one in six possibilities).*
> *By contrast an event is likely when its probability is a number close to one.* ***For example****, choosing a blue marble from a jar containing four blue marbles and one red marble (four in five possibilities).*
> *Furthermore, we can have events which have the same chance to happen.* ***For example****, getting head or tail when flipping a fair coin (one in two possibilities for both the events)].*

The SR contains three examples of events which can be classified as "unlikely", "even chance" and "likely": these examples are described in the text and used as evidence to illustrate the three notions of unlikelihood, even chance and likelihood. At the same time, they are concrete, simple, and based on commonsense, everyday knowledge.

Moreover, from a linguistic point of view, the text uses linkers to (a) contrast situations ("while", "by contrast"); (b) add elements ("furthermore"); and (c) exemplify ("for example"), the latter being used three times. The text employs straightforward and clear language, making complex concepts more accessible: "an event is unlikely when its probability is a number close to zero" vs "an event is likely when its probability is a number close to one". The examples provided are grounded in everyday experiences: rolling a die, choosing marbles from a jar, flipping a coin. The text does not utilize passive voice or nominalization, maintaining a direct and active tone all the time. Technical vocabulary related to probability (e.g., "probability", "outcomes", "favourable outcomes") is used accurately but is kept to a minimum.

5. Concluding remarks

The analysis provides some common threads in the use of language to express knowledge in the specific domain of physics:

1. Each text employs specialized terminology specific to the domain of physics. When discussing the semiotic resources AP often said she expects students to be able to use terms in a precise way.
2. The texts integrate multiple linguistic modalities, including verbal descriptions, mathematical equations, and visual representations. Each modality is chosen strategically to best convey the intended explanations and facilitate comprehension. This aligns with various research on the language of physics (Doran, 2018; Minardi, 2023).
3. "Categorise" is the most widely used CDF in this group of SRs. In several texts comparative analyses are used to highlight differences and similarities between different states, processes, or phenomena. The texts often categorize and classify various elements within the domain of physics, such as thermodynamic systems, or functions. The "categorise" CDF has an organizational structure which helps in organizing information by also clarifying nuanced differences. "Evaluate" is seldom used in the texts produced by AP..
4. Some texts provide evidence and justification for their explanations by referencing scientific laws, principles, or observed phenomena (CDF: "report"). This strengthens the validity of the explanations and enhances their credibility.
5. The texts predominantly use active voice and lack nominalizations, suggesting that students at this level are not expected to frequently use these features of academic discourse. This observation warrants further investigation. If confirmed, it indicates potential for additional instruction on the discourse patterns commonly associated with the academic language of Physics.

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Teachers' expectations in Austria: a comparison of lower secondary history and primary-level 'general studies'

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1. Introduction

The following section presents case studies of what lower secondary teachers expect 'good' history learners to write as a reaction to visual input compared to oral expectations of a primary teacher in so-called *general studies* classes ("Sachunterricht"). These expectations were elicited using the elicitation protocols presented in Chapter 3.2 (see also Appendix, Chapter 4.2). In other words, the teachers were asked to first select semiotic elements they like to use in their lessons and then to write down what they expect a good student would produce when using the same semiotic item to evaluate the learning outcomes of teaching this unit, i.e., testing the learners. All three teachers chose visual input in the form of photos, illustrations and cartoons as their semiotic elements to prompt language production. In line with the elicitation protocols for the secondary level, the expectations for history were assumed to be written language. In the case of the primary teacher, the student output was assumed to be oral language to better reflect the nature of general studies classes in primary education, which was also anticipated in the elicitation protocols used for this project (again, see Chapter 3.2).

2. The process and participants

Overall, five Austrian teachers sent in a total of 20 texts between spring and autumn of 2023:

a. Five texts from a primary teacher (initials: SS)
b. Three texts from a lower secondary teacher (initials: CB), teaching history, English, biology, handcrafting and IT ("Digitale Grundbildung")
c. Two texts from a lower secondary teacher (initials: MR), teaching history and political education as well as English
d. Five texts from an upper secondary teacher (initials: AK), teaching English (for business) and Italian
e. Five texts from a secondary teacher (initials: AP), teaching English and geography

In general, these teachers seemed to find this task interesting, as it helped teachers reflect on realistic expectations of the language needed in their subjects. Especially in the case of the primary teacher, writing texts on their expectations ("Erwartungshorizonte") is something that they remember from their studies. Yet, this is not an activity they do regularly for planning. Most secondary teachers, on the other hand, experienced this task as unusual and challenging but, for the most part, understood and managed the task. Only the geography / EFL teacher and one of the history teachers misunderstood the task and provided didactic comments and content descriptions instead of hypothetical student texts. In case of the geography / EFL teacher, it needs to be added that she received the instructions only in the written form. However, after explaining again, and adding the line "insert here what a good student would write" in the elicitation protocol, they understood and successfully revised their tasks. Overall, I assume that there might have been too much information when explaining the task, resulting in them only skimming the instructions. These difficulties were discussed in the working group's meeting in Elbasan when polishing the elicitation protocol.

For the chapter at hand, only contributions by teachers a. - c. (SS, CB, MR) mentioned above were considered to allow a reasonable and focused comparison. Table 1 provides metadata on these teachers:

Table 1. Metadata on teachers

	Teacher SS	**Teacher CB**	**Teacher MR**
Type of school	Public primary	Public lower secondary	Private lower secondary
Age	25	51	55
Years of teaching experience	2	30	30
Subjects they teach	all	History, English, biology, handcrafting and IT	History & English
Type of study programme	Primary education with a special focus on ELT & German as a second language; currently working on her PhD in the field of teaching general studies ("Sachunterricht")	Secondary education in the subjects English, biology, religion & German; several certificates in the field of CLIL, e-learning, teaching methods and librarianship	Secondary education in the subjects English and history; additional Master's in political education; certificate in CLIL teaching
Number of texts	5	3	2
Grade/ age-level of the texts provided	Grade 3-4 Age 8-10	Grade 6 & 8 Age 12-14	Grade 6 & 8 Age 12-14

3. Findings

The ten texts by these three teachers were analysed using the coding manual developed for this project (see Chapter 3.2 or TOOL-3 in the Appendix of the Report). In other words, the analysis focused on identifying CDFs on both basic and episode-level as well as their linguistic realizations. As defined by Dalton-Puffer et al. (2018), CDF-episodes are larger stretches of language unified by one overarching communicative intention, which can include and be built up of smaller CDF-instances, i.e., the so-called basic types. The table below presents an overview of the quantification of the results of the qualitative coding:

Table 2. Overview of coded CDFs

CDF-type	**Primary texts (n=5)**		**Secondary texts (n=5)**	
	Basic level	**Episode level**	**Basic level**	**Episode level**
Categorize	1		2	
Define			4	
Describe	7	2* (1 overlap with *report*)	8	2
Evaluate	3		0	
Explain	1		3	1
Explore			3	
Report	2	2*(1 overlap with *describe*)	7	1

No episode identifiable		2		1
Total	14		27	

As we can see, the secondary texts present a greater number and variety of CDF-basic types than the primary counterparts, while *describe* and *report* seem to play important roles at the episode level in both contexts. Before moving into the comparison in more detail, the sections below explore the findings of each context in more depth.

3.1 Lower secondary history texts

Starting with history, the two teachers submitted three texts by imaginary 12-year-olds (grade 6) and two texts by thought-up 14-year-olds (grade 8). Two of the grade-6 texts appear to mostly serve the communicative intention of *describing*, making them *describe*-episodes. Given that all texts used visual sources as prompts for student output, it is not surprising that *describe* also was the most common basic-type in the five texts provided (n=8). These *descriptions* were often clearly indicated by direct reference to the picture, e.g., using phrases such as "in the picture", "there are", "in front of", "in the background", "on the left", "looked like", or "shows". Furthermore, the imagined students tended to use present simple to *describe* the content of the visuals as well as to use present progressive for ongoing actions depicted in the source. These features made it easy to identify these CDF instances, and this also suggests that *description* is something that these teachers assume that their students can do well.

Similarly, *report* also played a considerable role in the texts, with seven instances of basic-level use. In one case, the picture mainly served as a prompt for a historical *report*-episode. The frequent use of *report* also is to be expected in these types of texts due to the nature of historical discourse (see Bauer-Marschallinger, 2022; Coffin, 2006; Lorenzo, 2017), i.e., relating the visual representation to the historical context not visible in the source. In these *reports*, the hypothetical students used past simple as well as a relatively nominal style, both of which are typical features of this type of historical discourse (see, e.g., Bauer-Marschallinger, 2022, or Lorenzo, 2017). Interestingly, one grade-8 text uses nominalizations as well as participle clauses quite heavily (marked in bold in the sample below), and generally presents a very complex sentence structure:

> *Excerpt 1:*
>
> *… (DF/RE: The White Rose was **an organisation of German students** (<u>founded by</u> Sophie and Hans Scholl and Alexander Schmorell), who saw the Nazi regime **as threat to the country and human freedom**. (RE: The White Rose created several leaflets **accusing** the **horrible crimes of the Nazi regime. When spreading** the leaflets at the university in 1943, the Scholl siblings [sic] <u>were caught by</u> the janitor and <u>finally arrested by</u> the Gestapo.) …* (Teacher CB)

What we can also see in this sample is a frequent use of passive voice (underlined) as well as subject-specific terminology ("Gestapo" & "the White Rose"). As such, the text is linguistically rather advanced and appropriate for historical discourse – even at a level that appears somewhat above what a good 14-year-old can do, meaning that this text is linguistically more sophisticated than what can be realistically expected at this level.

Moving on to *explain,* there is one text that seems to serve an explanatory purpose, overall (= CDF-episode). In this text, a hypothetical 12-year-old CLIL learner *explains* how different types of fossils are formed based on a visualisation of these processes. Only in the first sentence, the student refers to the graphic support, making it a *describe*-basic example. In all other parts, they *explain* different fossilisation processes or *define* specific sub-types. When *explaining*, the student sometimes uses clear, prototypical phrases for this, such as "due to" or "this is how". Other times, they use less clear signalling, such as the use of "and" in the first line in the excerpt below, where the second clause actually is a consequence of the first, rather than additional information:

Excerpt 2:

[EA: (DS: This graphic illustrates the different ways how fossils are formed): (EA: Animals die ***and*** *their soft parts decay. Hard body parts like shells or bones sink to the ground and are covered by several layers of sedimental rock. In some cases, shells are filled with sediments and the shell itself dissolves.* ***This is how*** *cast fossils are formed.)(DF: When shells or other hard body parts create tracks, we call these fossils trace fossils or mold fossils). (RE: These fossils are quite common and often found.)(EA: In some lucky cases the whole body turns into hard rock* ***due to*** *high pressure.) (DF: This type of fossil is called body fossil.)]* (Teacher CB)

Considering that the focus lies on what causes the differences in these types of fossils rather than *defining*, *describing* and/or organizing these different types, the overall intention seems to be *explain*. Somewhat clearer signalling could make this more obvious but would also be unrealistic for this age group. In general, this fictional student already presents this information in a systematic manner, even formulating a topic sentence, using subject-specific and precise vocabulary and, for the most part, indicating communicative intention. This, I assume, would only be realistic from a very good student at that age, or if the teacher explicitly practised verbalizing these types of processes. As a side note, it should be mentioned that this text presents transdisciplinary knowledge, i.e., knowledge important in geology and history. Overall, the focus definitely lies on geologic processes and not their historical significance, which is also indicated by the use of the present simple and passive voice.

In the five texts, four *definitions* could be found (two of them are provided in the sample above). As we can see, here, phrases such as "is called" or "when XY, we call this Z" are used. In the other two examples, we find "x was y" (excerpt 1, line 1) or "is also known as". So, generally, *definitions* were easy to spot, as the communicative intention was clearly marked, indicating that teachers assume that their learners know how to *define* terms used in their answers. It is quite noteworthy, however, that there are only four instances of *definitions* in these texts, even though these hypothetical learners were generally using subject-specific terminology. As such, it appears that teachers do not expect their learners to habitually *define* the terms they are using in their texts at this level.

In one sample where it seems that no unifying episode can be identified, the CDF-basic type *explore* is used three times. In this text, an imaginary 14-year-old student interprets a cartoon dealing with the Cold War:

Excerpt 3:

(DS: You can see two men in the cartoon. They are fighting. They look angry and concentrated. They are sitting on two bombs. (EO: ***I think*** *they are very powerful and they owe [sic] many weapons.)(DS/ CA:* ***Both*** *men are sweating and they are trying hard to win. The man in the black suit wants to press a button.)(EO:* ***I think*** *the two men are not friends and they are enemies****. I think*** *one is the American president and one is the soviet union president.) (RE: They were enemies in the period of the cold war. There was always the danger that they started a war again.(EO:* ***Maybe*** *even a worse one than the second world war –* ***maybe*** *with atomic bombs.))* (Teacher MR)

In between *descriptions* of what can be seen in the cartoon and *reports* of external knowledge, this imaginary student hypothesizes about the background and identity of the men depicted and the type of war the Cold War could have become (*explore*). This is marked with "I think" as well as "maybe" (= modal adverb). What appears to be lacking in this text is clear linking between the basic types, which could also have made it easier to identify the overall purpose of the paragraph. As such, it can be considered to be quite realistic for a 14-year-old CLIL history learner, as clear linking between CDF-types is something many learners struggle with (see, e.g., Bauer-Marschallinger, 2022).

Finally, *comparisons* are only used twice in these five texts to compare descriptions using "both" for similarities (see excerpt 3 above) and "whereas" for differences. Moreover, once, the text begins with a *categorization* of the source: "This is a picture from the stone age" (Teacher MR). What seems to be completely missing from the five texts are *evaluations*. Considering that the ability to *evaluate* is a

central element of historical competence (e.g., Körber et al., 2007; see Bauer-Marschallinger, 2022), its absence in these texts is interesting. It appears that these teachers do not yet expect their learners to be able to do this at their own accord at this level. Only once, a text contains a statement that does resemble appraisal: "The White Rose is one of the most famous and well-known resistance groups of WWII". However, this hypothetical student does not provide any real *evaluation* regarding historical significance and also does not provide any justifications. Therefore, it appears more likely that this imaginary student only *reports* a fact heard somewhere else and never digs any deeper regarding the movement's role in history or regarding the significance of the memorial in today's world. So, while this text (see also excerpt 1) is linguistically fairly advanced, I would argue that the expectations concerning historical thinking skills are actually below what one could expect from a good learner aged 14.

Concerning linguistic expectations, on the other hand, most texts reflect rather ambitious goals, including frequent use of nominalizations, passive voice, complex sentence structure, as well as consistent control of tenses. This would only be likely, I would argue, if the teacher explicitly taught these linguistic features in connection to the types of visual input provided. One of the teachers (MR), in fact, added comments regarding this, stating that she would practise *describing* historical scenes and *interpreting* historical cartoons with her students.

Working with the CDF analysis tool has also allowed a better understanding of the structure of these texts regarding the complexity and depth of dealing with the input. Usually, those texts with a greater variety of CDF-types appear more sophisticated, especially if they are well and explicitly connected, which most texts of this corpus do not fully achieve (see also Bauer-Marschallinger, 2022). In general, those texts that clearly indicate communicative intentions are easier to follow and more systematic, often culminating in a clear overarching purpose, i.e., CDF-episode. It was an interesting observation that the CDF analysis allowed finding a mistake in an answer provided. In the text dealing with the evolution of humans, the hypothetical student *describes* (and partly *compares*) different phases of human evolution. While most of the details relating to these types of humans are depicted in the source (i.e., therefore making them *describe* elements), one detail, namely "the use of hand axes" by Homo habilis, is not shown in the source (Figure 1), and was therefore classified as *report:*

> *Excerpt 4:*
>
> *DS: […] Homo habilis is the first to use tools like flintstone) (RE: hand axes and Homo habilis already used fire).* (Teacher CB)

However, the second detail of this sentence, i.e., that Homo habilis was the first to use fire, is in contradiction to the source and, upon online research, this instance of *report* seems to be factually wrong. When first reading through the text, I did not notice this, but the CDF analysis, i.e., deciding whether it was *report* or *describe,* made this issue very obvious. Looking at the sentence structure, it appears that this was indeed a mistake and that the writer of this text probably had "Homo erectus" in mind at this point.

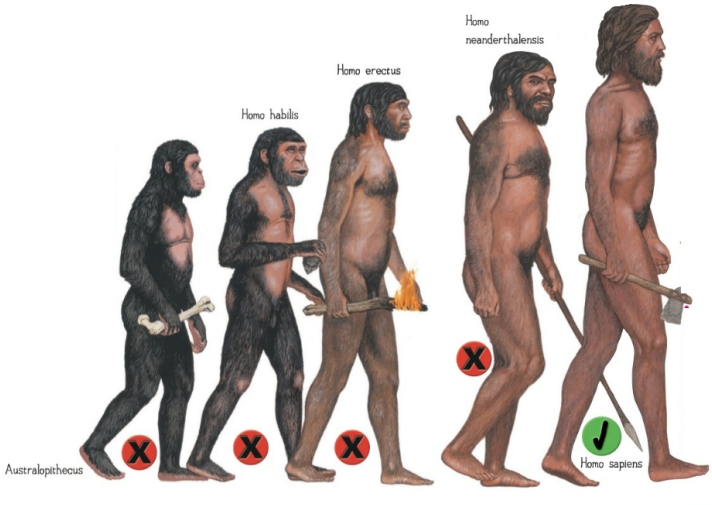

Figure 1. The evolution of mankind (Gilman Paiva, 2013, p. 28)

3.2 Primary *general studies* texts

Turning to the primary samples written by one teacher (SS) all relating to the subject "general studies", we can see that *describe* seems to be the most central CDF type, too. To be more precise,

half of the CDFs used at the basic level and two out of five episodes are instances of *describe*, meaning that the samples provided closely engage with what is visibly presented in the semiotic elements. For that purpose, the hypothetical students use simple syntax and present simple, e.g., when *describing* general processes such as the water cycle (based on an illustration thereof): "Hot water rises up into the sky. It is invisible then" (Teacher SS).

In another sample, they *describe* a route reading a map. Here, they also accurately use present simple, but once, they use present progressive, which seems a bit off, especially since it is presented as if you would have to start from the student's home to get to the sports field: "**To** get to the sports field I am starting from my home" (Teacher SS). However, such mistakes are to be expected from primary learners, so I would argue that the sample above is realistic for the age group. In the same extract, the student structures this *describe*-episode using temporal phrases such as "after", "then", "again", "now".

In another sample, an imagined primary student *describes* the contents of two depicted lunch boxes, using identifying phrases, e.g., "in the left lunch box" or "there is", to structure the *description*:

> *Excerpt 5:*
>
> *(DS: **In the left lunch box** are grapes and two sandwiches.) (EV: The sandwiches are healthy **because there is** lettuce in it.) (DS: I **can see** cheese and tomatoes.) (EV: This is a healthy snack.) (DS: **I can see** two sandwiches, in the blue lunch box. I think there is ham inside and lettuce and tomatoes. **There is** no fruit inside.) (CA/EV: I **think both** boxes are healthy.)* (Teacher SS)

Moreover, this hypothetical student sometimes signals communicative intentions, e.g., with "I can see". Yet, the student does not signal their intentions throughout. For example, the parallel *description* of the two lunch boxes seems to imply a *comparison*, but this is never explicitly expressed. Only once does this student mark similarities using the word "both". Similarly, it feels like this imaginary student wanted to *evaluate* the healthiness of these two options but did not manage to do so convincingly and systematically. For example, the student states twice that the lunch boxes are healthy (or that they think so) following the descriptions of the contents, which could be viewed as justification for this statement. Yet, this is not linguistically signalled, and the reasons could be a bit more in-depth. In line 1 of excerpt 5, however, the student uses "because" to show that what follows is a justification for the assessment. Again, the reason is not particularly sophisticated, but these are the only instances of *evaluate* in the five texts provided.

Overall, the sample text above does not seem to be unified by a particular communicative intention (= CDF episode). This teacher also offered an L1-version of the same text, now assuming to teach this topic in traditional classes, and here, the overall communicative intention of *evaluation* comes out much more clearly. In the German equivalent, justifications are provided more regularly and in more depth. Also, communicative intentions are marked more clearly, and the different basic CDF-types are better connected to support the overall message. In general, comparing the English-CLIL and German non-CLIL versions, the German version usually provides more details, more precision, better cohesion, a greater variety of CDF choices and (clearer) communicative signalling. This implies that this primary teacher expects answers to be more complete (content-wise), but also more cohesive (language-wise) when delivered in the students' L1.

In one example, an imaginary 8-to-9-year-old student writes down their daily meals and food-related habits based on a table that asks learners to track what they eat for a day:

> Excerpt 6:
>
> *[(DS/RE: **In the morning** I get up, I eat breakfast. **For breakfast** I eat cereals with milk and drink a glass of orange juice. In school I eat my sandwiches and only drink water. In my sandwiches there is lettuce, tomatoes, and cheese. For lunch I **always** eat different meals. I **like to** eat pizza and drink orange juice. In the afternoon I eat a snack and drink tea. I like fruit as a snack. For dinner I like to eat soup and drink tea.)]* (Teacher SS)

Here, it is difficult to decide what type of main discourse function this is. The task itself would rather ask for *describe,* i.e., tracking someone's food consumption for a day like in an experiment. The student, however, rather *reports* their general food-related habits, signalled by words like "always", the use of present simple, and by structuring this text according to times of the day ("in the morning", "for dinner I like to eat", etc.). In between, the student includes stating a preference ("I like to eat pizza"). While this involves opinions, it cannot be considered a *scientific evaluation* as no (criterion-based) justifications are provided. Although the German version also does not allow identifying a single overall CDF-episode, the German text again provides more variety and precision. For example, in the German version, the teacher included a criterion-based justification once, arguing that they prefer water to soft drinks, *because* water is healthier.

In another text*, report* seemed to be the only CDF type used:

> *Excerpt 7:*
>
> *[(RE: The girl needs her **sense of sight**, **sense of touch**, **sense of smell** and **sense of taste** to eat her snack and drink. The boy needs his **sense of sight**, his **sense of hearing** and his **sense of touch** to play the violin.)]* (Teacher SS)

This imaginary 8-year-old *reports* which senses are needed a) to eat and drink and b) to play the violin. The senses as such are not depicted, and the information included here can be seen as "essential facts or elements of an occurrence" (see coding manual); therefore, these two sentences have been categorized as *report.* This student also does not directly refer to the picture and does not provide reasons or explanations for the facts stated. If this were provided and communicatively signalled, it would present a more advanced sample, including other CDF-types. This, however, would be unrealistic for the target age. The repetitive simple structure of the sample seems appropriate for an 8-year-old A1 student. The use of nominalization also seems appropriate for the language of science. As explained in the didactic comment of the teacher, she would teach the nominalized phrases using rhymes and songs. Therefore, the used expressions appear realistic for the target group. The teacher also emphasized that this sample would be produced in oral language and with help from the teacher, given that Austrian 8-year-olds only receive limited English instruction, especially regarding writing skills.

Again, the teacher also added a German version, i.e., what students would produce if she taught this unit in the L1. Here, the answer is similar in nature, but it provides once more additional details and also makes connections more explicit. So, the German text not only *reports* facts, but it also *explains* why you both need smell and taste for eating.

In fact, *explaining* is included only once in the five English texts, namely when *describing* the water cycle provided by a hypothetical 9-10-year-old student:

> *Excerpt 8:*
>
> *(DS: Hot water rises up into the sky. It is invisible then.) (EA: **When** it cools down, **it can** rain or snow or hail.)(DS: Then it goes back into the earth or rivers or oceans. And the water cycle can start again.)* (Teacher SS)

As mentioned above, this student just *describes* the process as is visible in the illustration, without establishing the relationship between the steps. Only once does this student linguistically express a connection ("when X, it can Y").

