Education 2030 Curriculum Content Mapping: An Analysis of the Netherlands curriculum proposal

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Foreword

The Netherlands is currently embarking on a curriculum reform. This is an opportunity to bring its education system closer to its vision of the future of education, one that honours not only solid academic standards for students, but also promotes their personal and social development so they can lead productive, healthy and happy lives while contributing to the well-being of society.

As it happens in many other parts of the globe, education systems are under pressure to better prepare its students for the "future" and for the "real world", a world that is changing fast especially in light of globalisation as well as significant technological advances and of the impact they can have in our personal lives (e.g. cultural diversity requiring respect to reconciling tensions, digital means of connecting and collaborating, etc.) and in the future of work (e.g. with artificial intelligence potentially replacing typically human tasks). In all aspects of life - from virtual assistants that execute ordinary tasks to 3D printers that build houses to wireless devices that detect and monitor physical and brain activity - technology is pervasive and new developments are bound to continue at a rapid pace. On the one hand, knowledge creation has never been so promising. On the other, global