In the German version, the language is considerably more precise in how the different steps are connected, offering explanations for how water changes in the water cycle. There is also a lot more detail, and in this version, the student uses and defines subject-specific terms, which the CLIL version is lacking. Interestingly, looking at her didactic comment on the CLIL unit, the teacher mentions that she would introduce the subject-specific vocabulary and chunks with a poem, which the students can then reuse in their *explanations* of the water cycle. Therefore, I would argue that the CLIL sample (excerpt 8) is somewhat below what one could expect from a good student, as we can expect good

learners to use some of the chunks taught before. Moreover, especially if we assume that this is orally provided, the teacher could prompt the learners to use phrases that establish the connection between the different phases of the water cycle.

In general, however, the English CLIL texts provided by this teacher seem realistic for good students at CEFR level pre-A1/A1 and often reflect the didactic considerations this teacher added. For example, the teacher mentions in her didactic comment that expressing justifications, relative clauses, and more complex sentence structures in general is something her learners want to do but are yet unable to. She adds that in class, she scaffolds this by giving them sentence starters or asking eliciting questions, co-constructing such episodes together, but she would not expect them to produce such sentences on their own.

3.3 Comparison of primary and secondary texts

Comparing now the primary general studies CLIL texts and the lower secondary CLIL history texts, we can see that in both contexts, *describe* seems to be the most central CDF type. Moreover, they also use relatively similar linguistic means for this function, using present tenses, descriptive language and prepositional phrases. Yet, naturally, the secondary students would use a greater variety of functional language in a more discipline-specific way. Considering differences in cognitive maturity, extent of English instruction, and the difference in educational context (one being discipline-specific, one being "general education"), these dissimilarities are not surprising.

Similarly, *report* was used extensively in both contexts, but again the hypothetical secondary learners used a greater variety of linguistic forms to realize this function in a more discipline-specific way, i.e., by using past tenses, nominalizations and even participle clauses. Turning to the content of these *reports*, all three teachers seem to use visuals to prompt reporting declarative knowledge not directly present in the source. Yet, in primary, the output is usually closer connected to what is visible and appears more limited in scope than at secondary level, which again is to be expected given their differences in cognitive development and experience in schooling.

Yet, the dominance of *report* and *describe* in both contexts indicates that these teachers appear to have rather low expectations regarding thinking skills. CDF types that involve critical thinking are almost absent from both sets of texts. For example, despite being a central CDF for historical thinking (see, e.g., Bauer-Marschallinger, 2022), *evaluate* is not included in any of the five secondary texts. In primary, we have three instances of *evaluate*, but these are very limited in scope and are also not clearly marked. Likewise, *explore,* which entails hypothetical thinking, is used only rarely in this small corpus, namely in one sample at secondary level. Being used to express logical thinking, *explain*, too, is used rather infrequently in the secondary set of texts and only once in the primary texts.

What also became obvious in both sets of texts is that many texts do not sensibly intertwine other CDF types to support the overall communicative intention (i.e., a CDF-episode). Previous research already has shown that a greater variety of CDFs that are meaningfully linked to support the main intention are usually examples that are highly ranked from a content perspective (Bauer-Marschallinger, 2022; Breeze & Dafouz, 2017; see also Lorenzo's, 2017, observations regarding *functional stress*). To be expected, in the primary texts, the complexity of CDF constructions is even lower. Yet, what was interesting to see was that in the German samples, the CDF structure is more intricate than in their CLIL counterparts. In other words, in the L1 texts, there clearly is a greater variety of CDF types that are better linked and integrated into the whole text, sometimes making it easier to identify the episode type. Yet, this did not happen across the board, and in some samples, the structure of the German version was quite similar to the English CLIL version. Comparing the German primary texts to the secondary English CLIL texts, overall, shows that irrespective of the language, the CDF-structure tends to be more complex at secondary level. This is not surprising and indicates that it is not only the language that limits the expression of these hypothetical learners, but also cognitive maturity – at least in these teachers' exemplifications of their expectations.

Moving on to expectations regarding subject-specific language use, we can see that in primary, the teacher seems very aware that she is dealing with beginners. Considering her didactic comments that

she would indeed teach chunks of functional language and subject-specific terminology in age-appropriate ways, the level she assumes a good student might have is actually on the more pessimistic side. Usually, the structures are very simple, and the texts hardly include any discipline-related terminology. At secondary, the opposite seems to be the case: Here sometimes teachers appear to have very high expectations regarding subject-specific language use, including frequent use of nominalizations, passive voice, complex sentence structure, as well as consistent control of tenses. One teacher mentions that they would indeed teach these aspects, which surely would be necessary to reach this level of subject-specific discourse.

4. Conclusion and implications

To conclude, this type of data elicitation has shown that asking teachers to write down what they expect good students to produce facilitates interesting insights into the type of language teachers are aiming for. A CDF-based analysis of these texts has further shown that there seem to be considerable differences in their expectations concerning the type of cognitive functions and the content structure of such student productions. In terms of the type of cognitive discourse functions, the two contexts appear to be surprisingly similar, with CDFs typically associated with lower-level thinking skills being predominantly used in both collections. The differences relate more to the linguistic realizations and, to some extent, the structure of CDF episodes.

What these analyses also make visible are pedagogical implications for CLIL teacher training that helps teachers prepare their learners to actually reach these relatively high expectations regarding linguistic realizations. When it comes to thinking skills, however, such teacher training might also raise teachers' awareness regarding offering a more balanced programme, i.e., showing them ways to also tackle higher-order thinking skills, even at lower levels of education. This might also entail focusing on CDF episode structure and content in order to help learners express their cognitive processes in a more convincing and clear way. Especially young CLIL learners would benefit from such an intervention, as here teachers might expect young learners to do noticeably less well in the L2 than in the L1.

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Reflections Using the Teachers' Expectation in Albania: case analyses of textbooks of primary and secondary school

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1. Introduction

This chapter concerns the presentation of reflections for completing the Teachers' Expectation Tool by the group of teachers of the Albanian education system, Elbasan region, who participate in the CDF analysis by completing Task 2. The focus of this report is based on the curriculum framework of Albanian education, mainly in the subjects: history, science, mathematics. These subjects are developed in both cycles of education: primary and secondary school (6-9 years school) with the same denomination, except for the subject of science, which is called natural knowledge in primary education and biology in secondary education. The authors of the textbooks are Albanian and foreign, since the science texts are translated and adapted to Albanian for the students, while the history texts are written by Albanian authors.

This material presents the case studies of teachers engaged in documenting the expectations they had regarding the interpretations of semiotic images in the textbooks they work with. The teachers were asked to select from the textbooks the teaching topics that they thought were better covered. Among them, the illustrative images of the selected educational topics were drawn and they were asked to write their expectations, how they would interpret the picture from the focus of the best pupil. So, what do they expect from a very good pupil, to produce his interpretation of an image in the text. Using the "Teachers' Expectation Tool" we collect data related to the Albanian educational context, which does not use the CLIL approach in their curriculum. In the official document of the Ministry of Education "Standards for school textbooks", (2014) the purpose and standard of the use of illustrations in the text, which aim to encourage the student's independent action when working with the school textbook, is defined. Also, illustrations should not simply represent or reproduce what is found in the text, but contain information that complements the text, encouraging students to engage with the text in depth. In order to have a heterogeneous sampling, photos were chosen from texts of different school cycles: primary education and secondary education. The photos were also chosen from different chapters and different topics, with the aim that the testing of the students for language production based on the semiotic image, would be as concrete as possible.

This chapter aims to reflect reflections on the use of the teacher's expectations tool, with the aim of analyzing the role played by the semiotic image of a textbook in the realization of language functions, describing them through different types of CDF-s.

2. The process and participants

For the realization of the task in this project, 5 teachers were engaged, who teach in primary education and secondary education. They were engaged in the completion of 19 texts, according to the academic field they cover, fulfilling the expectations for some semiotic images. The "Teachers' Expectation Tool" instrument was completed in the Albanian language, since the CLIL approach is not applied in the Albanian educational context, and then it is translated into English using Google translate and verified by an english teacher. Selected schools are located in the urban and rural areas of the city. The teachers have long work experience and are qualified for their profession. Only two of them belong to primary

education, which means that they teach all the subjects included in this educational cycle. However, in this task, they have given language expectations only for a certain subject.

Table 1. Characteristics of the participants

	Teacher V.K	**Teacher T.M**	**Teacher T.S**	**Teacher M.K**	**Teacher V.M**
Type of school	Public primary	Public primary	Public secondary school	Public secondary school	Public secondary school
Age	49	58	42	44	56
Years of teaching experience	13	36	20	21	30
Subjects they teach	all	all	Maths	History	Biology
Type of study programme	Primary education and Master's degree in primary school	Primary education and Albanian language and literature degree for secondary and high school	Degree in Mathematics and Physics for secondary and high school	Degree in History and Geography for secondary and high school	Degree in Biology and Chemistry for secondary and high school
Number of submitted texts	5	3	5	3	3
Grade/age-level of the texts provided	Grade 1-5 Age 7-11 years	Grade 4-6 Age 10-12 years	Grade 6 - 9 Age 12-15 years	Grade 7 – 9 Age 13-15 years	Grade 6 - 8 Age 12-14 years

Only one text was selected from each participant, with a total of five texts. Consequently, 5 texts from different academic fields were coded and commented on. The completion of the material was carried out by the teachers for a period of several months during the beginning of 2024.

All teachers were contacted verbally, where they were explained how they should work. Initially, they encountered difficulties, as the task was understood as if the teachers themselves would interpret the selected semiotic text. For this reason, the interpretations of the images were made for the second time, after further clarifications. Secondly, the discussion arose as to which text would be called a good text. Or to put it another way, what characteristics should they have in mind when interpreting the text, in order to be qualified as a good linguistic reproduction. In general, there was a tendency to refer to the field of competencies, based on the fact that the curriculum of the Albanian education system is built on basic competencies and field competencies. In order for the data obtained to be as concrete and measurable as possible, it was explained in detail what a semiotic image is, what are the semiotic elements and how you can communicate through the semiotic image. The idea that did not unite our thoughts was related to their findings, that the photos used for illustrations in the textbooks are not used as a tool for interpretation by the teacher, since they are often not related to the content presented

in the text. For this reason, teachers decide to choose those images and educational topics, where the space to interpret would be more favorable than in topics, where semiotic images are not related to the content of the educational topic.

The other dilemma was related to how they would reflect the images in their interpretations. Since most of the texts used in the Albanian education system are not digitized, then the only possibility to present the semiotic images in their reflections was to scan the photos and place them in the material presented in word. Therefore, the presented images are individual work done by the teachers.

3. Findings

The selected texts were analyzed according to the draft CDF analyzes (Dalton-Puffer, 2013). From the 19 realized texts, we have data for only 5 semiotics texts (ST): two texts of primary school (science and history) and three texts of secondary school (math, history and science). The analyzed texts belong to each subject, with the aim of observing the changes in linguistic realizations in history, math and science texts. The individual text lengths ranged from 89 words to 114 words. Some of the general characteristics of these texts are:

a) ST1 pertains to the knowledge of nature (science) for primary education classes and the book is written by a foreign author. The topic is related to the grouping of living things and several types of animals are given in the figure, in order for the students to classify them according to groups. The text fulfills different communicative purposes, having a mixture of episodes: description, categorization and reporting. The semiotic element used in the text is helpful for the descriptive and categorizing function.

b) ST2 is taken from the history book of primary education. It presents a descriptive photo to illustrate the lesson topic "My family history". The image shows the generations of a family, presenting 3 generations of a family. The text contains several episodes, which are classified into descriptive, categorizing and explanatory.

c) ST3 is related to the teaching topic of the subject of mathematics “Fractions and decimal numbers”. The semiotic image represents a shopping center, where percentage price reductions are given for different items. The picture is completed with words, which help the student to be oriented more towards explanation than towards description. At this text we have several different communicative purposes present, but mostly they are oriented towards explanation.

d) ST4 is taken from the history book of secondary education. The semiotic image represents some slaves working and loading different goods. In an imaginary way, the photo gives the opportunity to over-interpret the period of feudalism, creating a text with an explanatory character, more than a descriptive one.

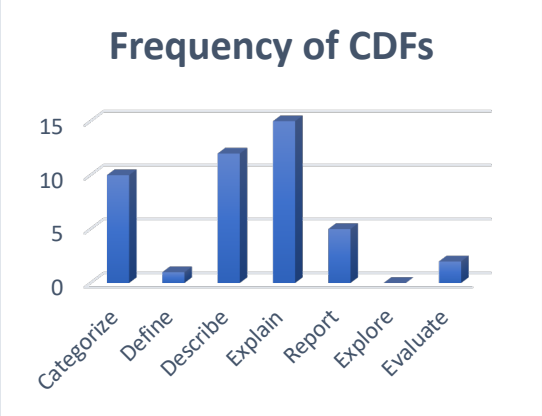
e) ST5 belongs to the subject of biology (science) of secondary school and the knowledge given about the vital organ of the heart. In the semiotic image, the organ of the heart is shown in detail. The semiotic image is also equipped with language tools for illustration. The text contains sentences that have some CDFs in sequence, which are natural for the expression of a 14-year-old child.

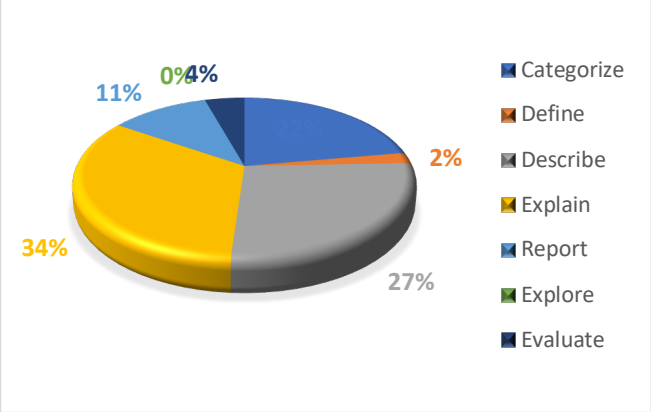
The number of CDF levels analyzed in these semiotics texts is separated from one text to another by the sign / (slash). These data are detailed in the table and presented in the chart below:

Table 2. Characteristics of coded CDF-s for each analyzed text

	Primary texts		**Secondary texts**			Number of words/text
CDF-Type	Basic level	Episode level	Basic level	Episode level	Total	
CATEGORIZE	5/2		1/1	1 overlaps with REPORT	10 Categorize	Text:1 (89 words)
DEFINE			1		1 Define	Text:2 (101 words)
DESCRIBE	4/3		1/2/2		12 Describe	Text:3 (86 words)
EVALUATE			1/1		2 Evaluate	Text:4 (88 words)
EXPLAIN	3		2/5/4	1 overlaps with REPORT	15 Explain	Text:5 (117 words)
EXPLORE					-	
REPORT	2		1/1	1 overlaps with EXPLAIN	5 Report	
TOTAL	19	-	23	3	45 CDF-s	Total of words:481

Table 3. The frequency of CDF-s across five semiotic texts (left) and the percentages of CDFs in terms of word count (right)





The analysis of the texts focused on the identification of CDF at the base and episode level, as well as on the linguistic interpretations. Quantitative data for coding results can be seen in Table 2. The primary texts have a smaller number of categories of basic CDF types compared to secondary level texts. They do not show any episode level CDF, where one of the types of CDF can overlap the other type. It happens differently in secondary texts, where the number and variety of CDF types are visible.

Primary texts: The type of CDF-s that dominates these texts is the *DESCRIBE* CDF and the *CATEGORIZE* CDF. It seems that it is normal for this age group to have this type of episode. In addition, communication with the semiotic image seems to be more direct, which encourages description and is identified through the expressions: in the photo; the photo shows etc. There are several linguistic elements that

identify the texts as descriptive: (a) verbs in the passive form; (b) personal and possessive pronouns of the third person, which serve as deictic words and have an indicative function; (c) the prepositions "in" and "on" that place in local relation sentences; (d) words that are directly related to what appears in the picture. There are also some linguistic elements that identify the texts as categorizing: (a) verbs that semantically mark comparison or categorization (divide, include, belong, resemble, etc.); (b) the subjects in a consecutive manner. Basic level of *EXPLORE* and *REPORT* is at minimum values, as primary texts are oriented more towards descriptive language.

Secondary texts: Basic level is more diverse than episode level. The type of CDF-s that dominates these texts is *EXPLAIN*. There are several linguistic elements that identify this type of CDF-s: (a) the use of verbs in the infinitive; (b) conjunctions that show cause and effect; (c) modal verb are features that report information with the purpose of explaining; (d) superlative adverb; (e) compound sentences using conjunctions "when" to give reasons and causes and specific vocabulary. During this categorization, there is a tendency to explain not only based on the semiotic image, but also in relation to previous knowledge. Only in one case does it happen that *EXPLAIN* overlaps with another type of CDF-s, such as *REPORT*.

DESCRIPTION is another type of CDF found in texts. The first sentences with which the text begins are mainly descriptive. These sentences are always accompanied by verbs in the present tense, which semantically indicate state, belonging or presentation (I have, I am, shows, consists etc.). The names used in the description are directly related to the identification of what is seen in the photo, so most descriptive sentences begin with a subject, which is identified in the semiotic image as an element. The use of the present continuous and demonstrative pronoun are linguistic elements in the function of description. The sentences have a simple grammatical structure, since the description also requires a basic level of cognitive and language skills. The syntax of the sentence is simple, avoiding sentences with subordinate clauses. A use of adverbs, prepositions and adjectives is observed. We also have present and time indicators, which are given through the lexicon with elements that refer to space.

CATEGORIZE is another type of CDF-s that is used more frequently in science texts. Sentences are accompanied by the use of pronouns and verbs that semantically require comparison (resemble, include, divide, etc.). Categorical type is considered at the average level of requirements for students, then the imaginary expectations of teachers are related to this type of level.

The most used type of CDF is *EXPLAIN*. Sentences are mainly composed and through the use of conjunctions, verb tenses, subordinate parts and specific vocabulary determine cause-effect relationships. Categorizations of the explain type are also seen in the report type of texts. The elements that fulfill the explanatory function in the texts such as: (a) the use of verbs in the infinitive; (b) conjunctions that show cause-and-effect and (c) modal verbs are features that report information with the purpose of explaining. The past tense and specific nouns are used to mark periods and realize the connection of cause-and-effect. One of the linguistic elements that distinguish this type of CDF is related to: the use of sentences with the time conjunction "when", such sentences are used to give reasons and causes by using superlative adjectives and contradictory conjunctions. We use simple syntactic constructions and the use of specific lexicon in accordance with the treated topic.

The *REPORT, DEFINE* and *EVALUATE* levels are rarely used in the expectations of text interpretation and are categorized by a few linguistic elements, such as: evaluative language using adverbs and adjectives, numbers and specific vocabulary. *EVALUATE* is characterized by criteria or standards that can be quantitative, i.e., expressible in numbers (Rieder-Marschallinger, S. 2022). The other elements are more related to the contextual nature of the reading. The *REPORT* and *EVALUATE* is found more in the interpretation of the text of the old secondary schools because older students usually provided more arguments to support their judgment (Dalton-Puffer, Ch. & Bauer-Marschallinger, S. 2019). Episode level

is seen in three cases, where in 2 cases *EXPLAIN* and *REPORT* overlap each other and once *CATEGORIZE* overlap REPORT. Science and mathematics texts have more CDF types than history texts.

In a general, evaluation of the texts, it seems that the teachers expect the most from the students to explain. Regarding the Albanian educational context, this trend finds justification, because the curriculum based on Basic Competencies puts teachers in front of the commitment that students acquire skills and attitudes. This seems to push them towards the tendency for the type of CDF *EXPLAIN*, while for the process of understanding through the semiotic image, other types of CDF-s would be more valuable. This basic level that is more present in science texts than in other texts shows "the role of language as a constituent part of subject competence: "being good at science, for example, also means being good at talking and writing about science, in a specific, conventionalized way (Minardi, S. 2020). In the texts we also note that they contain information that is not directly presented in the text. This encourages the explanatory nature, making it possible to use the CDF-s, *EXPLAIN*, more frequently. However, the language chosen for interpretation by the teachers is suitable for the age of the students, even though there was the expectation to have in the texts many types of CDF-s interlaced. In the interpretations of secondary school texts, the language is more chosen and the use of sentences with complex grammatical structures prevails.

The other levels of the CDF-s, such as: *EVALUATE, DEFINE* are fewer in number compared to the other levels, while the *EXPLORE* level, which is related to hypothetical thinking, is completely missing. Although only a few texts were taken to be analyzed, the little use of Evaluate and Define levels, as well as the complete absence of the Explore level, make us think that the semiotic images are not selected in the right way to awaken curiosity of students, in order to seek to understand more deeply through the image, but allows them to reach descriptive, comparative and explanatory level.

4. Conclusions

As a conclusion, we can say that semiotic images play an important role in promoting the process of understanding, which is realized through descriptions from different types of CDF. The data showed that language functions are realized through different basic levels of the CDF, where the most useful are Explore, Describe and Categorize.

Teachers' expectations are related to the type of language they aim from their students to achieve the cognitive and content functions expressed through language realizations. The use of language in the analyzed texts represents the use of several linguistic elements, related to: specific vocabulary and special grammatical and semantic tools, which are in function of linguistic realization for different types of CDF.

Explain is the most used CDF in these texts, which is also related to the need to adhere to the curricular framework of Albanian education, which is built on the basis of basic and key competencies. While the level Explores, it is almost absent in the analysis of the texts. In general, we can say that semiotic images are expected by teachers to be a function of learning and understanding the text in depth and not simply with an illustrative function.

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Reflections Using the Teachers' Expectation Tool: The Case of Albania

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1. Introduction

This report is an analysis of what Albanian teachers expect a "good" learner to write responding to a visual input; a semiotic item that teachers selected from the materials they work with. As presented in Chapter 3.1. teachers were asked to choose around 5 semiotic items they might be using in their lessons and then to write what they would expect a good student to produce when using that specific semiotic item, for example in a test.

2. The process and participants

Seven teachers who teach in the city of Elbasan participated in Task 2 "Teachers' expectation survey". All the teachers agreed to voluntarily participate in the survey and based on the GDPR and the rules of CA21114 they signed the consent form. The teachers were all contacted in person from April 2023 to December 2023. During the first meeting they were presented with the Task and were informed about their rights, the aim of the survey and what they were expected to do.

Table 1. Demographic information of participants

Participant	**Experience**	**Grade**	**School type**	**Target group age**	**Subject they teach**	**Nr of semiotics**
Teacher 1	35	10-12	Public, Bilingual	16-18	French	5
Teacher 2	20	6-9	Public, non-CLIL	12-15	English	1
Teacher 3	16	3-9	Public, non-CLIL	9-15	English	5
Teacher 4	6	6-9	Public, non-CLIL	12-15	Math	5
Teacher 5	29	6-9	Public, non-CLIL	12-15	Physics	5
Teacher 6	11	10-12	Public, bilingual	16-18	Math & Physics	5
Teacher 7	9	6-9	Private, non-CLIL	12-15	History	5

Teacher 1 and Teacher 6 work at the same bilingual high school (French and Albanian). Teacher 1 teaches French and she has prepared her texts in French which then were translated into English and sent back to the teacher for confirmation. Teacher 6. teaches Math and Physics in French at the same high school. She produced the texts in Albanian. Teacher 2 works in a public lower secondary school in the city center while Teacher 3 works in a lower secondary school in a remote village. They both teach EFL and have

produced the texts in English. Teachers 4 and 5 work at the same school in the city center and have produced their texts in Albanian. Teacher 7 who works in a private primary and lower secondary school in the city of Elbasan has also produced the texts in Albanian. All the texts that were produced by the teachers in Albanian were translated and then double-checked with the teachers.

The data collection process took place from April to December 2023. I contacted 11 content and language teachers from Elbasan. I tried to collect data from experienced teachers as well as less experienced ones. They were all contacted in person and only seven teachers were able to complete the task although they all seemed enthusiastic at the beginning. Generally, the first impression regarding the task was "Oh, wow, sounds so interesting!" but when the work started, some of them found it very challenging. Nevertheless, the teachers who completed the task reported that that was a "great exercise" which made them reflect on their daily work.

During the first meeting the teachers were presented with the task and given detailed instructions and, in the meanwhile, I tried not to influence their task completion. While I used the term semiotic items to explain to the teachers what we were asking them to do for this task, I used the term "multidisciplinary semiotic item" to explain the term to teachers of languages. The explanation of the term, as agreed by WG3 members during our working group meeting in Vienna in March 2023, was that the semiotic items that the language teachers had to choose, should not be used in the textbooks with the purpose of teaching vocabulary, but rather teaching content.

3 Findings

The table below as proposed in the coding manual (see chapter 3.3) refers to the distribution of the different CDFs in the five texts analyzed. For each text the table below specifies if it contains a specific CDF episode (EP).

The data summarized show that the most commonly used basic level CDF is described. Despite the subject the teachers teach, the age of their students, whether they teach in a public or private school, CLIL or non-CLIL school, the CDF identified in all their texts is DESCRIBE. This was to some point anticipated as the task for the teachers was to "write a text based on a semiotic item (imagine, graph, chart, etc), imagining themselves to be one of their good students. What was unexpected though, was the mention of other CDF, which are somehow different from one teacher to the other despite the similarity mentioned above. For example, explore is basic level CDF which is used only once in the texts analyzed, while we can identify no mentions of define.

Table 2. Overview of coded DCFs

	SR1 history	SR2 physics	SR3 EFL	SR4 FFL/CLIL	SR5 Physics/CLIL
Categorize			√	√	
Define					
Describe	√	√	√	√ (EP)	√
Evaluate	√			√ (overlap with CA)	
Explain		√ (EP)	√		√
Explore			√		
Report	√ (EP)		√	√	

When we look at 7 types of CDF, we can see from the table above that teachers generally "expect their imaginary student" to mention approximately 3 types of CDF. Two teachers though, (Teacher 3 & Teacher 4) have used more types of basic level CDF, thus making the communicative purpose of the text a little more complex. It would be interesting to discuss and analyze this specific case in order to understand why these teachers "unintentionally" included four or five types of CDF. One hypothesis might be related to the subject they teach. Both teachers are language teachers teaching in different contexts though. Whether this is one of the factors contributing to a highest percentage of CDF mentioned, we cannot be sure, but it would be interesting to see the report of other countries which might have collected data from language teachers as well.

On the other hand, Teacher 2 and Teacher 5, who teach Physics and Mathematics, have used only two types of CDF in their text in both cases to describe and explain. Whether this is a coincidence or not, or whether it is related to the subject they teach, again we can just speculate. What is interesting is that they teach in different contexts. Teacher 2 teaches Physics in a public lower secondary non-CLIL school, while Teacher 5 teaches Physics and Mathematics in a public upper secondary CLIL school.

While we can identify an episode (EP-explain) in the text produced by Teacher 2, the same episode seems to be mentioned in the text of Teacher 5 also, but the analysis shows that this is just a tentative and not an episode *per se*.

Teacher 5.

Text produced by the teacher: (DS: *In the figure*, two forms of wave propagation *are depicted*.) (DS: *Figure a) represents* the propagation of a transverse wave,) (EA: *created by* fixing one end of the medium and displacing the free end to the left and right.) (EA: In a transverse wave, the particles of the medium *move perpendicular* to the direction of *wave propagation*.) (DS: *Figure b) represents* the propagation of a longitudinal wave,) (EA: *created by* displacing the free end back and forth along the medium.) (EA: In a longitudinal wave, the particles move parallel to the direction of wave propagation.)

In this text, Teacher 5 seems to focus on EXPLAIN how the transverse and longitudinal waves are created, however we can say it is just a tentative explanation as not much evidence is provided. To try to explain how the waves are created and their characteristics, "our imaginary student" of the 11th grade of a CLIL school starts by describing the picture using "*in the figure*", "*two forms of waves are depicted".* Then the student tries to explain how each specific type of wave is created by using "*created by*…". The student uses other phrases such as "*perpendicular to the direction of wave*" or "*parallel to the direction of wave*" to "explain" the movement of different waves. The student uses present simple to DESCRIBE the pictures; the creation and the movement of the waves.

Although the sentences explaining the movement of the waves are not connected together, it seems like the student is also trying to identify the differences between the two waves regarding movement. In such a case we might talk about an overlap of two basic level CDF; describe and explain. Considering that the text is produced by a CLIL student whose level of French as the CLIL language is B1, the text might be considered realistic for two main reasons. The first reason regards the use of the linguistic elements and the CDF, and the second regards the unclarity of the episode. Although it seems like the imaginary student is trying to explain, there is lack of evidence for this, which is somehow realistic as students often do this especially when they write in Physics.

Teacher 2.

Text produced by the teacher*:* [EA: (DS: In the figure, we observe a hydraulic machine. Its main parts are: 2 cylindrical vessels with different diameters, the connecting part, pistons that seal each vessel from above, and the fluid that completely fills the vessels.) (EA: Under the action of force FA, the smaller piston A will move downwards, exerting pressure on the fluid.)

p= FA / SA (SA−area of piston A)

According to Pascal's law, this pressure will be transmitted uniformly throughout the fluid, so it will also exert force on the larger piston B, lifting it upwards. In this way, the machine placed on the larger piston will be lifted upwards. This means that at every unit of the surface area of piston B, an additional force equal to p is exerted.) (DS: From the figure, we observe that piston A moves more than piston B,) (EA: making us understand that with the hydraulic machine, we "gain" in force but "lose" in distance.)]

As we can see from the text, the main communicative intention in this text is to explain how a hydraulic machine works, meaning that the episode type is EXPLAIN. The imaginary student provides this explanation by first describing what we see in the picture "*In the figure we observe*...". Then the student explains how the machine works using simple phrases like "*according to Pascal's law*", "*under the action of force…", "this means", "making us understand*", and the formula provided. The text, though in a linguistic context, seems somehow complex and unrealistic for the age of the good student.

While for the other teachers we could compare the results as they teach the same subjects despite different contexts, for Teacher 1 who teaches History in a private lower-secondary school this is not possible. What is interesting about that text is that the teacher expects the good student to have a very clear idea of the communicative intention of the text (EP-report) and to be able to use specialized

terminology for that specific subject and topic. The teacher seems to expect a lot more from his student in a linguistic context, thus making it quite unrealistic even for "our good imaginary student". While expecting the student to describe, evaluate and report based on the semiotic item selected (a picture showing NATO building with the NATO flag as well as the Albanian flag and the American flag), the teacher expects students to use subject specific terms such as: *subsequently inspired, attempts to disrupt the established international geopolitical order*, or *largest global military alliance* which in my point of view (not a content specialist) are too complex for a good 15-year-old student.

One thing that we might want to consider in this case is that the teacher who produced this text is also a researcher in the field of History and a part-time lecturer at the university, and what he produced might have been influenced by his background. This raises the question of how and how much the background of the teacher influences his/her expectations on the language that the good student needs to produce.

Considering the five texts we can say that three of them seem quite realistic to be produced by the good student (in those specific contexts and topics), one of them unrealistic and the other somehow realistic.

Challenges and limitations:

It is important to emphasize in this report that there are some challenges and limitations which need to be considered.

- Probably because of lack of proficiency in English, content teachers produced the texts in Albanian. The texts were then translated in English and double-checked with the teachers. Yet, we consider there might have been slight changes in the translation process which we are not aware of. The same might have happened with one of the language teachers who teaches French in a CLIL school who produced the text in French.
- As reported by the teachers the decision of finding the most adequate semiotic items was challenging. This was especially emphasized by the History teacher maybe due to the fact that History books are the only textbooks in Albanian schools that are written by Albanian authors, who unfortunately seem not to focus much on the use of semiotic items (MoE, 2014).
- I contacted 11 teachers and only 7 teachers responded (one of them was able to produce only one text). All the teachers that I contacted live and work in Elbasan, thus the data I have collected represents a very limited number of teachers from only one region in Albania.

4. Conclusions & implications

After reviewing the teachers' contributions, we have come to the following conclusions:

1. All the teachers admitted that when in the class, they mostly focus on their students absorbing the subject content rather than the use of language. This task made them see the process of teaching and learning in a different perspective.

2. Generally, the teachers tend to use approximately three CDF. There is a difference in the CDF used between language teachers and science teachers. Language teachers have used more CDF (four or five) compared to Physic teachers who have used only two.
3. The CDFs that are very rarely used are *define* and *explore* and the reasoning behind this decision remains unclear.
4. Not all the teachers have a clear communicative intention (episode) in their texts. Sometimes (Teacher 5 and Teacher 3) there is a tentative, but not explicitly described.
5. Each text employs specialized terminology specific to the domain. In the case of language teachers this seems more related to the topic rather than the domain.

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Report on COST participation in Working Group 3 – Task 2 Teachers' expectations: Slovakia

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1. Introduction - Joining COST

I joined the COST organization, namely CA21114 - CLIL Network for Languages in Education: Towards bi- and multilingual disciplinary literacies (CLILNetLE), Working Group 3, on August 3rd, 2023. I started to familiarize myself with the COST matrix, mission, and working group tasks.

I found a lot of people involved in the working group. At this stage, Teresa Ting – Working Group 3 leader - reached out to me and introduced the task descriptions. The tasks for WG3 had already been stated. They were designed into two tasks: Task 1 to analyze national curriculum materials for disciplinary literacies or cognitive discourse functions and/or Task 2 to analyze semiotic resources used by content and language teachers across educational levels for CDFs.

According to those descriptions, I decided to work on Task 2, which was an inquiry into content teachers' expectations of what disciplinary literacies are. I reached out to the teachers of Mathematics, Chemistry, and Forestry whom I had known before. I explained what I would need and left them some time to work on it. The work on this task is described in sections 4 and 5. Then, within the aims of the COST Action, there were three online training sessions on understanding and application of cognitive discourse functions conducted by Silvia Rieder-Marschallinger (Austria) and Silvia Minardi (Italy), supported by Christiane Dalton-Puffer (Austria). After the online trainings, there was a meeting of the members of WG3 in Elbasan (Albania), where we met in person and worked together on the tasks related to WG3 and WG2. After that, I contacted other teachers because of the interviews with the members of WG5 in Slovakia, who asked me to help them with their tasks. On that occasion, I collected the other five SEs, this time from teachers with a CLIL background. In mid-April, we also had an online discussion on the use of the coding manual to analyze CDFs in semiotic resources. The online discussion was very useful as it cleared all doubts about the understanding and conduct of the analyses.

2. Trainings – CDF analysis

The trainings were held online on 15th, 22nd, 29th January, and 12th February via ZOOM. The comprehenisve EXPLAIN on how to identify individual CDFs was explained using sample history texts and science texts.The mentors *Silvia Rieder-Marschallinger* (for history*)* and *Silvia Minardi* (for science) were very knowledgeable and well-prepared and answered all our questions and guided us through uncertainties we had when analysing the sample extracts. I find it important to learn these new professional skills for my professional growth. Moreover, it is critical for the successful project progress. Furthermore, the trainings were recorded, and the people enrolled in the trainings could get to the recordings of the trainings in Google Drive via a shared document. I do appreciate this option as it offers a possibility to return to the content discussed and used in the training.

3. The Meeting in Elbasan

The meeting in Elbasan had several dimensions. Firstly, the members of the WG met in person. It made a difference in communication and networking, as nothing can substitute personal contact and perception. The people stood out of the computer screens and became physical people. I suppose this enhanced communication and willingness to cooperate, behave responsibly towards each other, fulfill tasks on time, and other similar intangible matters.

Another dimension is related to the project's progress. The members of the working group in both tasks shared their thoughts on curriculum analysis and teachers' expectation analysis. During the meeting, we discussed the feedback on curriculum extracts and teachers' expectations, which we had already gathered. Within our task, we consequently created metainformation forms – a front page for the individual curriculum extracts, a front page for each semiotic resource description, and a form for information about the contributing teacher. We also managed to draft a manual on how to code CDFs to individual teachers' expectations and tested it within a small group.

The last, but not least dimension is cultural, as we had a chance to see how people live and work in Albania, a member country of COST organisation and our COST action as well.

4. Semiotic resources – tool for identification of disciplinary literacies

Semiotic resources (hereinafter SR) were designed to serve to gather texts teachers expect their good students to produce when seeing the SR. The description of a SR suggested it should be any visual used in the instruction of the subject. The subjects we were focusing on were Mathematics, Science comprising biology, chemistry, physics, History, and Foreign Language across the educational levels, i.e., primary, secondary, and tertiary levels of education. The call for SRs was open wide.

4.1 Collecting semiotic resources

I collected fourteen (14) SRs from seven teachers listed in Table 1. All of them teach at the tertiary level. Three of them teach at the Faculty of Medicine in an EMI environment. The remaining four teachers teach content subjects (disciplines) at a technical university in a non-CLIL environment. The contributing teachers consist of five women and two men, with teaching experiences ranging from 5 to over 20 years. However, as content teachers teaching in the EMI environment, they did not know anything about the CLIL method. Learning it or getting familiar with it seemed unimportant to them, because they have their content to teach, and that is all they need to be perfect in.

Table 1. List of participating teachers and their characteristics

Initials of the participating teacher.	EB	IP	MS	DL	ZP	VV	JS
The subject she/he teaches.	Science - biology, chemistry	Science - physics, chemistry	Science - Physics	Math - Geometry	Science - forestry	Science - chemistry	Math
Participating teacher's gender	Female	Male	Male	Female	Female	Female	Female
Teacher's approximate age	31-40	41-50	41-50	41-50	41-50	41-50	41-50
Years of experience	11-15	16-20	11-15	21-25	11-15	16-20	16-20
Teacher's background	Chemistry	Physics	Physics	Design	Forestry	Chemistry	Math
Number of SRs	2	1	2	3	2	1	3
CLIL or Non-CLIL	EMI	EMI	EMI	Non-CLIL	Non-CLIL	Non-CLIL	Non-CLIL

The teachers from the Non-CLIL environment are aware of the CLIL method from their previous experience in the CLIL project. The SRs include six from mathematics and geometry, two from biology (specifically forestry), and six from sciences (chemistry and interdisciplinary subjects like biochemistry and biophysics). The teachers use a lot of visuals; however, they were surprised when asked to step into the student´s shoes and write what a good student would say or write about the images. There are two aspects that could influence the text provided for an SR. Firstly, it would be insightful to have the same teacher repeat the task after some time to verify the reliability of their responses. Secondly, comparing descriptions from a mediocre student, a top student, and a struggling student could reveal more about students' actual disciplinary capabilities.

5. Analysis of semiotic resources

I analyzed five semiotic resource datasheets from three teachers. The information is summarised in Table 2.

Table 2. Information on contributing teachers and semiotic resources

Teacher	DL1 – Denisa Lizoňová	DL2 – Denisa Lizoňová	DL3 – Denisa Lizoňová	ZP2 – Zuzana Parobeková	VV1- Veronika Veľková
Years of experience	25	25	25	11	19
Subject	Mathematics - Geometry	Mathematics - Geometry	Mathematics - Geometry	Science - Forestry	Science- Chemistry
Educational level	tertiary	tertiary	tertiary	tertiary	tertiary
English texts	Google translated	Google translated	Google translated	Google translated	Deepl translated
CLIL/Non-CLIL	Non-CLIL	Non-CLIL	Non-CLIL	Non-CLIL	Non-CLIL
Number of words	114	159	141	234	191

The analysis is divided into two parts: understanding semiotic resources and texts' analysis.
Firstly, a relationship between the quality of SR and the number or kind of CDFs used to describe them (dealt with in 5.1, Notion 1) is discussed, and secondly, the inclusion of abstract thinking or providing the context for the topic shall be introduced.

5.1 Semiotic resources as visual information media

Having analyzed five SRs and following an online task members' discussion, it is evident that the semiotic resources vary and significantly influence the CDFs required to describe them.

Notion 1: Information loading - visual input of SRs

VV is a university chemistry teacher with 19 years of experience. She can speak English but does not use English in her classes. She contributed one SR. The text was translated by VV (?) using Deepl. The SR was on Dangerous goods.
The semiotic resource from VV has very limited visual input—two colours and two numbers. So, the CDFs needed to describe it mostly refer to information from external sources, this led me to code the SR as a REPORT CDF episode.

(VV1) Chemistry – Dangerous goods

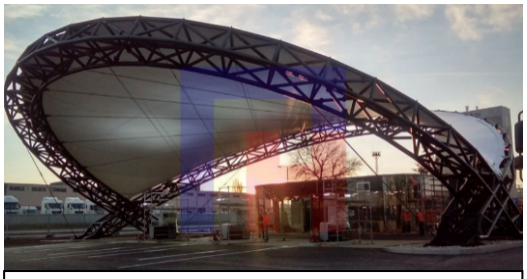
Figure 1: Semiotic resource from VV1

According to Eppler and Burkhard (2013, p.112), "Knowledge visualization designates all graphic means that can be used to construct, assess, measure, convey or apply knowledge (i.e. complex insights, experiences, methods, etc.). Beyond the mere transport of information or facts, people who employ knowledge visualization aim to create, assess, reference, or transfer insights, experiences, attitudes, values, expectations, perspectives, opinions, and predictions, and this in a way that enables someone else to re-construct, remember, find or apply these insights correctly." This characteristic particularly applies to sciences or content subjects. Moreover, Eppel and Burkhard (2013) present a table describing visuals from various aspects, such as knowledge type, knowledge visualization purpose, target group, situation where it should be used, and visualization format (p.13). There are at least two areas worth mentioning, which are knowledge type and visualization format. The knowledge type is further divided into six types of knowledge: declarative knowledge (know-what), procedural knowledge (know-how), experiential knowledge or experience (know-why), people-related knowledge (know-who), orientation or location-based knowledge (know-where), scenario-based knowledge (know-what-if) or normative, value-based knowledge. Regarding the format, they are described as structured texts/tables, mental images/stories, heuristic sketches, conceptual diagrams, images /visual metaphors, knowledge maps, and interactive visualizations.

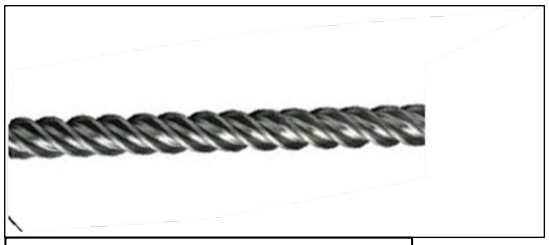
Within our COST research, it should be studied more deeply if some of the formats (conceptual diagrams, tables, knowledge maps) appear more often in semiotic resources from/for science subjects, while others (mental images/stories, sketches, interactive visualizations) might be found more often in language education.

Notion 2 : Abstract thinking employment and context presentation

The next example presents the semiotic resource from DL from Mathematics – Geometry. DL has 25 years of teaching experience. She teaches subjects of Descriptive Geometry and Applied geometry in furniture design. She teaches in Slovak. Although she can speak English, she does not teach in English, and her texts were translated by Google Translate.
There are two SRs with real objects. The first one shows a real object, a gas station shelter construction. However, it is used for the EXPLAIN of geometrical shapes. The second one shows a steel bar in the shape of a helix. The texts of these semiotic resources did not say much about them. Even if the object is mentioned in the first sentence only, it never appears later in the text produced by DL. The text mentions subject-related words, such as lines, planes, curves, etc., which are not obvious in the picture. So, the imaginary student describing this SR is expected to use a lot of abstract thinking and imagination. The question of how to capture this mental activity of a student arises, as it is not included in CDFs.



(DL1- Math/Geometry – Hyperbolic Paraboloid)



DL3- Math/Geometry - Helix

Figure 2: Semiotic resources DL1 and DL3

The next striking idea builds on the ability of semiotic resources to supply contextual information. As it is in this particular SR. It depicts a real object used to show learners a possible application of geometry to real-life objects. The students then can see how mastering geometry is connected to real life. However, this should be inferred from the text, as apart from the first sentence (*"it shows a technical surface*"), the rest of the text is geometry and not a description of the shelter (See Text DL1).

The idea of connecting real-life objects to scientific rules does not refer directly to disciplinary literacies, but it relates to the concept of CLIL in the sense of 4Cs (Coyle et al., 2010). The four Cs in CLIL entail content, communication, cognition, and culture. Content refers to knowledge (which is being investigated by CDF analyses) used in a real sociocultural context. In this regard, the mentioned semiotic elements provide a certain context for knowledge, in this case, geometry. Cognition refers to cognitive or thinking skills that learners use which could refer to disciplinary literacies. This concept implies that semiotic resources could also provide some context that embeds content when we are talking about sciences. The question that we cannot answer about these particular SRs is whether the teacher intended or expected a student to emphasize this context or not.

5.2 CDF analyses of the texts

The following part discusses the analysises of texts. In every text, I focused on episode CDFs, basic CDFs, and linguistic features. All the texts come from a tertiary level and were chosen from three different fields: math/geometry, forestry, and chemistry. None of the teachers use English in their instruction.

5.2. 1 Texts from DL (DL1 – Hyperbolic Paraboloid, DL2 - DL2 Math/Geometry – Linear Perspective, DL3 Math/Geometry – Helix)

The three texts from geometry, which all come from the same teacher, are rather similar in their style. All of them use language where key terms are repeatedly used but are not pictured, so the teacher expects the students to imagine or visualise the terms in the picture. In two cases out of three, there are pictures of real objects used to explain some geometry rules (Figure 2, DL1 and DL3). In all cases, the texts use a lot of subject-related vocabulary, and passives[1]. Personal pronouns referring to the person describing the image, such as "we" or "I", are rarely used. I found only one example of an EVALUATE CDF, which overlapped with REPORTING. Yet, it is not personal evaluation but external knowledge that the author finds it important to mention.

[1] Colour-coding is being used in the analyses to show the mentioned linguistic features: subject-related vocabulary, passives, personal pronouns, adjectives, nominalisation. It does not follow the Coding Manual.

Text DL1:

" [DS: The figure shows a technical surface called a hyperbolic paraboloid. This particular solution was created as an intersection of a hyperbolic paraboloid with a rotating cylindrical surface.) (DF: A hyperbolic paraboloid is characterized by containing two families of mutually skew lines.) (EA: The lines in each family are parallel to a common plane, but not to each other. Each line from one intersects all lines from the other system. Each point of a hyperbolic paraboloid is traversed by two constituent lines, each from a different system.) (DF: A hyperbolic paraboloid is most often defined by a spatial quadrilateral.) (EA: The name hyperbolic paraboloid is derived from the fact that the cross-sections of this surface are parabolas and hyperbolas.)]"

Text DL2, extract :

"EV/RE: There is one important difference between linear perspective and painter's perspective,…"

Text DL3:

[DS: The picture shows a practical use of a curve we call a cylindrical helix.) (EA: It is formed by the so-called helical motion of a point about an axis. The screw motion is a motion composed of two uniform motions: a rotational motion about the o-axis and a displacement in the direction of the o-axis.) (DF: The distance of the screwed point from the axis is called the radius of the helix. The distance the point travels in the direction of the axis of the screw when rotated through 360° is called the height of the screw thread.) (EA: Due to the orientation of the movement, we speak of a right- or left-handed helix.) (DF: One thread of a helix is the part of the helix between two points for which the difference of rotation between them is 360°.) (DF: A helix is a space curve.)]

5.2.2 Text ZP2 – Forestry – Forest-steppe ecosystems

In text ZP2, we can see that numerous adjectives are used. The adjectives´ density[2] achieved 18%. The text incorporates external knowledge from different fields, such as geology, botany, zoology, and forest management (See the complete analysis of the semiotic resource text)

Text ZP2 – Forestry, extract

"DS: Forest-steppe communities are shown in the pictures. Groups of forest trees alternate with grassy areas and thus create a typical rich forest-steppe mosaic. RE: These communities are usually found on south-facing slopes on permeable rocks, mainly limestone, dolomite or rocks of volcanic origin. The soils are shallow, quickly drying out, poor in nutrients and often stony.) (RE: Trees (that tolerate extreme drought and overheating) are typical for this community. ….

5.2.3 Text VV1 – Chemistry – Dangerous goods

This semiotic resource provided limited "visual information" as it has been pointed out earlier (section 5.1, Notion 1). The CDF episode is REPORT. The other basic CDFs used in the text are DESCRIBE, DEFINE, and EXPLAIN. The text uses nominalizations through subject-specific vocabulary. There is no hedging, as the

[2] The adjective density was calculated as the number of adjectives per the number of words in the text.

sentences are clear and stated. The language students are expected to use is exact and objective, with frequent references to outside sources. The adjective density is 7%. The verb “is” from the phrase something is something else is used seven times in this short text.

Text VV1 – Dangerous goods

[DS: (DF: A model of the ADR table, which is used to mark vehicles when transporting dangerous goods.) (EX: ADR is the European Agreement on the Carriage of Dangerous Goods by Road.) (RE: Every vehicle transporting any dangerous substance must be marked with an orange board bordered in black divided into two parts.)]

[DS: In the upper part there is the Kemler code, in the lower part there is the UN code.) (RE: The Kemler code can be a two- or three-digit number that describes the type of danger of the given substance), (DF "doubling" the number means increased danger in the given area.) (RE: Specifically, 33 means highly flammable liquid.) [RE (DF: The UN code is the identification number of a specific dangerous substance or group of substances assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods. In this case, it is fuel (automotive) gasoline.) DF: Gasoline is a highly flammable liquid of a hydrocarbon nature, (CA: it belongs to the 1st danger class with an ignition temperature of up to 21 °C.) (EA: It evaporates easily and its vapors are explosive when mixed with air.) (DS: It is harmful to the environment, especially surface and underground water and plant organisms.)]

6. Summary of the analyses:

DL1 Math/Geometry – Hyperbolic Paraboloid	
Episode	DESCRIBE
Basic CDFs	EXPLAIN, DEFINE
Number of basic CDFs	2
Linguistically outstanding items	Subject-related vocabulary, context

DL2 Math/Geometry – Linear Perspective	
Episode	DESCRIBE
Basic CDFs	EXPLAIN, DEFINE, REPORTING, EVALUATE
Number of basic CDFs	4
Linguistically outstanding items	Subject-related vocabulary, abstract thinking

DL3 Math/Geometry - Helix	
Episode	DESCRIBE
Basic CDFs	EXPLAIN, DEFINE
Number of basic CDFs	2
Linguistically outstanding items	Subject-related vocabulary, passives, context

ZP2 Forestry – Forest-steppe communities	
Episode	DESCRIBE/EXPLAIN
Basic CDFs	REPORT, DESCRIBE, EXPLAIN
Number of basic CDFs	3
Linguistically outstanding items	Adjectives (density=18%), a lot of “for example”, multiple expertise

VV1 Chemistry – Hazardous substances	
Episode	REPORTING
Basic CDFs	DESCRIBE, EXPLAIN, DEFINE, CLASSIFY
Number of basic CDFs	4
Linguistically outstanding items	Subject-related vocabulary, nominalization, verb structure: **i**s - phrase

7. Conclusions

Participating in COST CLILNetLE provides invaluable experience in many aspects. It connects people working in different environments who bring expertise and different points of view. It unifies the efforts to achieve the designed aims. Semiotic resources seem to be an effective tool for investigating the use and distribution of CDS within the examined fields, namely, science, history, and language.

Based on the analyses of the texts for SRs from different sciences, several interesting ideas appeared. I could not compare them to other SRs by subject, educational level, CLIL ort non-CLIL background. However, I believe, all SRs provided a different idea worth further developing or investigating.
It was found that DESCRIBE is the most frequently used CDF in the texts analyzed together with EXPLAIN, DEFINE and REPORT. There are occasional occurrences of EVALUATE and CATEGORIZE. The EXPLORE CDF was not used.

Looking at linguistic features, the most common features were subject-related vocabulary, the use of adjectives, nominalization, and the use of passives. Personal pronouns are scarcely used; if they are used, they do not introduce personal involvement or standpoint. That suggests that technical texts are very often objective and impersonal; therefore, they hardly use EVALUATE or EXPLORE CDFs.

The areas that need further investigation might include:
- the visual content of the semiotic resources and their systematization or classification;
- the connection between an SR and CDFs. It seems that REPORTING CDF (Notion 1) is more often used if the SR does not show rich visual information;
- how to capture the imagination or abstract thinking (Notion 2) which connects the text and the SR. Cognitive discourse functions show the cognitive processes applied in the text. However, they do not cover abstract thinking or imagination which is sometimes needed to visualize the content in the SR, as in SR DL1 and DL3 (Figure 1)
- to find out the relationship between sciences and CDFs and/or individual linguistic features. Quantification is needed to prove any relationships.

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Teachers' Expectations in Turkey: A case of a chemistry teacher

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1. Introduction

This chapter presents a case study of a chemistry teacher's expectations about what a good high school student would be supposed to write as a response to various visual semiotics presented in the textbooks to represent the particular scientific ideas.

2. The participants and process

I collected data from a total of six chemistry teachers who are working in different secondary schools in Turkey (see Table 1). All six teachers are female with one (1) to 10 years of teaching experience. They all have B.S. degrees in teaching chemistry, and one of the teachers completed her master's degree in chemistry education. Four of the six teachers work in private CLIL schools where science and mathematics courses are fully taught in English. All teachers are fluent in English as they all completed their undergraduate degree at a University where all courses are offered in English, except Turkish Literacy and History of Turkish Republic courses. In this chapter, I only focused on the semiotic texts provided by Teacher E, who is a CLIL teacher in a private school with nine years of experience.

Table 1. Demographic information of participants

	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E	Teacher F
Type of school	Private-Upper Secondary-NotCLIL	Private-Upper Secondary-CLIL	Public-Upper Secondary-NotCLIL	Private-Upper Secondary-CLIL	Private-Upper Secondary-CLIL	Private-Upper Secondary-CLIL
Age	24	33	30	36	34	27
Experience	2 years	6 years	7 years	10 years	9 years	1 year
Subject	Chemistry	Chemistry	Chemistry	Chemistry	Chemistry	Chemistry
Educational Background	B.S. in Teaching Chemistry	Integrated BS&MS in Teaching Chemistry	Integrated BS&MS in Teaching Chemistry	Integrated BS&MS in Teaching Chemistry & M.S. in Chemistry Education	Integrated BS&MS in Teaching Chemistry	B.S. in Teaching Chemistry
Number of texts	7	6	5	7	5	6
Grade/age-level of the texts	Grade 9 /Age 14-15	Grade 10/ Age 15-16	Grade 11/ Age 16-17	Grade 11/ Age 16-17	Grade 9 /Age 14-15	Grade 9 /Age 14-15

I first contacted the teachers at the end of May 2023, and I collected about half of the data until July 15, 2023. Over the summer, I took a break to collect data. Before the break, some of the teachers would not complete the data process even if they promised to do so. Then, in October I contacted these teachers once again as well as contacting some new teachers whom I did not get in touch with before.

I invited the participant teachers to the study through emails. In the first email, I briefly introduced the CLILNetLE project as well as explaining the goal of surveying teachers' expectations, that is how students verbally communicate information conveyed through visual semiotics used for teaching and learning of particular concepts/ideas in different scientific disciplines, such as chemistry. I also provided information about how to select a textbook and what criteria need to be considered while selecting semiotic visual elements from a particular textbook. I asked them to select 5 to 8 visual elements from the textbook they like and send the electronic copy of such visual elements to me. They usually immediately return to my emails confirming that they would send the visuals in a couple of days or so. Once they sent the visual elements, I checked if they were conceptually rich or not. The visuals were mostly good in terms of representing the certain science content. I placed the visual elements into the template in the form of a doc file.

In the second email, I provided the teachers with information about what they are supposed to do with these visual items, which was sent as a doc file. I summarized the task expectations in the email in Turkish, and I also attached the task instruction file in English. I clearly mentioned that they would write a text in relation to each visual item such that they like their students to express in writing as a good verbal representation of each particular semiotic visual element. I offered two sample texts as examples concerning two semiotic visual elements related to biology content. In the emails, I also set the deadline for returning their written texts, about a two-week period. If they did not send their written texts on time, I kindly sent them an email as a reminder along with extending the timeline two more weeks to complete.

As the teachers completed their written texts, they did not turn to me with any questions, and all of them submitted their texts in an acceptable form in terms of length and content. Thus, I considered that the task instructions were easy to follow and understand for teachers.

A total of 36 semiotic texts were submitted by the six teachers. The number of texts that individual teachers provided changed in between five to seven (see Table 1). The individual text lengths ranged from 81 words to 162 words, and the word count of half of the texts were 119 and above.

3. The findings

Teacher E has written five (5) semiotic texts in relation to semiotic visual elements (SVE) she selected from the book as cited: "Brown et al. (2021). *Chemistry the central science in SI units, 15th Global Edition.* Harlow, Pearson." Such SVEs were about the topic of nature matter and intermolecular bonds. More specifically;

(a) SVE 1 represents how the physical properties of substances change with respect to the intermolecular forces which depend on the surface area of molecules, providing molecular representations of two different substances, pentane (linear molecules) and dimethyl propane (spherical molecules). These two substances include the same number of carbon and hydrogen (C_5H_{12}) but such atoms are arranged differently, generating two different substances.

(b) SVE 2 graphically shows the change in boiling points of covalent hydrides of elements in Group 4A, 5A, 6A and 7A with respect to changing molecular weight. In fact, this is a frequently used

representation in the textbooks to illustrate how the boiling point of substances with hydrogen bonds change as a function of the strength of hydrogen bonds existing in between the molecules of these substances. The strength of hydrogen bonds depends on the electronegativity of nonmetal elements covalently bonded to hydrogen and also the molecular weight of covalent hydrides such as water, ammonia, hydrogen chloride etc.

(c) SVE 3 represents the hydrogen bonds existing in between the various molecules such as two water molecules, two ammonia molecules, one ammonia and one water molecule etc. by utilizing open chemical formulas of such molecules.

(d) SVE 4 represents Rutherford's alpha-scattering experiment together with how the beam of alpha particles behave as they interact with gold atoms.

(e) SVE 5 shows the changing atomic size of elements across Group 1A, Group 2A, Group 3 A, Group 6A, Group 7A in the periods of 2, 3, and 4 at the periodic table. In addition, along with the size of element atoms (neutral atoms), it pictorially illustrates the type of ion (cation or anion) each element atom is likely to produce as well as size of such ions.

When we examine the CDFs across the semiotic texts accompanied with the five semiotic visual elements, the most frequently observed CDFs are the *describe* (DS:10) and the *explain* (EA:12) followed with the *define* (DF: 4), *report* (RE: 3) and *categorize* (CA: 2). The CDFs namely *explore* and *evaluate* did not appear across the texts (see Figure 1). The CDF of *describe* appeared once in each SVE but SVE 5 included an episode of *describe* along with 5 basic elements of *describe* embedded into the whole episode (see Dalton-Puffer et al., 2018 for distinction between basic and episode level). In fact, the frequency of such CDF elements are consistent with the science education literature, because students' quality of scientific explanations about a particular science concept indicate the complexity of their learning (de Andrade, 2019; Tang, 2016). Moreover, when we look at the percentages of words allotted for each CDF emerged from the data, there appears to be consistency between how often each CDF is identified across the five texts and how extensive each CDF is across five texts in terms of word count. About 70% of semiotic texts showed the characteristics of *explain* and *describe*, whereas only about 30% of semiotic texts indicated the features of *report*, *define* and *categorize* functions.

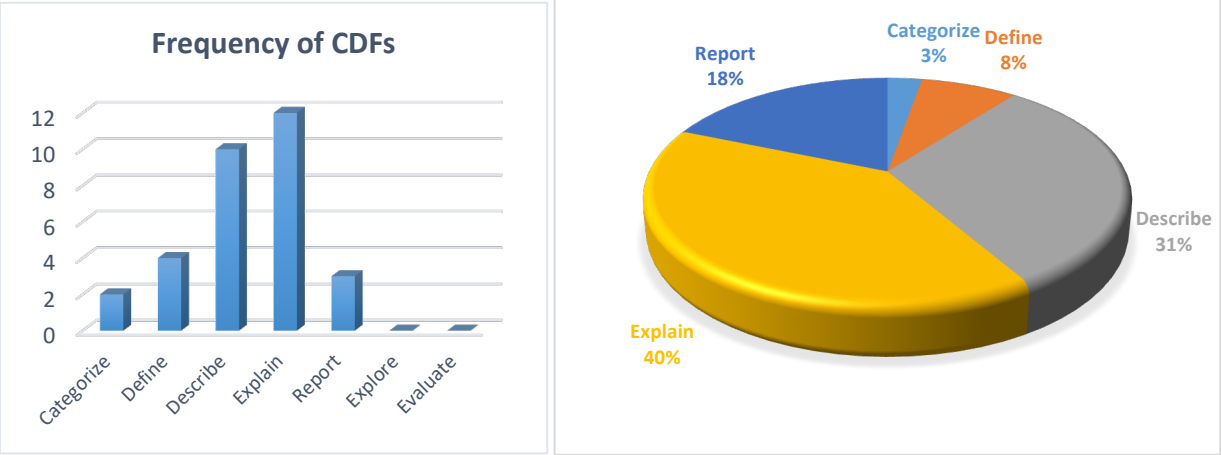

Figure 1. The frequency of CDFs across five semiotic texts (left) and the percentages of CDFs in terms of word count (right)

SVE 1 is identified as an *explain* function in the episode level (EA), it includes 4 different *explain* functions and one *describe* function in the basic level. Teacher E starts by stating that the physical

properties of substances depend on the strength of intermolecular forces existing in between the particles. This sets the stage for the *explain* function (EA1) because this is the main conceptual focus of SVE1. She then introduces the semiotic visual element, describing what it is (DS1). This visual element contains two molecules of n-pentane, which has a linear molecular structure and two molecules of 2,2 dimethyl propane, which is called neopentane with a spherical molecular structure. Even if such substances have two different molecular structures, they consist of the same number of carbon and hydrogen atoms (C_5H_{12}), implying the same molecular mass. The CDF of *describe* follows with an *explain* (EA2) such that the sentence starts with "since" dependent clause, stating that due to the nonpolar nature of these two substances, there exists only London forces in between the molecules of each one. This one follows with another basic level CDF *explain* (EA3) with one more dependent clause (although). This sentence justifies why these two substances have different boiling points, referring to the differences in the shape of molecules of each substance. The final two sentences are also coded as the basic level *explain* function (EA4). The text shows the sequential reasoning in a cause-and-effect manner with a dependent "when" clause, asserting that the linear molecules create larger contact areas and result in having strong intermolecular interactions. In relation to this one, there is one more expression with correlative conjunction such that the stronger the interactions are between the molecules, the higher the boiling points of substances would be.

SVE 2 is coded as an *explain* function in the episode level (EA), consisting of 3 *explain* functions in the basic level. Yet, there is also a *describe* function apart from the episode level *explain* function. Teacher E begins with the introduction of the semiotic visual, describing the variables represented in the graph: molecular weight of substances versus their boiling points (DS1). This follows with two sequential sentences, which are coded as an *explanation* function in the basic level (EA1). The first one indicates the trend in between the molecular weight of hydrides of group 14 elements and their boiling points. The second one further elucidates, including the phrase "in other words" as a connection in addition with a "when" dependent clause to provide reason for why there is such a trend between these two variables for the particular group of elements. Afterwards, there is a nice move to an extraordinary trend in the graph with the conjunctive adverb "however" following with "when" dependent clause. This one refers to the unexpected trend in a descriptive manner, but this one is connected with the "this is because" phrase, providing a reason for why particular substances like water, ammonia and hydrogen fluoride have higher boiling points compared to the others. These two sentences are considered as the CDF of *explain* in the basic level (EA2). The last basic level CDF, namely *explain* function further states how the substances including hydrogen with highly electronegative elements of nitrogen, oxygen and fluorine creates molecules with high dipole moments (EA3). Overall, there are distinct moves in between basic level CDF *explain* functions, with proper conjunctive words and phrases, as well as dependent and independent clauses. Such sequential sentences are presented in a cause-and-effect manner, largely making the semiotic text as the *explain* function at the episode level.

SVE 3 included no particular episode level CDF. However, this semiotic text consists of some basic level CDF functions as: one *categorize*, four *define*, and one *describe*. Teacher E first *categorize*s the electrostatic interactions as intramolecular and intermolecular forces into two groups (CA1). Then, she *define*s the intramolecular forces as strong forces that keep the atoms together within a molecule, utilizing the verb of "to be" (DF1). Then, she *define*s the specific intramolecular forces called covalent bonds as part of intramolecular forces, using the verb "to be" (DF2). Afterwards, she switches to *define* intermolecular forces as weak forces, including the verb "to be" (DF3). In order to indicate the transfer from one term to another, she utilizes the conjunctive adverb "however" before the new CDF of *define*. As a subsequent term, she *define*s a specific intermolecular force called hydrogen bonding, including the verb "to be" in the sentence once again (DF4). In the final sentence, she *describe*s what is illustrated in the SVE3 without directly indicating that this is shown in the visual, utilizing the phrase "in this figure"

(DS1). The semiotic text starts with the CDF *categorize*, then the following sentences *define* the categories from general to specific, and the last sentence tells about what the visual represents us in terms of occurrence of hydrogen bonding.

SVE 4 consists of one *describe* function, one *report* function, one *categorize* function, and three *explain* functions in the basic level. In addition, there were observed two *report* functions at the episodic level. The semiotic text begins with the CDF of *describe* (DS1), which tells about what the semiotic visual element shows. Then, there is an episodic level *report* function (*RE1e) that provides information about how Rutherford performed the experiment as well as telling about the number of distinct observations he made (CA1). Afterwards, the semiotic text just directly reports the nature of three unique observations from the experiment as statements by utilizing the past tense (RE1). This one follows with another episodic level *report* function (RE2e) which contains three basic level *explain* functions (EA1-2-3) as a list in sequence. In fact, each *explain* function involves the interpretation of experimental observations, in other words, reporting of conclusions drawn from the observational data. Such *explain* statements included the inferences from the observations are either connected with "because" or involved a "which" clause with the indicator word "cause". These "which" clauses provided further information about the reasons for such inferences.

SVE 5 indicated the characteristics of *describe* function in the episode level. This particular episode included five *describe* functions in the basic level, which make the whole text as the CDF of *describe* at the episode level. The text starts with a general introduction of the visual element with including the key indicator "this table shows…" for the *describe* function. The subsequent 4 *describe* functions refer to the major trends shown in the figure about the size of atoms and ions in the periodic table. The fundamental indicator of *describe* function in each sentence are either "as a general trend" or "as we can see" phrases. This text is a kind of verbal description of a visual image, which is already observed when the image is examined.

4. Conclusion

The findings showed that the CDFs are frequently shaped with respect to the nature of the visual element. For example, VSE 1-2 represented the conceptual ideas, so that the texts employed the *explain* function both in the episode and basic level with proper linguistic clauses and connecting words. VSE 3, however, involved the categorization and definition of such categories without representing dominant CDFs in the episode level. VSE 4 involved the well-known experiment of Rutherford, which paved the way for the construction of the current atomic model, thus the *report* function properly utilized for this particular text. The VSE 5 explicitly illustrates the changes in the columns and the periods of periodic table, therefore the text represents the features of *describe* function with suitable verbs and indicator phrases.

Based on the findings, the most frequently observed CDFs are the *explain* and *describe* functions, and the majority of texts (71%) allotted to these two functions following with *report*, *define* and *categorize* functions. However, the CDFs of *explore* and *evaluate* are missing for this particular case. In fact, the dominance of particular CDF functions across the five texts somehow represents the central goals of science teachers and science curricula around the world for teaching science as they intend to produce disciplinary literate citizens.

Note: * *e refers to the episodic level*.

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Reflections Using the Teachers' Expectation Tool: Turkey

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1. The contributions

By using the "Teachers' Expectation Tool", I collected data from four teachers working in the Turkish educational context. All teachers were working at lower secondary state schools. Three of them were history teachers and one was an English as a foreign language teacher. Each teacher provided five pieces of text for our pilot study. Table 1 below summarizes the characteristics of the teachers and the educational context they provided data for.

Table 1. Characteristics of the data

Participants	Experience in years	Subject	Grade	School type	Target group age
Teacher 1	11	History	6-7	State	11-12
Teacher 2	17	History	8	State	13-14
Teacher 3	17	History	8	State	13-14
Teacher 4	13	Foreign Language	8	State	13

None of the school contexts from where the data was collected implemented CLIL. Therefore, the history teachers received instructions and provided texts in Turkish to indicate their expectations while the English teacher completed the task in English. The three history teachers chose semiotic items from a variety of topics including the history of the Turkish Revolution, early Turkish states in Central Asia, migration of Turks from Central Asia, and geographical discoveries by European countries during the 15th and 16th centuries. The topics chosen by the English teacher were also diverse, including science, technology, online shopping, and friendship.

2. The process of data collection

I contacted Teachers 1, 2, and 3 online and Teacher 4 face-to-face. In each case, I requested the teachers to read the instructions and ask for clarifications if they needed any. All teachers requested clarification for the various challenges they faced in understanding and completing the task.

First, the three history teachers found it challenging to understand what exactly is meant by "semiotic elements" (i.e., a key phrase in the instructions) in the context of history education. Second, I had to verbally clarify to each teacher what the task asked for; therefore, I feel that "imagining writing for an exam" was confusing for the teachers as they are used to creating exams, not imagining student responses. Finally, and in connection with the previous challenge, one teacher found it difficult to determine what constitutes "good writing" for a specific age group. She asked whether she should write a perfect response or intentionally place mistakes in her response. It seems that the hypothetical situation we wanted to create for teachers to elicit their responses is unusual and somehow challenging for them to imagine.

First of all, my experience was that face-to-face interaction with the teacher highly facilitates the task communication process and quickly clarifies the confusion they have. Sole dependence on task instructions might cause problems and confusion, negatively affecting the validity of the data. Based on my experiences of using the “Teachers’ Expectation Tool”, I would modify a few things on the tool. First, I would provide examples or a brief explanation of what is meant by "semiotic elements" in the context of different disciplines’ education to help teachers better understand the task. Second, and potentially in addition to the current procedure, I would try alternative ways of collecting data about teacher expectations and see how they would work. One way, for example, could be providing a sample student response for them to analyze and correct, instead of asking teachers to imagine writing an exam answer as if they were students. This may, of course, cause other unprecedented problems, but to find and explore optimal methods, we should try and test alternatives. Finally, regarding the current version of task instructions, I thought that some modifications to the wording could also make it easier for teachers. If we give instructions to the teachers in the form of simple steps, they may have less confusion. For example, the instructions could be based on the following structure:

i) choose a useful semiotic element you use for teaching,

ii) imagine you are a good student,

iii) as a good student, what would you write about this semiotic element?

3. The findings

For the purpose of this report, I focus on Teacher 4’s data only, i.e., the English language teacher who provided five pieces of text based on semiotic elements she chose from the 8th-grade ELT textbook which is commonly used across state schools in Türkiye. I had the chance to talk with her about the data she provided, and I sporadically integrated her comments into this part.

Teacher 4 chose semiotic items from four different units of the textbook, which, as she explained, was because the texts she would produce based on visuals from the same unit would be repetitive. I think the fact that the texts belong to different units is an advantage because it allows seeing the teacher’s disciplinary-literacy-related expectations regarding different themes and different linguistic skills. Information on the five texts is presented in Table 2 below.

Table 2. Characteristics of the texts

Semiotic element	Word count	Target level	Theme of the unit	Topic
1	88	A2	In the kitchen	Making a pizza
2	94	A2	Science	Life of Stephan Hawking
3	82	A2	The Internet	Sending e-mails
4	119	A2	The Internet	Online shopping
5	141	A2	Friendship	Meeting with a friend

While the level of the texts seems appropriate for the target age group and proficiency level, it was interesting that, in one case, the teacher wrote a dialogue rather than prose. The semiotic element associated with this case was a series of three pictures illustrating one friend visiting the other and

making a plan to see a movie. Therefore, the teacher expects students to engage in a dialogue, rather than describe the visual. Based on the text Teacher 4 provided, we understand that the dialogue requires linguistic functions such as suggesting, accepting, refusing, talking about likes and dislikes, and thanking. These functions cannot be elicited through prose describing the visual in a storytelling format. Teacher 4 later confirmed that her expectation with this visual was that students get prepared for and involved in verbal dialogue and successfully use these linguistic functions. Additionally, this dialogue shows an interaction between two people, demonstrating social communication and turn-taking. Therefore, by providing a dialogue rather than prose, the teacher might be expecting students to have such social skills as well. This appears to be typical EFL instruction, i.e., being focused on everyday interactions and how to successfully manage social life.

To explore to what extent this EFL teacher also expects content-based literacy skills, these texts were also analyzed through the lens of Cognitive Discourse Functions (Dalton-Puffer, 2013) by applying the coding manual presented in section 3.2. of this report. When we look at the data from the perspective of CDF, we observe that *evaluation* (EV) is the most frequent CDF (see Figure 1). Out of the 13 instances of EVs, eight were in the dialogue text (Text 5), indicating that Teacher 4 expected students to use evaluative sentences when they engaged in a conversation with a friend to arrange an outside activity. Therefore, evaluative sentences are associated with certain linguistic functions that students are expected to use to discuss likes and dislikes, suggest a social activity, and accept or refuse suggestions.

From a content perspective, ELT in this context does not have clear disciplinary content criteria associated with other courses such as Mathematics, Science, or History. However, in parallel with the aims of the textbook, Teacher 4's expectations align with real-world needs and applications that enable functioning effectively in various contexts. For example, the biographical text about Stephen Hawking not only requires linguistic accuracy but also an understanding of scientific achievements and their historical context. Similarly, the process of shopping online integrates financial literacy and digital competence, which are essential skills in modern life. Finally, the instructions for sending an email incorporate technological skills necessary for academic and professional communication. Each task is justified by its relevance to the students' daily lives and future academic or professional needs. These justifications underscore the importance of integrating content knowledge with language skills to enhance overall learning effectiveness and prepare students for diverse communicative contexts.

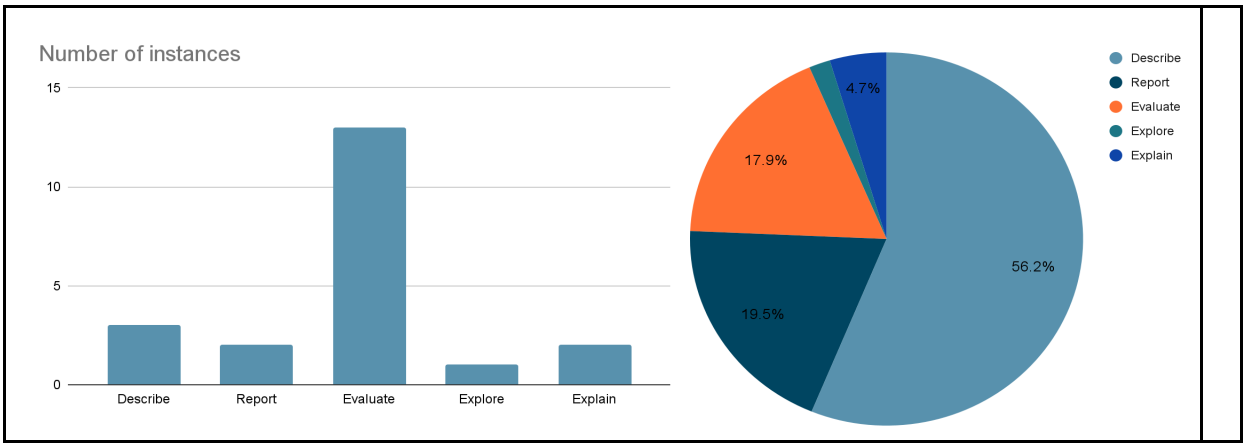

Figure 1. Number of CDF instances (left) and their percentages in terms of word count (right).

The other CDFs were significantly less frequent in terms of the number of instances. However, when we look at how much space they take (word counts) in the texts produced by the teacher, we observe a different picture. As seen on the right side of Figure 1, most of the texts were descriptive in function. This was largely due to the three texts that described a series of actions in the form of

imperative sentences, one describing the steps of making a pizza (Text 1), one describing how to send homework as an attachment through e-mail (Text 3), and the other describing the steps of shopping online (Text 4). Therefore, one prominent feature of these descriptions was the central role of "command verbs" as part of imperative sentences. For example, in the case of Text 1, the focus was on verbs such as *slice, fry, add, grate*, and *bake*, while in the case of Text 3, the focus was on *login, click, type, choose, double click, upload,* and *send*. These verb choices also clearly show a connection to the theme of the texts and are, in fact, quite specific to the vocational fields of cooking and IT. Moreover, these two texts were also similar to each other also in terms of how they incorporate connecting words that indicate the temporal relationship between activities. This shows how Teacher 4 expects the students to make use of such words as *first, next, after that*, and *now* to create continuity when describing the steps of a task. Text 4, which describes the steps of online shopping, however, was not similar to the other two in that respect because it did not involve such connecting words. When I asked Teacher 4 why she ignored connecting words in the case of Text 4 and provided the steps of online shopping by listing sentences one under the other, she responded,

> *I did not intentionally keep out the connecting words in Text 4. I guess I felt that it was not important when talking about online shopping. It is kind of optional for students. I would not necessarily expect them to use connecting words each time they describe how to do something.* (Teacher 4)

This explanation was interesting because it shows that interpreting the expectations of teachers solely based on such texts is difficult and might be incomplete. In the absence of Teacher 4's comment above, one can easily think that connecting words is important for students when they are discussing certain topics, but not as much with others. However, in reality, the teacher thinks the absence or existence of connecting words is not important. This raises a methodological question, i.e., whether follow-up interviews should be an integral part of such data collection.

Dalton-Puffer et al. (2018) suggest that episode-level CDFs are extended segments of speech that fulfill a single overarching communicative purpose. These episodes can be comprised of smaller CDFs, which are considered basic level. In the current data, episode-level CDFs were observed in all of the texts, except Text 5 which was in the form of a dialogue. For example, Texts 1, 3, and 4 were whole-paragraph episode-level descriptions that involved basic-level CDFs such as *explanation*, *evaluation*, and *exploration.* In the following extract from Text 3, the teacher uses the *explore* function within the *description*.

> Choose the file from your computer or your mobile phone. Double-click the file and upload it to your e-mail. You can also write your message if you want. Now, you can send it.

With the sentence "You can also write your message if you want", Teacher 4 offers a further option that can be used when sending an attachment with an email. This alternative course of action is presented with the modal verb "can" which signals optionality here. It seems that the students are not just expected to describe how to use a computer to send a file in a simple manner, they are also expected to discuss alternative actions and choices when needed, which adds intricacy and complexity to the communicative message. However, it is also noteworthy that this was the only explorative statement in the data from Teacher 4, which might imply that the function of exploration is expected, but to a very limited degree.

On the other hand, Text 2 was an episode-level *report* that involved basic-level *evaluations*. For instance, while reporting the life of the late scientist Stephan Hawking with factual descriptive sentences such as "He studied physics at Oxford University" and "He won many prizes and medals", the teacher used evaluative sentences such as "He was a great scientist" and "He had a successful

life". This indicates that Teacher 4 expects students to be able to make comments about people based on what they did. Some of the adjectives Teacher 4 used in Text 2, for example, include *brilliant, great, determined*, and *hardworking*. Therefore, students are expected to make such evaluations using certain adjectives that describe personal characteristics.

Finally, it is also interesting how some CDFs were quite frequent while others were largely missing. Considering that these texts were produced from the perspective of 8th-grade students who have A2-level English proficiency, it is possible to attribute the frequency of CDFs such as *describing* and *evaluating* over *exploring* and *explaining* to pedagogical and developmental factors.

Although all CDFs can take sophisticated complex forms, at this level of proficiency, *describing* and *evaluating* usually require lower cognitive and linguistic demands compared to *exploring* and *explaining*. 8th-grade foreign language learners who are at the A2 level of language proficiency can handle describing objects, people and processes, and expressing opinions or preferences more comfortably. Students are not required to show a performance beyond that; for example, by providing convincing justification for one's stance. On the other hand, *exploring* and *explaining* functions necessitate a higher level of abstract thinking and more complex language structures, such as cause-and-effect relationships, hypotheses, and detailed reasoning. These might be challenging for learners who are still building their language foundations. Furthermore, while *describing* and *evaluating* impose a lower cognitive load and allow students to focus more on language use rather than struggling with content complexity, the *exploring* and *explaining* functions can be cognitively demanding because they require critical thinking, hypothesizing, and synthesizing information.

A further explanation can be made from a pedagogical perspective. *Description* activities usually help learners practice essential vocabulary (e.g., adjectives, nouns) and basic grammatical structures (e.g., present simple, imperatives). Similarly, *evaluative* tasks at this proficiency level often involve simpler structures such as opinion phrases and comparative structures, which are essential for expressing personal views and preferences. It should be pointed out, however, that at higher proficiency levels, the process of *evaluation*, i.e., taking a stance and convincingly justifying it, is typically fairly complex, both linguistically and cognitively. Likewise, *exploring* and *explaining* often require learners to use more sophisticated vocabulary and complex sentence structures (e.g., subordinating conjunctions, passive voice), which, as Teacher 4 explains, are not yet the primary focus at this stage of language learning.

The emphasis on *describing* and *evaluating* over *exploring* and *explaining* in these texts aligns with the developmental and pedagogical needs of 8th-grade foreign language learners. This approach ensures that students are not overwhelmed, while gradually building their language proficiency and preparing them for more complex cognitive discourse functions in future learning stages.

4. Conclusion and implications

In conclusion, the study using the "Teachers' Expectation Tool" provided valuable insights into teacher expectations in the Turkish educational context. The analysis of Teacher 4's texts revealed a strong emphasis on practical and real-world applications of language skills, reflecting the goals of the ELT curriculum in state schools. The findings indicate that while the tasks largely focused on describing and evaluating, they also demonstrated an implicit expectation for students to develop social communication skills through dialogue.

The challenges encountered by teachers in understanding and completing the tasks suggest the need for clearer instructions and potentially alternative methods of data collection, such as providing

sample responses for analysis. This pilot study suggests that follow-up interviews could be beneficial in clarifying teachers' expectations and improving the validity of the data. Overall, the research emphasizes the importance of aligning educational tools and methods with the disciplinary literacy related needs of students, which can ensure that language learning remains relevant and effective in preparing students for real-world communication.

5. References

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Teachers' expectations of learners' learning in Italy. Analysis of two teachers' assumptions on: 1) Physics and 2)English

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1. Introduction

The following report presents two case studies part of a larger project investigating what teachers of different disciplines, working at diverse school levels and contexts, would expect their average good learners to have learnt of the subject they study, as a result of their studies. The design was mostly aimed at finding out how learners communicate information contained in multi-disciplinary semiotic elements (visuals, figures, maps, photos), not always present in a coursebook. It was thus agreed that teachers were going to be asked to find 5-8 semiotic visual elements (SVEs) that they would traditionally use to teach specific disciplinary themes at different classroom levels.

The research design adopted for this type of study implied the recognition of the type of those cognitive discourse functions (CDFs) (Dalton-Puffer & Bauer-Marschallinger, 2019) students would use when they report what they had learnt as well as the CDFs'supposed relevance for learning.

The design also implied the identification of those disciplines where CDFs are expected to be more frequently used by learners and understand their role for learning, and to find a number of teachers of those subjects who would agree on participating to the study.

An important step in this research was represented by the novelty of this type of study and by the need to understand the rationale and the functioning of the tool to be used as well as to learn from its use. Our diverse teaching and research traditions and experiences, when adopting a new approach in investigating how learning takes place, might generate some friction with previously endorsed research procedures. It was thus quite important for both researchers and participating teachers to try out this type of approach,observe its functioning and discuss its pedagogical implications .

2. Participants' selection and the process

At the beginning of the study, since the team had to identify a number of teachers in each country willing to be part of the study, I got in touch with a group of teachers – from primary to upper secondary schools - selected among those I had met in teacher education courses (both CLIL and EFL), or in research projects. These teachers (English, History, Physics, Mathematics), once informed about the study, declared their interest in carrying out the task and accepted to be part of the investigation. The disciplines identified for this research study were in the end Physics and English as a a Foreign Language (EFL) and four teachers were invited to a preliminary colloquium.

During the preliminary meeting, the procedure was explained, it would have involved teachers' use of semiotic visual elements (SVEs) used to elicit their learners' responses to a subject specific task. Learners' supposed responses had to be saved by teachers in writing. Unfortunately, not all teachers managed to participate, some primary teachers were the first ones to withdraw, mainly for time reasons. Some primary and upper secondary school teachers later on volunteered to carry out the task after the summer, if the investigation had continued. And this might be considered in the future an opportunity to refine the investigation.

I chose among the teachers who had volunteered – initially four, then reduced to two – those who had confirmed their participation - who taught two subjects I was mostly interested in - English and Physics – both subjects where SVEs are frequently used. Among the reasons for choosing these two disciplines there were both the fact that in Physics I expected CDFs to be more frequently used, and that I am not an expert in Physics, as well as the fact that being myself an English teacher, I was also interested in how the CDFs worked in the learning of a foreign language.

The two teachers –presented in Table 1 – were experienced teachers and teacher educators, had been involved in CLIL experiences even if not at the time of the study. They had a sound educational background and taught in two different but subsequent school levels: lower and upper secondary schools, thus I would have had the opportunity to observe CDFs use at diverse learning ages and experiences. The two teachers - MCC and MAC - had both attended a number of disciplinary and cross-disciplinary teacher education courses in Italy and abroad, they had been involved as teacher educators themselves and had been part of a number of research groups in their field of study, Mathematics & Physics and English; one of them was also a coursebook author. They also taught in the same Italian region, similar, and possibly comparable, school populations, and, last but not least, the Physics teacher's confidence in using English in her previous experience in CLIL further confirmed my choice.

Table 1. Demographic information of participants

Teachers	Age	School Level	Educational Background	Teach. Exper.	Subject	Teacher education
MCC MariaCristina	55	Italian State Upper secondary school, Scientific Lyceum, (partly CLIL); Town North. Italy	-Nuclear Physics Degree	27	Mathematics& Physics	Attended pre-& in-service Teach.Ed , projects & CLIL courses
MAC MariaAngela	62	State Lower Second. School 3rd yr. (Non CLIL). Small town in Northern Italy	-Foreign lang. Degree -MA TEFL (UK) -PhD Linguistics (Italy)	32	English as a Foreign Language (EFL)	Attended & led numerous in-set Teach.Ed courses - eTwinning exchanges; EFL Coursebook author

3. The process

The first encounters were carried out separately with each teacher starting in the last week of April 2023, while other encounters took place at the end of May 2023, and completed at the end of October 2023.

Following the agreed protocol, the teachers were individually interviewed, presented with the task and asked to sign their willingness to participate. When they were initially presented with the task, I told each teacher that we were carrying out a pilot study on the kind of language they would expect students to use when they present something complex that they had learnt.

3.1 Adjusting to teachers' disciplinary expectations and schemata

The most interesting aspects of the encounters with both teachers were those where, after my introduction to the tasks, both teachers asked specific questions and raised a few issues that were discipline specific and linked to their teaching habits and schemata.

MAC, the English teacher, in a lower secondary school (3yrs - learners' age 11-14) underlined the fact that SVEs were frequently used in her discipline for developing learners' vocabulary and for eliciting and enhancing learners' spoken skills through either groupwork discussions or debates within languaging tasks. This particular aspect was mentioned during the encounters when she was asked to report in writing what she expected her average good learners would have produced. She raised the issue that her written account would have been somehow different from her learners' traditional spoken performances because the communication channels used would have been different. She was also particularly concerned with learners' differences from year 1 to year 3 both in terms of their L1 possible interference and of their L2 (English) use, as well as of their cognitive development at that age. Another issue that was also raised concerned the questions frequently used by foreign language teachers to elicit learners' responses to a task, since they may influence learners' responses determining both the sequence of the narrative and of the language used. Her position clearly emerges in the preamble to the text she produced for each SVE, where she added samples of

questions she would have asked learners to elicit their responses (ctrl. Samples of English Excerpts in section 4, Findings).

MCC, the Physics teacher, did not raise issues similar to those raised by MAC, rather she was much more concerned with the fact that since her learners' performances in Physics are almost always connected with the use of SVEs, she did not measure her learners' performance prevailingly in terms of their use of language, whether written or spoken, but rather on accuracy of sequences, CDFs episodes, reports or descriptions, or of appropriate terminology. This could not have been fully reported in her written account of her learners' presentations. Both teachers, even if with a different perspective, by 'stepping into their learners' steps', 'authoring' them, became much more aware of the close connection of language and cognition. Both teachers identified and selected a number of authentic SVEs , coming either from coursebooks, or from the web, as used in different school years, all saved with the source references, each teacher then selected 6 SVEs for her discipline (Table 2).

Table2. Semiotic visual elements (SVEs)

Teachers	**PHYSICS 2.1**	**PHYSICS 2.2**	**PHYSICS 2.3**	**PHYSICS 2.4**	**PHYSICS 2.5**	**PHYSICS 2.6**
MCC MariaCristina	Yr:2 Age:15/16	Yr:3 Age:16/17	Yr:4 Age:16/17	Yr: 5 Age:17/18	Yr: 4 Age:16/17	Yr.5 Age:17/18
SVEs	A normal distribution curve, graph showing the numbers of people of different heights. (*Cutnell/ Johnson Physics*; Zanichelli)	Three diverse graphs representing the position-time graph of an object moving in uniformly accelerated motion. *(Hallyday's Phisics, 1 Zanichelli)*	Picture of the motion of the two balls in the figure compares the motion along one direction (the vertical direction, red ball) and the motion in one plane (vertical and horizontal direction, yellow ball). *(Hallyday's Phisics, 2 Zanichelli)*	Image of the Anderson bubble chamber In-depth (material acquired thanks to a training activity for Scientific degrees in collaboration with the Faculty of Physics, University of Pavia)	Image: the effect of diffraction that results when a wave encounters obstacles that are comparable in size to its wavelength and is explained by Huygens' principle (fromWalker,*Physics, Theoretical models& problem solving*. 2 Pearson)	The figure is Ørsted's experiment, which highlights the correlation between electrical and magnetic phenomena. https://www.aps.org/apsnews/2008/07/1820-oersted-electromagnetism
Teachers	**ENGLISH 2.1**	**ENGLISH 2.2**	**ENGLISH 2.3**	**ENGLISH 2.4**	**ENGLISH 2.5**	**ENGLISH 2.6**
MAC MariaAngela Non-CLIL school	Age:13 Yr: 3 CEFR: A2	Age:13 Yr: 3 CEFR: A2+	Age:11 Yr: 1 CEFR: A1	Age:10/11 Yr: 1 CEFR: A1	Age:2 Yr: 2 CEFR: A2	Age:12 Yr: 2 CEFR:A1+A2
SVEs	Picture of the first computer produced Time: 1950s. (from a 3rd yr Course Book,*Make it*, CUP.)	The colour map of Australia with its internal subdivisions. (from a3rd yr course-book, *High Spirits*, OUP)	A picture of a student's bedroom, with typical objects, (1st yr.coursebook, Discover 1, Pearson)	A double picture of two birthday wishlist.with the images of possible presents. (from *Discover 1* a 1st yr course Book, Pearson)	A map of England with visual journey elements: itinerary, plane, train, bike,car, price,duration, distances. (2nd yr coursebook *Discover2*, Pearson)	A map of a town with 22 pictures of places & activities that may elicit the learner to narrate what s/he did. (2nd yr coursebook *Discover 2* , Pearson)

3. Findings

The main findings mostly concerned
a) Teachers' personal responses to the task (see 3.1),
b) Teachers' SVEs and expected text production,

c) the instances of CDFs for each subject contained in each of the produced texts and collected in the following tables (3 and 4), and
d) my own responses to the investigation.

4.3.1 Teachers' personal responses to the task
As already presented in section 3.1, teachers' responses to a task on their expectations of the outcomes of their teaching and of their learners' learning that they were experiencing for the first time, were particularly interesting because these teachers were asked , as mentioned before, to step into their learners' shoes while reflecting on their own daily activities. They raised some issues, they mostly asked clarification questions but, mostly their comments and their questions were closely related to their reflections enacted by the task, on their own teaching and to aspects of their teaching they had never experienced before. Interesting point to be noted was the case of the English teacher (MAC), as she reported that when she administered part of the same tasks as part of the year final test, two of her learners' outcomes *de facto* matched her previously expected text.

4.3.2 Teachers' SVEs and expected text production,
Both MCC and MAC acknowledged the fact that they often use SVEs (Table 2) in their daily teaching but both admitted that when they wrote the supposed learners' texts, they were sometimes surprised by the outcomes as they either reported that they probably had provided many more details than those contained in the visual elements used. Yet, this task triggered more reflections on the cognition aspects elicited by visuals more than the reading of texts.

4.3.3 Instances of CDFs for each subject contained in each of the produced texts (tables 3&4)
The tables 3&4 below report the CDFs present in the teachers' accounts of their learners' outcomes resulting from the use of SVEs.

Table 3 – PHYSICS - Overview of CDFs

	SVE_1	SVE_2	SVE_3	SVE_4	SVE_5	SVE_6
CATEGORIZE	✓	✓				
DEFINE	✓	✓	EP	✓	✓	
DESCRIBE	EP	✓	✓	EP	✓	✓
EVALUATE				✓	✓	
EXPLAIN	✓	✓	✓	✓	✓	✓
EXPLORE						
REPORT		✓		✓		✓

Table 4 – ENGLISH - Overview of CDFs

	SVE_1	SVE_2	SVE_3	SVE_4	SVE_5	SVE_6
CATEGORIZE						
DEFINE	✓	✓			✓	
DESCRIBE	✓	✓	✓	EP	✓	✓
EVALUATE	✓		✓	✓	EP	✓
EXPLAIN		✓		✓	✓	✓
EXPLORE						
REPORT	✓		✓			✓

The two CDFs tables completion highlighted the differences among both subjects as well as the age level and the teaching approaches adopted and the expected language produced. While the outcomes of Physics expected 'texts' showed a more complex underlying interaction and use of the CDFs related to Physics and to the 'explain' category, the EFL 'texts', in terms of language use, presented a prevailing presence of 'describing', 'reporting', and 'evaluating' CDFs, corresponding to the 'expected' EFL task outcomes also in terms of 'language chunks'.

There are differences in those CDFs that highlight learners' active learning processes directly connected to their teachers' classroom work and to the type of tasks and activities daily used, but the use of these CDFs is closely linked to the specificity of the discipline and to the continuity of the exposure to specific approaches. This might suggest partly 'rethinking' the expected outcomes of both disciplines as well as of their pedagogical approaches. Yes, but what and who does rethinking involve? These are aspects that should be considered within initial teacher education programs, learners'age and each discipline expected outcomes. The differences might be attributed to the specificity of each discipline and to the expected learners' performance, even if - in both cases - the age difference represented a significant differentiating factor.

4.3.4 My response to the investigation & implications for future research

Even if this is a small-scale research, the findings emerging from the overall analysis as well as from the type of CDFs present, prove the internal validity of the approach adopted and of the tools used. I was particularly stimulated by the choice of two subjects so different particularly in terms of expected language production and of cognitive reasoning.

At the beginning of the study, I was particularly concerned about the adoption of such an approach to investigate learning episodes resorting to SVEs and to teachers' own description of learners' expected production both in terms of disciplinary knowledge and of language use. Teachers' 'written' description of expected learners' outcomes could have been biased by teachers' individual experiences both in terms of language use and of subject literacies.

As for linguistic expectations, most EFL texts reflect teaching traditions at lower secondary school level mostly in terms of vocabulary knowledge, oracy and chunks, while the Physics texts include nominalizations, passive voice, at times complex sentences and consistent control of tenses, in connection to the types of visual input provided, but also to the use of written modes.

There are several aspects that might be considered for future research implications, they might be related to the use of SVEs without limiting them to the use of images that could, for example, be represented by specific videos, not always directly related to the discipline, in order to elicit learners' responses also in out-of-school contexts. Or else, the use of video-recordings of learners' spoken interactions on specific projects in groupwork, another aspect to be taken into consideration for the CDFs analysis.

This type of research demands for a reconsideration also of teacher education where disciplinary literacies are very seldom explicitely presented and discussed in terms of learners' cognition and metacognition, and where emphasis is seldom posed on learners' oracy. In this respect an innovative approach would include the use of an interdisciplinary literacies approach. As one of the teachers said, we need 'rethinking' teaching and teacher education and this can be done by stimulating learners' 'interthinking' through oracy.

APPENDIXES

Only half of the excerpts (3 out of 6 for each subject) were chosen as examples of different levels of the expected learners' responses for English and for Physics; they are reported below. The English excerpts are preceded by the teacher's comments on the context and on the instructions she would have given the learners. This highlights the diverse contextualised support traditionally provided in EFL classrooms.

ENGLISH

Excerpt 2.1 (180 words) Level 3 lower secondary school, Age: 13 A2 level. The task would be presented after a class discussion on the importance of technology and on ideas and desire for the students' immediate future (next year's school) and beyond (future job) and it would look like this: *Look at the picture of one of the first computers. What does it look like? Is it similar to what we use today? Answer the question and add some information about your relationship with computers and technology in general, the types of electronic gadgets you use, and what for. Will technology be important in your future school or job.*

This picture **looks like** a wardrobe, a cupboard, or a big film projector, *but* it **represents** one of the first computers produced. **I think** this picture was taken in the 1950s, *because* the woman is wearing clothes of that period. The computer in the picture is very big and *probably* very slow. Today computers are much smaller and faster. **I like** computers and electronic gadgets. I've got a desktop which **I use** at home, a tablet that **I use** at school for my projects and for my electronic books, a smartphone, a smartwatch and a games console to play videogames online. **I play** with people from many different countries, and **we use** English to communicate. I also **use** the Internet a lot, to study and to have fun. I **think** I'm quite good at using technology and my dream is to become a software developer. If I pass the exam, next year I'm going to a scientific high school where there are lots of computer science lessons. I also **think** technology will be very important for everybody's life. (Teacher MAC)

Excerpt 2.2 (250 words) Age:13 , level 3 lower secondary school, A2/A2+ level. The task would be that of describing the map of Australia at first sight, without any previous discussion or presentation about the topic, answering the question: *Look at the following map. What do you understand about Australia? What would you like to know?* Comment: The task would then be meant to elicit previous knowledge and highlight focus points to develop during later lessons. It's not so much a matter of showing that the student has learnt the topic well but rather that he/she can use the language to show higher order skills. Even though the language in itself is quite simple, it's making inferences (*this is probably why, which means, must be, I've heard*), expressing opinions (*I think*) and desire for further knowledge (*I'd like to know more*) that are taken into account here.

This is a map of Australia, a very big island located in the Southern Hemisphere. From the map **I can see** that it's divided into some big regions plus Tasmania, which is another smaller island south of Australia. There's also the picture of the Australian flag. It's blue with some white stars and with the Union Jack in the top left corner. This is *probably* because Australia was a British colony in the past. And **I think** this is why English is its official language. The main cities indicated on the map are Brisbane, Sydney, Canberra, and Melbourne on the east- and south-east coast, Perth in the south-west and Darwin in the north. They are all along the coast or near the sea, which **means** that the land there is more fertile. I can also see a bottle of wine, so Australia **must be** a wine-producing country. The town of Alice Springs is in the centre. I've heard that there is a big desert there, and that there is an important rock formation. Then there are pictures of typical animals like kangaroos and koalas, and sharks in the sea. I'd like **to know** more about them and also about the Aborigines and their traditions. In fact, **I see** the symbols of a boomerang and of a typical Aboriginal musical instrument. Other pictures in the map **represent** Sydney's Opera House, which is a symbol of Australia in the world, and a diver near the east coast where **I can see** corals. (Teacher MAC)

Excerpt 2.3 (166 words) Age: 11, A1 level. This task would be carried out at the end of a vocabulary and grammar focus on rooms and furniture, prepositions of place and the use of there is/are. The request would be the following: *Describe the room that you see in this picture. Do you like this room? Do you think it is a boy's room or a girl's room? Why?* I would expect a text like this from a very good 10 or 11 year- old student in a class 1 at lower secondary school. An expansion of this task could be to *ask for what IS NOT in the picture which the student has in his/her room*.

This is the photo of a student's bedroom. There is a bed on the right with a pillow, a blanket, and some cushions. There's a shelf above the bed and on it there are a lot of books. Next to the books there is a basket and a lamp. In the corner of the room there's a desk with some drawers. On the desk there are some pens and pencils and another lamp. Next to the desk there's a radiator, in the corner. Above the radiator, on the wall, there's a bookcase with some books and other objects. There's also a chair in front of the desk**. I think** it's comfortable. On the floor there's a white rug and on the rug there's an armchair. Opposite the bed there's a French window with some curtains. **I think** this room is OK. It's small but comfortable. **I think** it's a girl's room *because* it's very tidy and for the flowers painted on the cushions and the curtain. (Teacher MAC)

PHYSICS

Excerpt 2.3 (213 Words). Yr.3, Age:16/17

The motion of the two balls in the figure **compares** the motion along one direction (the vertical direction, red ball) and the motion in one plane (vertical and horizontal direction, yellow ball). The red ball and the yellow ball **fall from** the same height but **have** different initial velocities. In describing the behaviour of the two balls, friction with air **is considered** negligible. The red ball **has** zero initial velocity in both vertical and horizontal directions, and its motion toward the ground **is** uniformly **accelerated** (free fall). The yellow ball **has** initial velocity equal to zero in the vertical direction, but not in the horizontal direction, and **it moves** in the plane. Its motion **can be described** as a superposition of two motions: uniform rectilinear motion in the horizontal direction and free-fall motion in the vertical direction. The two balls **were dropped** at the same instant, and the sequence of images **shows** that the vertical motion of the two balls (*the uniformly accelerated, free-fall motion*) is identical because they both **travel** the same vertical distance in the same time interval. **This means** that the horizontal motion **does not influence** the vertical motion of the yellow ball, and the vertical and horizontal motions **do not influence** each other and **are independent of** each other. (Teacher MCC)

Excerpt 2.4 (228 words), Yr.4, Age 16/17

In the figure we can **observe** the effect of diffraction that **results** when a wave **encounters** obstacles that **are comparable** in size to its wavelength and **is explained** by Huygens' principle that slits **behave** in turn as sources of waves that **propagate** outward in all directions. Even light, upon encountering an obstacle possessing two thin slits (thin *in the sense of* comparable to the size of the wavelength of light, order of magnitude 10^(-7) m), **produces** diffraction. Young **verified** this behavior experimentally in the double-slit experiment. By collecting light rays on a screen, interference figures with characteristic light and dark bangs **are observed**. The bangs **form** because light rays from the slits **interfere** *constructively* where you **have** bright spots, destructively where you **have** darkness. The *constructive interference condition* between wavelength □ and distance d between the slits **is as follows**: d·sen□=m□□
The angle □ **depends on** the distance y at which the bright spot is formed with respect to the central fringe and the distance L between screen and double slit (tan□=y/L).
The parameter m **is** an integer indicating the position of the fringe with respect to the central fringe (m=0).
By **studying** the geometrical characteristics of the interference figures, it is possible **to determine** the wavelength of the light *if* the distance between the slits **is known**, or the distance between the slits if the wavelength **is known.** (Teacher MCC)

Excerpt 2.6 (242 words).Yr.5, Age 17/18

Young's double-slit experiment, **demonstrates** that light *can behave* as a wave. The wave model of light **could not explain** some phenomena discovered in the early 1900s, such as blackbody radiation, the photoelectric effect, and the Compton effect. The introduction of the quantum of energy, thanks to Planck, and the description of light by photons, thanks to Einstein, explained these phenomena by assuming that light did not always behave as a wave, but sometimes behaved as a particle (with zero mass). This idea **laid** the foundation for the development of Quantum Mechanics and **paved the way** for a new way of interpreting the behavior of nature such as De Broglie's: *if* light sometimes **manifests** corpuscular behaviors, why couldn't a particle **manifest** wave-like behaviors? De Broglie **derived** the wavelength □ of a particle of mass m and velocity v: □=h/p, with h Planck's constant, p momentum of the particle. The image **shows** experimental confirmation of De Broglie's hypothesis: constructive and destructive interference bangs **are obtained** from a beam of electrons (particles) interacting with a diffraction grating (analogous to the double slit): at first it **appears** that the electrons **arrive** on the screen randomly, but the final figure formed by the electrons is absolutely analogous to what would be obtained with light. This result, a fundamental contribution of knowledge,

indicates that we can no longer **describe** nature with the categories of wave and particle, but *must* **think** *differently* and **introduce** the concept of quantum object. (Teacher MCC)

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Reflections on Using the Teachers' Expectations Tool: The Case of Serbia

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1. The contributions

Texts samples that were used to complete Task 2 of the Part 3.3 of the WG3 Deliverable 7 were taken from textbooks that are used by students during the freshmen year (age group: 19 years old) for the following subjects: Mathematics 1, Strength of materials, Mechanics 1, Engineering materials, Physics, Dynamics, Mathematics 1: Algebra. The data was collected from 10 professors working at a public technical university in Serbia out of which two teach Mathematics 1, one teaches Mathematics 1: Algebra, two teach Physics, two teach Strength of materials, one teaches Engineering materials and one teaches Dynamics and one teaches Mechanics 1. All of them have 15 to 30+ years of teaching experience at the post-secondary level. They have also taught abroad and have published papers in renowned international journals with Impact Factor. Each of the professors provided two to four semiotic elements and explained at least one text example. The texts were translated from Serbian into English. The university that they teach at is non-CLIL.

2. The process of data collection

The professors were contacted via email and then by phone for further explanation of the task. All of them agreed to participate immediately since they had already participated in a CLIL project from 2019 until 2021. They found the task interesting and understandable. Initial communication with the professors was straightforward but when their written tasks came in, I realized that they did not understand what they were supposed to do. Instead of giving examples of "what kind of language a good student should produce", they generally wrote about their expectations about the subject. So, I scheduled a Zoom meeting with all 10 of them and explained the task again. Thankfully, all agreed to redo the task and this time the expectations set by WG3 were met. When I reflect on this task now, I think that it is meant more for primary and secondary school than the post-secondary because university students are more mature, already have certain language skills and are expected to use academic and technical language at all times. This explains professors' misunderstanding of the task when it was first explained. In a way, I understand why they did it the way they did - it is because they teach subjects that mostly deal with numbers and calculations and that that their expectations are primarily this: good calculations result in good grades. Another explanation could be that at the tertiary level, professors are experts in their respective fields, not trained educators. As such, they might have little experience and training when it comes to reflecting on student outputs, and most likely, they had probably never had to formulate what precisely they expect their students to produce; a task primary or secondary teachers might be more familiar with.

3. The findings

The findings represent my reflections on the task. Just as I mentioned in the previous section, professors at tertiary level expect their students to use academic and technical language throughout. In most cases, these educators use simple language for very difficult concepts that they have to explain to their students. Nonetheless, they expect their students to use technical language from day one. Let us take into consideration the following example about shear forces expressed via stress. It is explained in very understandable language in Serbian (Cyrillic alphabet) but with technical terms (highlighted in red):

Excerpt 1:

Истакнимо да у горњим једначинама десну страну израза знамо, а леву не. Дакле, можемо да закључимо да се јавља проблем како да одредимо леви део ових израза, односно, како да одредимо распоред напона по попречном пресеку. Сен-Венан је први предложио поступак за решавање овог проблема, поступак који је касније назван Сен-Венанов полуобртна метода а које се базира на:

- *претпоставци о напонима*
- *претпоставци о дефомрацијама, и*
- *вези напона и деформације (Хуков закон).*

In English it reads:

Let's emphasize that in the above equations we know the right side of the expression but not the left side. So, we can conclude that there is a problem of how to determine the left part, that is, how to determine the distribution of stress in the cross section. Saint-Venant was the first to propose a procedure to solve this problem, a procedure later called Saint-Venant's half-reverse principle, which is based on:

- *Assumptions about stress*
- *Assumptions about deformations and*
- *Relationship between stress and deformation (Hooke's law).* (Professor DČ)

While most of the language seems quite general, students also have to master some technical terms such *elementary dysfunction of variables, disjunctive form, canonical elementary conjunction of variables, perfect conjunctive normal form in relation to variability*, etc. These are the terms that cannot be simplified like the language in the example above.

Interestingly, all professors sent the examples in Serbian, which I had to translate (again) in English and then return it to them so that they could check technical language. What they agreed on was that it sounded more difficult in English then in Serbian even though Serbian language has 7 cases, enclitics, logical subject, verbal aspects and two alphabets. This is probably because English is not their native language.

When I reflect on what professors have produced, I can easily say that they have done a good job and I am thankful to them for agreeing to redo the task.

Interestingly, two professors who teach Mathematics both sent their tasks, but one professor did not provide examples of what he expects a good student should produce in terms of language while the other one did. The professor who did not provide a language sample instead sent semiotic elements and explained that the student who had mastered the material should be able to do most of the tasks in Mathematics 1 without difficulty and use appropriate (technical) language. According to him, the goal is to master the basics of linear algebra with analytical geometry and differential calculus by one variable in a theoretical and practical sense. He did, however, list examples of technical language the student is expected to produce, such as: *Matrix calculus - Systems of linear equations - Vectors in geometry and in coordinates - Lines and planes in the coordinate system - Curves and surfaces of the second order - The concept of functions and elementary functions - Limes, properties and applications - Derivatives and applications of the differential calculus - Taylor's polynomial - Parametrically defined curves*.

After the semiotic elements, he explained, that, “as it could be seen from the semiotic elements, students are expected to know the procedure for solving problems, equations and calculations while language is kept to a minimum”. He also indicated that that is what they consider good writing in mathematics, which makes sense because for professors of mathematics, numbers are what words are for professors of language and literature. Nonetheless, he did say that students are expected to

use technical language that they acquire from textbooks as well as from professors and assistants during lectures and discussions, such as: invertible matrix, square matrix, determinant, adjoint matrix, regular and singular matrix, etc. (Professor MB)

The second professor who teaches Mathematics 1: Algebra said the same as the former professor, namely that students are expected to familiarize themselves with the basic concepts of the following areas: indefinite and definite integrals and their applications, differential calculus of real functions of several real independent variables, differential equations of the first order. They should study technical language that is used in mathematics such as: integral calculus, calculate the areas of flat figures, the lengths of arcs of rectifiable early curves, the surfaces and volumes of rotating bodies, partial derivatives of real and vector functions that depend on several independent real variables, differential equations of the first order, namely: *equations where the variables can be separated, homogeneous and linear differential equations of the first order, Bernoulli's differential equation and differential equations written in the form of a total differential, equations of orthogonal and isogonal trajectories of one-parameter families of straight lines*, etc.

In addition to these comments, she provided 4 semiotic elements and one example of what a good student should produce in class and on the exam (in Latin alphabet; technical language is marked in red):

Excerpt 2:

Diferencijalna jednačina je svaka jednačina u kojoj se javljaju nezavisno promenljiva *x*, nepoznata funkcija *y(x)* i izvodi te funkcije. Opšti oblik ove jednačine je

(1.1.1) $F(x, y, y', ..., y^{(n)}) = 0$

Ovo je"obična" diferencijalna jednačina je nepoznata funkcija zavisi samo od jedne nezavisno promenljive. Sem običnih, postoje i parcijalne diferencijalne jednačine kod kojih nepoznata funkcija zavisi od više nezavisno promenljivih. Nadalje ćemo za diferencijalne jednačine koristiti oznaku DJ. Red diferencijalne jednačine je red najvišeg izvoda koji se javlja u DJ. Rešavanje diferencijalne jednačine je određivanje nepoznate funkcije y(x) koja se u njoj javlja. Funkcija y(x) koja identički zadovoljava DJ (1.1.1) je rešenje (integral) diferencijalne jednačine. Rešenje DJ (1.1.1) može da bude opšte, partikularno I singularno. (Professor DDD)

In English, the above paragraph reads:

A differential equation is any equation in which there are an independent variable x, a discrete function y(x) and the derivative of those functions. The general form of the equation is:

(1.1.1) $F(x, y, y', ..., y^{(n)}) = 0$

This is an "ordinary" differential equation because the unknown function depends on only one independent variable. Apart from the ordinary ones, there are also partial differential equations where the unknown function depends on several independent variables. Furthermore, we will use the notation DE for differential equations. The order of a differential equation is the order of the highest derivative that occurs in the differential equation. Solving DE is determining the unknown function y(x) that appears in it. The function y(x) which identically satisfies DE (1.1.1) is the solution (integral) of the differential equation. The solution of DE (1.1.1) can be general, particular and singular.

The professor indicated that, “as it is seen from her example, professional language is a must and this is what we expect from our students to produce”. She stressed that the example sounds much different in Serbian than in English, meaning that it sounds more difficult in English, which is the students’ second language. She also pointed out that she likes to give examples from everyday life to make classes more interesting (e.g. weather forecasting and climate change, economics and finance, medicine and healthcare, environmental science etc.) during lectures and discussions because that is a good way for freshmen to understand difficult concepts in math.

A third professor also did not send explanations of semiotic elements and language production, but simply said that expectations from students attending the course Algebra and Linear Algebra is to “acquaint students with the basics of mathematical logic, general and linear algebra and mathematical analysis, combinatorics, graph theory, vector spaces and elements of analytical geometry, as well as to enable students to effectively apply the acquired knowledge in professional subjects”. (Professor MP)

As for language, the professor said that the students are expected to know calculations as well as professional algebra language, which is not easy for students to learn in Serbian. Terms such as *elementary dysfunction of variables, disjunctive form, canonical elementary conjunction of variables, perfect conjunctive normal form in relation to variability* - take time to learn and, then, use on regular bases during lectures and discussions.

Seven other professors sent explanations of the semiotic elements and what kind of language they require from their students. The language they require is simple (to explain complex concepts) while technical language in mathematical procedures and calculations is difficult (as seen from the examples above).

4. Conclusion and implications

Generally, the professors who participated in this task have provided us with valuable insights. Interestingly, all of them have agreed that technical language is a must and, implicitly, part and parcel of their subject. Their initial misunderstanding of the task also implies that taking over the perspective of students and imagining what they would produce is not something that crosses subject specialists’ minds. They expected that technical language was mandatory, and they did not feel the need to address or even realistically produce the language per se. Therefore, it is quite obvious that professors at technical universities have high expectations from their students for both technical knowledge and language. In short, they expect their students to use technical language from day one.

I personally believe that task was meant more for the primary and secondary school then tertiary level because university students are more mature, already have certain language skills and are expected to use academic and technical language at all times. Nonetheless, and especially relating these findings to the overall thrust of this COST project, it should be pointed out that not all students absorb this type of language through osmosis but could benefit from more explicit instruction.

The fact that subject-expert professors misunderstood the task the first time about what kind of language (except technical) they want their student to produce tells us that this is not something they consider primary in their teaching, since it is expected from the start. Interestingly, these professors could list examples and write about their expectations in general which is a clear indicator that they seem aware of what type of language is needed to master their subject. These could be good starting points for pedagogical interventions that help freshmen students meet the high expectations of their professors that would further allow more growth in subject-specific literacy throughout their tertiary education.

3.5. SUMMARY OVERVIEW TASK-2: SURVEY OF TEACHERS' EXPECTATIONS

While TASK-1 surveyed official curricular documents to understand curricular demands regarding academic language and discipline-specific literacy/ies (DL), i.e. information which is essential for policy makers, teacher educators, teachers, and ultimately for the students' success in school and their future professional pursuits, TASK-2 sought the same understanding by looking at "lived" expectations. Of course, curricular documents set official baselines and are tools to generally communicate expectations between different stakeholders. Yet, teachers' actual expectations might, in fact, be more specific and even differ from what is decreed in curricular documents. In any case, the teachers' concrete expectations affect what happens in a classroom and how learners develop to a considerable extent (see Hattie, 2009). Consequently, the **COST Action 21114 "CLILNetLE: CLIL Network for Languages in Education"** also aimed to examine teachers' expectations of students' productive disciplinary discourse. However, asking (content) teachers directly about their expectations when it comes to DL skills is not as straightforward, considering that "disciplinary literacy/ies" is a complex and, to some extent, elusive concept. Therefore, TASK-2 intended to gauge their expectations in an indirect way by letting educators put themselves in the shoes of their learners to compose a text they expect a good student would produce in an examination setting to explain their understanding of a semiotic prompt (e.g. an image, a graph, a diary entry, a cartoon etc.).

This was a task that many of our contributing teachers found very interesting and insightful, but also rather challenging. While some younger teachers felt more comfortable doing this task, as they had more recently practiced writing such texts in their studies, most experienced teachers reported that the act of "writing like a student" was extremely unusual for them and therefore tricky. Yet, it appears only logical that educators should be able to produce what they expect good students to express, since clearly delineating one's expectations from students is not only essential for establishing the learning objective, it sets the groundwork for structured and purposeful teaching towards these objectives. This brings us to the first implication of our findings:

> **Implication No.1: Educators need to explicitly reflect on and make visible their own expectations regarding students' DL. In this regard, the Elicitation Protocol of TASK-2 might be a very useful teacher-training tool for both content and language teachers.**

As pointed out in the report by Merita Hoxha (AL), *all the teachers admitted that when in the class, they mostly focus on their students absorbing the subject content rather than the use of language. This task made them see the process of teaching and learning in a different perspective.* Similarly, Nataša Bakić-Mirić (RS) remarked in her report that, given *the overall thrust of this COST project, it should be pointed out that not all students absorb this type of language through osmosis but could benefit from more explicit instruction.* In her context, a number of the tertiary Science or Mathematics professors she contacted had a hard time understanding the task and, at times, did not manage to take on the perspective of their students and imagine what they would produce, since for these tertiary-level subject

specialists, the answer to this question was clear and simple: they expect students to use "technical language from day one" and could not imagine what else needs to be said about this. This may reflect the common observation that subject-specialists tend to reduce DL to the level of vocabulary, technical terms and single words or short phrases (see, e.g. Smit & Dafouz, 2012; Hüttner et al., 2013). Thus, teachers need to be made aware of all the layers productive disciplinary literacy/ies entail.

The findings of the TASK-2 survey provide some insight into the linguistic realization of DL skills across different subjects and grade levels. As discussed in the TASK-2 country reports, by surveying the teachers' texts through a CDF-focused lens, it was possible to delineate the linguistic features needed for communicating subject-specific knowledge. The Coding & Analysis Guide helped researchers 1) identify the cognitive functions needed and their respective language patterns when engaging with semiotic resources and 2) illuminate which discourse features tend to be expected for different CDF-types. For example, this exploratory survey shows that teachers expect learners to use a high density of adjectives, prepositions of place, passive voice and present tenses for *descriptions,* while students are expected to use nominalizations, participle clauses, past tenses and phrases to mark examples when *reporting*, or to use complex clauses and signal phrases for *explanations*. Obviously, this is only a glimpse into the data, but it highlights that the Coding & Analysis Guide allowed also those TASK-2 researchers who are content specialists to investigate the linguistic demands prompted by various semiotic resources (see Section 3.4 for details).

Besides illustrating how certain CDFs are expected to be linguistically realized, this collection of teachers' texts also shows the range of different cognitive discourse functions teachers expect from students, bringing us to the second implication:

> **Implication No 2: Teacher training aimed at sensitizing educators towards layers of DL should consider both linguistic realizations of different academic discourse functions and also the range of thinking skills they expect their students to express.**

Across all of the reports in Section 3.4, CDF types associated with lower-level thinking skills dominated the corpus, such as *describe, categorize,* or *report*, i.e. operations where knowledge is typically only reproduced and re-arranged, but usually not used for problem-solving or critical thinking. In other words, teachers tend to associate the use of semiotic resources with eliciting declarative knowledge rather than considering these semiotic prompts as a way to engage students in higher-order and more self-reliant cognitive operations. Throughout the TASK-2 corpus, CDF-types like *evaluate, explore,* or *explain* are rare, especially in History (e.g. Rieder-Marschallinger (AT) or Cungu (AL)) and Science (e.g. Minardi (IT), Adadan (TR), Štefková (SK)). Yet, CDFs associated with higher-order thinking processes play important roles in the discourse of most subjects (and also their curricular documents, see Dalton-Puffer & Bauer-Marschallinger, 2019, for example). As highlighted in the report by Silvia Rieder-Marschallinger (AT), who compared primary and secondary teachers' texts as well as L1 and L2 productions at the primary level, *such teacher training might also raise teachers' awareness regarding offering a more balanced programme, i.e. showing them ways to also tackle higher-order thinking skills, even at lower levels of education. This might also entail focusing on CDF episode-structure and content in order to help learners express their cognitive processes in a more convincing and clear way. Especially young CLIL learners would benefit from such an intervention, as here teachers*

might expect young learners to do noticeably less well in the L2 than in the L1. As previous research (e.g. Bauer-Marschallinger, 2022; Breeze & Dafouz, 2017; Lorenzo, 2017) and some of the reports in Section 3.4 have shown, comprehensible and clearly signaled CDF-episode-structure seems key for sophisticated and convincing subject-specific discourse and should therefore be explicitly addressed during teacher training at all levels, in all subjects.

At this point, however, it should be mentioned that the results outlined in the reports in Section 3.4 only present the findings of a pilot study, field-testing the *Teachers' Expectation Text Elicitation Protocol* and the *Cognitive Discourse Function (CDF)-Based Coding & Analysis Guide*, which links to the next implication:

> **Implication No. 3: While the research tools developed for TASK-2 of WG3 facilitate many interesting insights, these tools still need further refinement before applying them on a wider scale.**

As already mentioned above, some teachers misunderstood the task, which required verbal clarifications in several contexts. Therefore, the *Teachers' Expectation Text Elicitation Protocol* needs some more specification, mostly to help teachers understand what is meant by a *semiotic resource* and what type of output is expected. Moreover, the instructions would benefit from being more concise to avoid teachers only skimming the rather extensive instructions. On top of that, Yavuz Kurt (TR), suggests in his report that, *in addition to the current procedure, I would try alternative ways of collecting data about teacher expectations and see how they would work. One way, for example, could be providing a sample student response for them to analyse and correct, instead of asking teachers to imagine writing an exam answer as if they were students.* Alternatively*, follow-up interviews could be beneficial in clarifying teachers' expectations and improving the validity of the data.*

Put differently, it seems that while the Teachers' Expectation Text Elicitation Protocol allows the collection of very insightful data, the findings would benefit from triangulation to gain a fuller picture and to dig deeper into the teachers' reasonings. It also needs to be kept in mind that taking semiotic resources, which are often visuals, steer the teachers' texts towards descriptive language, so it is not surprising that *describe* is the most frequent CDF type across the different reports:

- *The findings showed that the CDFs are frequently shaped with respect to the nature of the visual element* (Emine Adadan (TR)).
- *The first sentences with which the text begins are mainly descriptive. These sentences are always accompanied by verbs in the present tense, which semantically indicate state, belonging or presentation (I have, I am, shows, consists etc.)* (Jonida Cungu (AL)).

Yet, this might also be typical of classroom interaction *per se* (see Dalton-Puffer et al., 2018), since any type of visual, realia or general informative input might first be described to create a shared basis for further investigation or elaboration, i.e. a subsequent (co-)construction of other CDF types.

As many of the authors of the reports pointed out, differences in distributions might also stem from differences in subjects and age-group, referring to different levels of cognitive maturity, but also needs and purposes of different subjects. For example, those reports dealing with demands in EFL classes indicate that these texts seem to reflect the social

needs of a language and expansion of vocabulary (see reports by Yavuz Kurt (TR) or Lucille Lopriore (IT)).

Therefore, the following research-related implication needs to be considered:

> **Implication No 4: A more systematic analysis and comparison of cases is needed for a fuller understanding of differences in target groups and subject disciplines.**

These reports each provide interesting initial insights, but represent individual case studies resting on convenience samples, without pronounced comparative elements. Rudimentary comparisons between different contexts or languages have shown some informative trends (see report by Rieder-Marschallinger (AT) for a comparison between primary-level *General Studies* and secondary-level History texts, as well as a comparison of texts written in the L1 and L2 at primary level). However, these comparisons are still rather limited, and therefore, more sophisticated and systematic meta-analyses across different datasets are advised. In fact, some endeavours of different COST researchers, including from ICT countries, are currently being planned. This might also entail an investigation of whether the type of semiotic resource plays a role (see. e.g. report by Jaroslava Štefková (SK)).

Since we could not directly ask teachers, one aspect of these reports that could only be speculated on is how realistic the teachers' written expectations are compared to what "real" students would produce. Only in the case of one teacher in the report by Lucilla Lopriore (IT) do we find information on the teacher having actually used the semiotic resource for assessment purposes. Comparing the teacher's anticipated results and the learners' actual performance, *two of her learners' outcomes* de facto *matched her previously expected text.* In many cases, however, the expectations, especially the linguistic ones, seem rather high. This brings us closer to one of the next phases of the COST Action: Developing teacher training programmes and sample instructional materials which would help teachers create their own instructional tasks and progressions to help learners attain desired content and discourse learning objectives. In terms of research, the work related to TASK-2 has provided a sound basis to advance our understanding of what is needed for such pedagogical interventions, pointing the way to future scientific explorations and providing further footing for these pedagogical measures.

References Section 3.4

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4. APPENDIX: SURVEY TOOLS DEVELOPED

NOTE: As with the chapters in Section 2.4 and 3.4, the three Survey Tools are inserted within the body of Deliverable-7 *proper*. As such, the page-numbering of the document pertaining to the Deliverable *proper* continue with "page/D7" while those of the Survey Tools are coded accordingly, e.g. page 2 of Survey-Tool-1 is numbered "2/TOOL-1". This organisation will allow tool-developers to receive feedback from researchers who use these to conduct similar surveys and use such feedback to refine the tools and subsequently share improved versions of these tools. To access each tool, click on the range of pages indicated.

SURVEYING CURRICULAR DEMANDS • Codebook & Survey Log

Survey Tool Developed by

Christiane Dalton-Puffer, University Wien & Y.L. Teresa Ting, University of Calabria

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Part A. TASK-1 CODING KEY

How to colour-code and tag mentions of various types of disciplinary literacy/ies*.

- Note that the TAGGING, i.e., inserting the code (between brackets) **is the most important step** since we will use this coding to analyze the data.
- The colouring is just for us to have a visual appreciation of how many (or few) mentions of DL there are. Here is a video explaining how to set up keyboard shortcuts for colour-coding text.
- We consider both **spoken and written language**.
- There are seven categories, A to G:

A. Mention of students' ability to perform **verbal actions based on thinking skills**, using COMMAND VERBS denoting **language actions**. (There are also other command verbs such as *create*, *design* etc. that don't involve language, which we are not analyzing here.) Code in fuchsia and tag with (CV) 1. *explain cause and effect* 2. *report/narrate* 3. *categorize* 4. *define* 5. *describe* 6. *evaluate* 7. *explore* For more information and examples, please see Table 1 below.	e.g. "***comparing*** *domestic and wild animals (CV) for the connection between their body structure and their movements…"* *"Students can* ***describe the change*** *of position of objects (CV) in terms of distance and displacement.."* *"Students will* ***explain the cause-and-effect relationship*** *(CV) between the two world wars"* *"Students* ***compare*** *(CV) and* ***evaluate*** *(CV) the appropriacy of ecosystems for touristic development"* (NOTE that here, we have an example where there are **two instances** of "CV") *"...****assessing*** *the significance (CV) of X and* ***justifying*** *decisions (CV)*

B. Mention of students' awareness of **genre or text-types.** Code in electric blue and tag with (GG) for each type of genre mentioned.	e.g., *"students should discern between newspaper articles (GG), research papers (GG), advertisements (GG), personal letters (GG), formal letters (GG), informal emails (GG), formal emails (GG), etc."*
C. Other mentions of students' **productive use of language (PL)** for showing learning that are not covered by A. or B. Code in green and tag with (PL).	*and write a newspaper article (GG) to convince (PL) others to…* *searching, processing and presenting information (PL)*

D. Mention of students' ability to navigate, use and also show learning through **digital literacy elements**. Code in purple and tag with (DD).	e.g. *"organize a slide presentation (DD) on the topic… and write a newspaper article (GG) to convince (PL) others to…*
E. Mention of students' ability to extract information from **visual elements** for learning and also use visual elements to show their knowledge. Code this in orange and tag with (VV) for each visual element mentioned.	e.g. "*Students should be able to interpret information contained in line graphs (VV), bar charts (VV), pie-graphs (VV), tables (VV), etc. and be able to represent information contained in tables into appropriate graphs (VV) (i.e. understand when it is appropriate to use line graphs, bar charts and/or pie charts)*
F. Mention students' ability to work with **subject specific realia** required for undertaking subject-specific hands-on actions. Code this in light blue and tag with (TT) for each tool mentioned.	*e.g., "Working with suitable aids (e.g. magnifying glass (TT), microscope (TT), computer (DD), specialist literature,; searching, processing and presenting information (PL); identifying and solving problems; Carrying out simple experiments and measuring procedures (TT)."*
G. **ALL ELSE** that you feel is relevant but does not fall into the categories above. For example: • Mentions of bi/multi/translingual practices; • other mentions which explicitly state or may imply an "awareness of DL" Code these in red and tagged as (OTH) for "other".	*"For every task that he does not understand, he asks for an explanation (OTH), at home or at school*

TABLE 1. Expanded examples of CDFs (adapted from Dalton-Puffer, C. (2013). A construct of cognitive discourse functions for conceptualising content-language integration in CLIL and multilingual education. *EuJAL, 1*(2), 216–253.

	Type	
I tell you how we can cut up the world according to certain ideas	**categorize**	*categorize, classify, compare, contrast, exemplify, match, structure, subsume*
I tell you about the extension of this object of specialist knowledge	**define**	*Define, identify, characterize*
I tell you details of what I can see (also metaphorically)	**describe**	*Describe, label, identify, name, specify*
I tell you what my position is vis a vis X	**evaluate**	*Evaluate, judge, argue, justify, take a stance, critique, comment, reflect*
I tell you about the causes or motives of X	**explain**	*Explain, reason, express cause/effect, draw conclusions, deduce*
I tell you something that is potential (i.e. non-factual)	**explore**	*Explore, hypothesize, speculate, predict, guess, estimate, simulate*
I tell you sth. external to our immediate context on which I have a legitimate knowledge claim	**report**	*Report, inform, recount, narrate , present, summarize, relate*

Part B. TASK-1 ANALYSIS TEMPLATE

Subject Country educational level (age)
(eg.) Biology Austria-lower secondary (age 10-14)

COUNTRY CODE_SUBJECT CODE_educ level
(e.g. AT_BIO_lowersec)

Page number where original text in national language starts in the official document.

SECTION OF CURRICULUM TEXT + page number of original text
REFLECTION - word count of text: •

SECTION OF CURRICULUM TEXT + page number of original text
REFLECTION - word count of text: •

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SECTION OF CURRICULUM TEXT + page number of original text
REFLECTION - word count of text: •

END OF CURRICULUM TEXT

Specific COMMENTARY on this part of the curriculum
- make mention of total approximate word count of text on which you are commenting You may for example comment on the missed opportunities that you discern in this curriculum: e.g. where you would insert explicit mention of language resources for working towards subject learning goals.

Some general commentary/ies which might be used in the "general discussion" part of a final Report:

The question we are asking is: "*Does the COUNTRY's National Curriculum draw COUNTRY's teachers' attention to the need to build their students' academic language / disciplinary literacies as an essential parallel process accompanying content-learning?*"

- ……
- …..
- …..

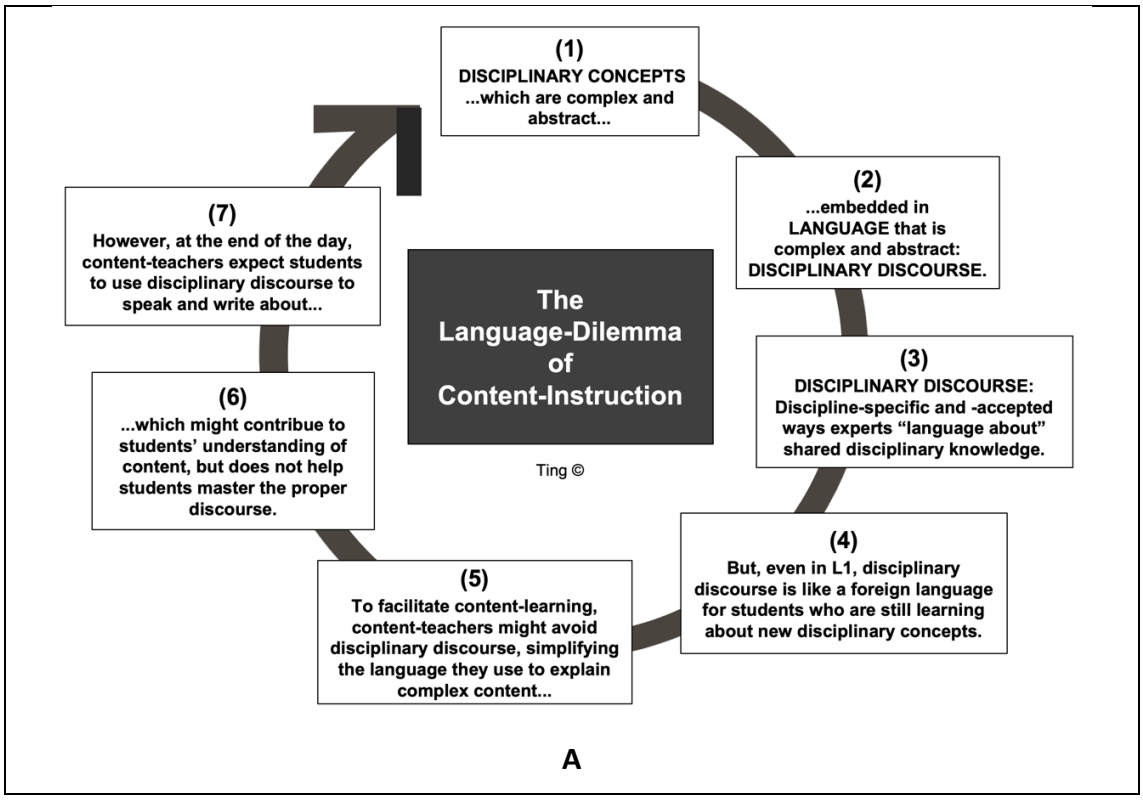
A TEACHERS' EXPECTATIONS ELICITATION PROTOCOL • Gaining Insight into Language and Discourse Which Teachers Expect from Their Learners

Protocol Developed by

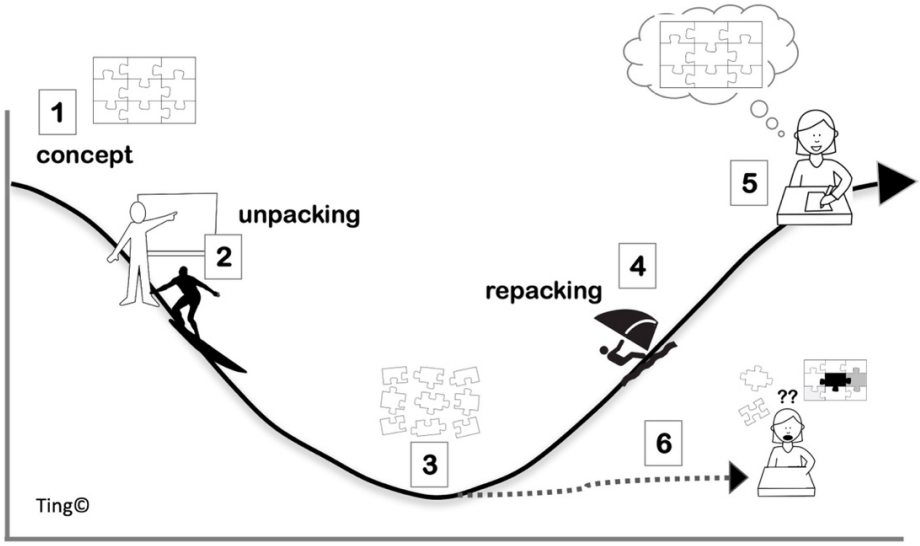
Y.L. Teresa Ting, University of Calabria & Silvia Rieder-Marschallinger, KPH Wien Krems

1. Introduction

As explained in previous Sections of this Deliverable, while all subject-teachers can easily identify the discipline-specific concepts they want their students to understand, many fail to appreciate that the discipline-specific language within which those concepts are embedded often sounds like a foreign language for those who are external to the particular disciplinary community of practice, i.e. learners. As such, like the learning of a foreign language, we must teach students disciplinary discourse, *explicitly*. And who is best positioned to teach students how to write and speak in ways which are acceptable to the chemistry community if not the chemistry teacher? That said, "a chemistry teacher is as interested in teaching word transformations as an English Foreign Language teacher is in teaching chemical transformations" (Ting, forthcoming). Thus "The Language Dilemma of Content Education" (Figure 1A): subject teachers simplify complex disciplinary discourse to help students understand complex discipline-specific concepts; i.e. subject-teachers ride down the semantic wave while explaining content (Figure 1B), but often forget to help their students ride back up the semantic wave, yet expect their students to then communicate disciplinary notions using discipline-appropriate discourse, which, even in L1, is like a foreign language to learners.



A



B

Figure 1. **A**: "The Language Dilemma of Content-Instruction" poses a potentially vicious cycle whereby content-teachers, during instruction, simplify complex and foreign-sounding disciplinary discourse so to facilitate content learning (rightly so), yet expect their students to then utilize complex disciplinary-discourse to communicate knowledge. **B:** Maton's semantic wave (2013) illustrates how, complex concepts (1) are unpacked by contentious teachers (2) into more comprehensible units of information. However, it is then necessary to re-pack the information (4) which helps students organize information into precise and correct understandings (5). If we do not help students "ride up the semantic wave", they are left with disorganized notions (6) (from Ting, 2024).

Thus the need to first sensitize subject-teachers to the fact that they themselves, at the end of the day, expect their students to "language about" discipline-specific notions in discipline-appropriate ways. Once subject-specialists realize that they are best positioned to delineate the type of disciplinary discourse their students need to learn, then it becomes possible to help these teachers develop instructional tasks for building their students' disciplinary discourse proficiency. By first delineating the discourse that teachers themselves expect, it is more likely that they will embrace tasks which help students acquire that language.

Note that this same argument extends to bot L1-language and foreign language education. After many years of compulsory schooling and sometimes equally many years of FL-learning, school-leavers must be equipped with academic/professional language skills in both L1 and in the FL. Thus the importance of also delineating the type of language which language-experts expect from their learners.

2. Protocol for eliciting teachers' expectations

Below, protocol instructions are in this font while instructions for teacher-contributors are in *this font.*

Step 1. Contact potential teacher-contributors and inform them of the survey and what it would entail (see Box 1). For those who express interest in taking part in the survey, follow up with the three-step process.

BOX 1.

We are conducting a pilot study on the kind of language that we would expect ours students to write when they have learnt something complex, like what you teach. We are particularly interested in how students communicate information contained in what we call "semiotic-elements"; anything that is not the text of a textbook. For example, visuals, figures, flow-charts, images, or also (textual) sources like diary excerpts, newspaper excerpts etc. We hope that, in exchange for your time, we will be able to come back to you in a year or so with some tasks that you can use for your teaching.

We need you to identify 3-5 "semiotic-elements", such as images, timelines, (info-)graphics, diagrams etc, that you often use to help your students understand a given topic-X associated with that semiotic element.

For each semiotic element, we need you to imagine if you were to present it to your students at an exam: what textual output would you like to see a ***good model student*** *write/say* about each item so that you would gladly give that student a 10/10 on their understanding of that topic.*

*What teachers expect their students to *write* is preferred. However, for teacher-contributors who teach primary-level learners, it is acceptable if they would prefer to write what they expect their young students to *say*.

Step 2. Send interested teacher-contributors information illustrated in BOX 2-5, depending on the subjects they teach and which age-group learners they teach. Each BOX provides an illustration of the type of text we would like them to produce in reference to each of the semiotic elements that they themselves have chosen.

BOX 2. For upper-secondary or first year tertiary teachers who teach science, maths or other STEM-subjects

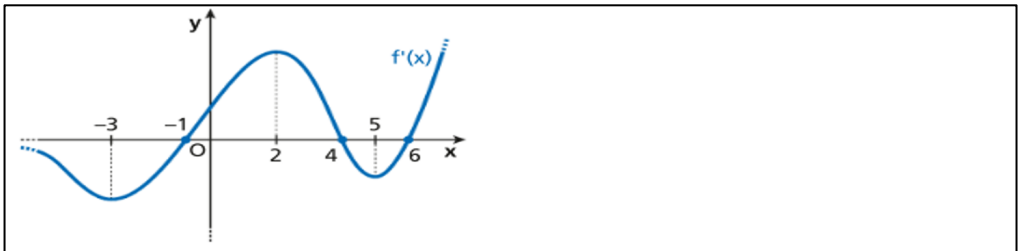
Below is an example of two images taken from a chapter addressing the topic of "mimicry and natural selection", in a textbook for 15-year-old students. Under the images is a text (100-150 words) which a science teacher has written to show what she would expect a good student, who is familiar with the images (i.e. via in lessons and/or in the textbook) would write about on the topic if the student were to be presented with the images at an exam.

Figure 19.1 Variations in colour and shape in the common mormon butterfly.

Age-appropriate good writing (100-150 words) from a good student that shows you they have learnt the topic well:

This figure illustrates how a single species of butterflies increases its survival by changing its appearance through "mimicry". This happens when animals respond to conditions within its habitat. This species, called the common mormon butterfly, normally looks like the one on the left and it is not a poisonous butterfly. However, when mormon butterflies live in areas where another butterfly, rose swallowtail butterflies are common, mormon butterflies change their appearance to mimic the rose swallowtail butterflies, which look like the one on the right. Mormon butterflies try to look like - mimic - rose swallowtail butterflies because swallowtail butterflies are toxic, so predators in the area, such as birds avoid butterflies that look like rose swallowtail butterflies. So, "mimicry" helps common mormon butterflies look like swallowtail butterflies and in this way, mormon butterflies can protect themselves from predators.

- Image source: Cambridge IGCSE Biology (3rd Edition; p. 247). Mary Jones & Geoff Jones. Cambridge University Press. ISBN: 9780521147798



One of the consequences of Lagrange's theorem states that if the first derivative of a function is positive over an interval, the function is increasing in that same interval; conversely, if the first derivative of a function is negative over an interval, the function is decreasing in that same interval.

In this graph, the first derivative is positive in the intervals (0, 4) and (6, +∞), therefore the function is increasing in these intervals.

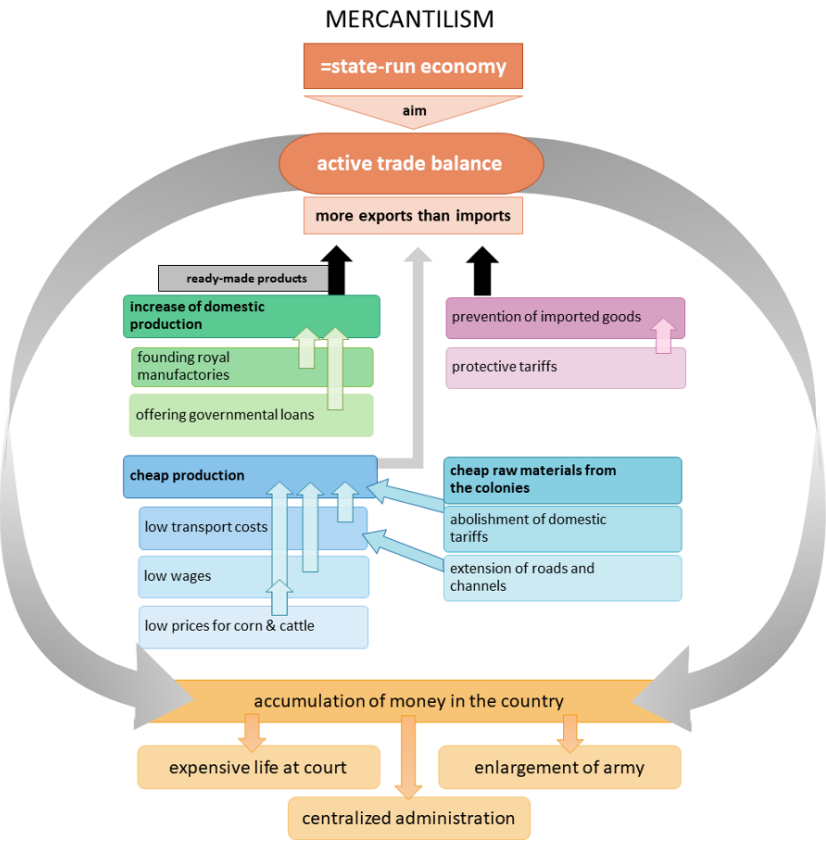
Furthermore, the first derivative is negative in the intervals (-∞, -1) and (4, 6), therefore the function is decreasing in these intervals.

- Image source: Teoremi funzioni derivabili. Volume 5 Pag 1720 n 185

Note that teacher-contributors teaching first-year tertiary level students were given the same examples above, but asked to produce a text of 150-250 words

BOX 3. For upper-secondary or first year tertiary teachers who teach History and other non-STEM-subjects.

Below is an example of a flow-chart addressing the topic of "Mercantilism". Under the images is a text (100-150 words) which a history teacher has written to show what she would expect a good student, who is familiar with the images (i.e. via in lessons and/or in the textbook) would write about on the topic if the student were to be presented with the images at an exam.

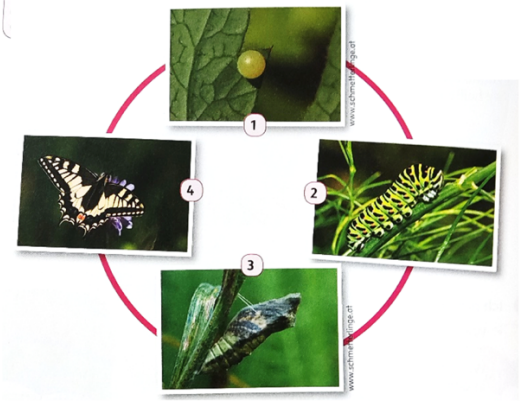


This flowchart shows how mercantilism works. Mercantilism is a type of state-run economy which aims for an active trade balance. This means that there should be more exports than imports. To achieve this, the following strategies were used:
First of all, domestic production of ready-made goods was increased through governmental loans and founding royal manufactories. In these factories, production needed to be cheap. Therefore, wages had to be low, which was only possible due to low prices for corn and cattle. Moreover, transportation costs were also kept low. This was made possible through the extension of roads and channels. Cheap production also relied on cheap raw materials taken from colonies and the abolishment of domestic tariffs.
Turning to imports, mercantilist economies prevented the import of expensive goods by protective tariffs.
The active trade balance achieved through these strategies ensured a constant accumulation of money. This then allowed an expensive life at court as well as a larger army and centralized administration.

- Image source: Bauer-Marschallinger (2022)

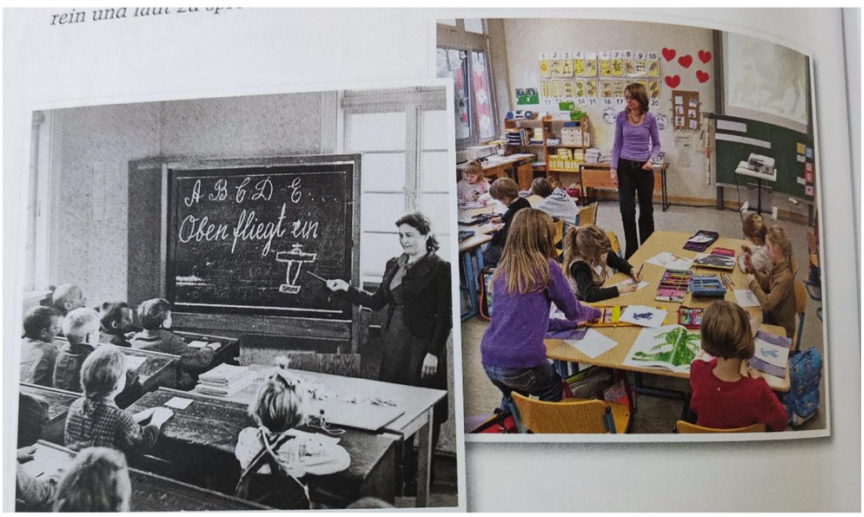
BOX 4. For primary-level science or history teachers.

Below are two examples showing images related to science (top) or history which a teacher has used in her lessons. Under each image, the teacher has written a text (30-80 words) which shows what she would expect a good primary-level student, who is familiar with the images, might write or say when shown the images.



Lifecycle of a butterfly: There are four stages. First, they are born in eggs. A caterpillar hatches from the egg. The caterpillar is very hungry. It eats a lot. Then it builds a cocoon. It changes into a butterfly. The cocoon breaks. The butterfly can fly.

- Image source: Sonnenklar 3-4 (1st Edition; p. 22). Christian Bertsch, Susanne Eichhorn, Kornelia Lehner-Simonis, Sabine Ludwig-Szendi.ÖBV. ISBN: 978-3-209-11373-3

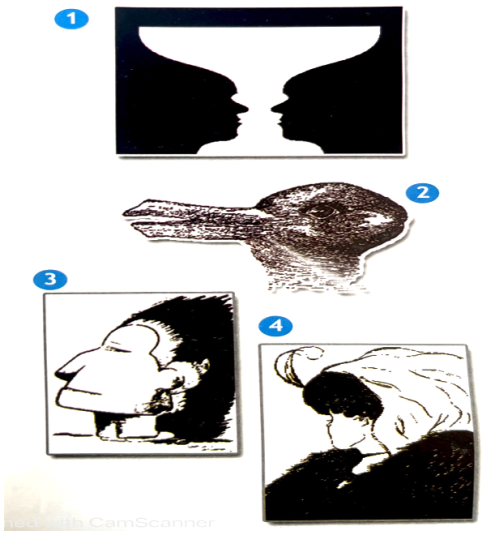


The photos show school. One photo is really old. It's in black and white. The teacher is strict. The children sit and listen. There's a blackboard.
One photo is colourful. The children sit in groups. They draw. They look like us. There are many things for learning.

- Image source: Sonnenklar 3-4 (1st Edition; p. 32). Christian Bertsch, Susanne Eichhorn, Kornelia Lehner-Simonis, Sabine Ludwig-Szendi.ÖBV. ISBN: 978-3-209-11373-3

BOX 5. For upper middle school First Foreign Language (English) teachers.

Below is an example of an image taken from an English foreign language textbook that a teacher has used in her lessons. Under the image, the teacher has written a text (100-200 words) which shows what she would expect a good 14-year-old student, who is familiar with the image, to write about the image if it were presented at an exam.



Sometimes our eyes can see things from different points of view, and have different thoughts about them. We can prove it with these pictures. The first picture is in black and white. With the black part, we can notice two faces facing each other and with the white part we can notice a glass of wine. These are optical illusions that humans create.
People say that the first optical illusion we see can tell us about our personality.
For example, if we realize the black spot first, it means that we are extroverted and creative, and we like being with people with the same energy. But if we see the white spot first, it means that we are independent, good advisors, and very intelligent.
In the second picture, we can see a rabbit otherwise we can see a gender. In this picture, the first thing I see is the rabbit.
In the third picture, I see an Indian's head, but if you look closer you can see a man with a lantern in his hand.
In the last picture, I see a lady in a ¾ position, but I can't see the hidden illusion.
That's why I think that people see things from different perspectives, and that's why we should not be judgmental.

- Image source: Access 4, B1+ (2009; p. 82). Virginia Evans & Jenny Dooley. Express Publishing. ISBN: 9781848620315

Step-3. Collect each teacher's contribution and submit it to the Teachers' Expectations database.

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Bauer-Marschallinger, S. (2022). *CLIL with a capital I – Using cognitive discourse functions to integrate language and content acquisition in the CLIL history classroom* [PhD]. University of Vienna, Vienna.

Maton, K. (2013). Making semantic waves: A key to cumulative knowledge-building. *Linguistics and Education*, 24: 8-22. http://dx.doi.org/10.1016/j.linged.2012.11.005

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A CDF-BASED CODING & ANALYSIS GUIDE • Analyzing Teachers' Expectations

Coding & Analysis Guide Developed by

Silvia Rieder-Marschallinger, KPH Wien Krems & Silvia Minardi, Liceo Quasimodo Magenta (Milan)

1. Introduction

TASK-2 of WG3 intended to collect concrete examples of teachers' expectations of students' disciplinary literacies in order to better understand the demands in different subjects and at various school levels. To facilitate this process and to have a common way of approaching the texts produced by the teachers, and thus to be able to compare them, we developed a coding and analysis manual. Previous research has shown that Dalton-Puffer's (2013) construct of cognitive discourse functions (CDFs) is a helpful tool to bring to light and discuss the features of disciplinary literacies in a systematic yet flexible way that also allows insights into the 'construction of content' (see, e.g., Dalton-Puffer & Bauer-Marschallinger, 2019; Bauer-Marschallinger, 2022; Breeze & Dafouz, 2017; Hofman Hopf, 2015; Kröss, 2014; Lorenzo, 2017). Consequently, CDFs were chosen as underlying construct for this coding and analysis manual. This tool was drafted in connection to the meeting of Working Group 2 and 3 in Elbasan (Albania) in March 2024, where it was shared and discussed with members interested in the analyses of the Task-2 texts. Seven members then agreed to pilot this coding manual, each applying it to 5-10 texts of the task-2 corpus. The next section describes this analysis tool and presents the core elements, which are specifications of the CDF construct for the subject history as well as for science.

2. The coding and analysis manual

The coding manual contains five sections: (1) an introduction to the CDF construct, (2) specifications for the CDF construct for the subject of history and science, (3) step-by-step instructions to analyse teachers' expectations, (4) sample analyses, and (5) references and further reading.

The introduction to the CDF construct in **section 1** was included to help coders orientate and to be reminded of what the concept of cognitive discourse functions and its taxonomy entail. As such, this part briefly describes the theoretical footing of the construct and then presents the original construct:

Table 1 Dalton-Puffer's (2013, 2016) CDF construct; fourth column added by the authors of the manual

CDF	general communicative intention	examples of CDF Verbs	abbreviation
Categorize	I tell you how we can cut up the world according to certain ideas	*classify, compare, contrast, match, structure, categorise, subsume*	CA
Define	I tell you about the extension of this object of specialist knowledge	*define, identify, characterise*	DF
Describe	I tell you details of what I can see (also metaphorically)	*describe, label, name, specify*	DS
Evaluate	I tell you what my position is vis a vis X	*evaluate, judge, argue, justify, take a stance, critique, comment, reflect*	EV
Explain	I give you reasons for and tell you cause/s of X	*explain, reason, express cause/effect, deduce, draw conclusions*	EA
Explore	I tell you something that is potential (i.e., non-factual)	*explore, hypothesise, predict, speculate, guess, estimate, simulate*	EO
Report	I tell you sth. external to our immediate context on which I have a legitimate knowledge claim	*report, inform, recount, narrate, present, summarise, relate*	RE

This table includes each core type (first column), the general communicative intention it expresses (second column), and command verbs often used to prompt these functions. In the fourth column, we added abbreviations commonly used for these CDF-types. In this introduction, it is also mentioned that CDFs can run on different levels, i.e., the basic- and episode-levels (Dalton-Puffer et al., 2018). In essence, *CDF-episodes* are more extensive stretches of speech that serve one overarching communicative intention, which can then be built up of smaller CDF constituents, termed the *basic level*.

Then, in **section 2**, the readers are presented with two suggestions to specify Dalton-Puffer's (2013, 2016) construct for two focus disciplines of this COST action, namely *history* and *science*. As mentioned above, previous research has demonstrated that the original, general construct is useful in that it enables a CDF-based discussion in different disciplines. However, subject-specific analyses have indicated that it requires more detailed specifications and clearer boundaries between the CDF types to use it as a reliable analysis tool (see Bauer-Marschallinger, 2022). Therefore, based on the general taxonomy, specifications for different subjects have been suggested to increase the reliability of the CDF construct as a research-analytical tool. These specifications are presented in Table 2 and 3 below.

*Table 2. Specification of Dalton-Puffer's CDF construct for the subject **history** by Bauer-Marschallinger (2022, p. 298)*

CDF	**Additions/ specifications for the subject HISTORY (changes marked in bold)**
Categorize (CA)	**I tell you about similarities and differences** (*compare*) and how we can cut up the world according to certain ideas (*classify*).
Define (DF)	I tell you about the extension of this object of specialist knowledge **in the context of its time.**
Describe (DS)	I tell you details of what I can **perceive on the basis of historical sources and materials.**
Evaluate (EV)	I tell you what my position is vis a vis X (**e.g., the validity or historical significance of a source, an argument, an opinion, etc.) and I provide you with historically valid justifications for this view.**
Explain (EA)	I give you reasons for and tell you **about the causes or motives of X.**
Explore (EO)	I tell you something that is **counter-factual (= sth. that could have been) or speculative (= sth. that might have been).**
Report (RE)	I tell you sth. external to our immediate context**, i.e., not observable in the sources/ materials at hand**, on which I have a legitimate knowledge claim. **I give you a condensed version (= key points) of what I have been working on recently.**

*Table 3. Specification of Dalton-Puffer's CDF construct for **science** by Minardi*

CDF	**Additions/ specifications for SCIENCE**
Categorize (CA)	I tell you how to • **allocate an object or term to a class of objects or terms** which has already been established. The items to be classified are first considered with respect to an essential feature, then compared, and finally grouped in a class according to their respective similarities and differences (*classify*). • **put two or more objects, facts or ideas together and stating in what ways they are similar or dissimilar**. The two phenomena must be comparable, that is, they must have some characteristics in common (*compare* and *contrast*).

Define *(DF)*	I tell you how to **determine the meaning** of a term, such as a word, sentence or symbol, e.g. in a mathematical language.
Describe *(DS)*	I tell you how to **visualise the nature of something** by telling its main characteristics or essential features (how it looks, sounds, tastes, smells, works, is produced). Note: In science you can describe conditions, the results of an experiment, chemical changes, physical movements, what is seen through a microscope…
Evaluate *(EV)*	I express my **opinions** or show my own **perspectives** on something we, as scientists, are investigating.
Explain *(EA)*	I tell you about the process of **seeking relationships among scientific facts**, for example by looking for causes and effect. Note: Providing **evidence** is an essential part of an explanation.
Explore *(EO)*	I try to give a temporary or tentative solution to a scientific problem or an explanation for why something happens.
Report *(RE)*	I tell you the **essential facts or elements of an occurrence.** I tell you what others claim. I refer to a **formula** to tell you about a specific aspect of a scientific notion or concept.

In **section 3**, readers are provided with a step-by-step guide on how to work through the samples, starting with reading the whole text, then highlighting language features that help them identify the underlying communicative intention, before indicating the best fitting CDF type. Here, the readers are also provided with a box containing practical information on how to conduct this analysis. For example, readers are reminded that individual CDFs can run over several sentences or that one sentence might contain two CDFs in sequence, and that these could also overlap. These reminders also include instructions on how to mark these occurrences in text-processing software, such as Microsoft Word. Moreover, this section offers tips on how to assign CDF types more reliably, e.g., by adding a reminder not to get hung up on so-called 'signal phrases', as sometimes form and function might not match, and thus one always needs to keep the context in mind. This part also includes hints on how to differentiate between specific CDF types in history and science, e.g., the difference of *report* and *describe* (in history) or the difference between *explain* and *evaluate* (in science). These tips are based on our own experiences working with CDFs and discussions with and open questions by other (COST) researchers.

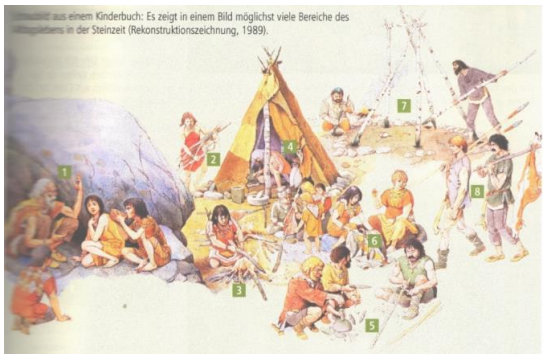
Afterwards, coders are invited to read through the sample again and mark and comment on any linguistic features that strike them as typical for their discipline. This step was marked as optional.

Then, researchers using the manual should decide and indicate whether the whole sample appears to express an overall communicative intention (= CDF episode), unifying the text. Again, further explanation and an example are provided to clarify this step.

We also asked them to cross-check their analysis, meaning that they should review each other's codings and discuss any potential disagreements and decide as a team which code would be the best choice.

Finally, we asked researchers to add a summarizing, reflective comment below the coded sample. Basically, we wanted them to explicate whether or not an episode could be identified, thereby potentially classifying the type of written text. Moreover, we asked them to describe which CDF types were generally used, how they were realized linguistically, and what these insights might tell us about the teachers' expectations in terms of disciplinary literacies. We also asked them to evaluate how realistic they believe these teachers' expectations to be, keeping the target- and age-group in mind.

Then, **section 4** provides sample analyses to illustrate what such an analysis might look like in Microsoft Word. One such sample is provided below (Figure 1). Please note that this is a screenshot so that comments can be seen as well.



[DS: (CA: This is a picture from the stone age.) (DS: There are many people in the picture. There are women, men and children. In the background they are building a tent. A woman is cooking in front of a tent. Another woman has got wood in her hands. She is collecting wood. On the left side you can see an old man. He tells the kids some stories.) (RE/EA: They had no books,) so they only knew things from telling.)(DS: Two women are making clothes. Two men are coming home from hunting with a deer.)]

Word count: 93 words
Age of good student (and CEFR level if applicable): age of 12, CEFR A1
Source:
Textbook: Unsere Vergangenheit 2
Authors: Benedikt Maukner
Publisher: Hölzel Verlag
page number: p. 29

Any other comments: It`s eminent that the students work on the vocabulary they need for describing the scenery in the beginning e.g.: build up a tent, gather wood, etc. Afterwards the students are able to describe the scenery by using present tense continuous.

Analytical comment: This text can be classified as a historical source description (illustration of life in the stone age). This overall communicative intention (=episode) seems rather obvious due to the heavy use of descriptive language and the CDF-basic type DESCRIBE. Features of descriptive language include direct reference to the picture and its content, realized through phrases like "in the picture", "there are" as well as prepositions like "in front of", "in the background" or "on the left". Moreover, whenever this imaginative student is describing, they use present progressive. This descriptive paragraph, however, is introduced with a classification of the source, which seems very typical in historical discourse. In between the descriptions, the text also contains information that is not directly presented in the text, for which past simple is used; therefore, it is reported information. In this particular case, it is a reported cause-effect relation (EXPLAIN).
Overall, this text seems very typical of this type of historical writing, making use of appropriate tenses and descriptive language. Given that the teacher submitted this as a lower secondary text of an imaginary 12-year-old student, this seems to be a somewhat ambitious expectation. However, especially if the teacher practiced historical source description beforehand, as indicated in the comment above, then this outcome can be realistic.

Kommentiert [SRM1]: Classifying phrase

Kommentiert [SRM2]: Mentioning of era

Kommentiert [SRM3]: Descriptive language

Kommentiert [SRM4]: Direct reference to the historical source

Kommentiert [SRM5]: Phrases for description (prepositions)

Kommentiert [SRM6]: Present progressive is used to describe what's happening in the picture

Kommentiert [SRM7]: Prepositions for description

Kommentiert [SRM8]: Use of personal pronoun

Kommentiert [SRM9]: The use of past tense makes this difficult to code. We can the „see" the absence in the picture, but it also refers to a general historical fact (RE). Due to the use of past tense and the fact that we can't see it clearly in the picture, I opted for REPORT (=something external to the source at hand)

Kommentiert [SRM10]: Linking to show cause and effect

Figure 1. Sample analysis: Living during the stone age.

Finally, **section 5** lists literature used for the coding and analysis manual.

3. The analysis process and outlook

As mentioned in the introduction, this manual was created prior to and further developed at the meeting of Working Group 2 and 3 in Elbasan, Albania, in March 2024. The authors of the coding manual, Silvia Rieder-Marschallinger and Silvia Minardi, presented it to COST members interested in the analyses of the Task-2 corpus, followed by a discussion that allowed us to improve the manual. We tried to clarify open questions regarding the procedure in the manual, and we also directly incorporated their first round of feedback, e.g., what to include as practical information or general tips. Then, we asked them to try out the manual with one teacher sample directly in Elbasan, providing us with further insights to adjust this analysis tool. For example, we realized that deciding if there is a unifying CDF-episode should happen later in the analysis process than we initially suggested, i.e., moving it from step 2 to step 4, as this allowed a more deliberate and appropriate coding.

At this meeting, we also agreed that each member of this analysis team would select at least 5 texts that they elicited for the Task-2 corpus and analyse these texts according to this manual. We then met periodically via Zoom to discuss the process, clarifying open questions and finding coding partners for the cross-checking analysis, and to organize the writing of chapters for the current report. The authors of the coding manual were also available for further questions via e-mail and cross-checked some of the analyses when asked by the members of the analysis team. The results of the first piloting of this tool can be found in section 3.3 of this report, also providing more information on the selected texts, their teacher participants, and their specific research process. Generally, this pilot study has helped us trial a CDF-based coding manual, which will be fine-tuned in the following months and published with other research tools developed by Working Group 3.

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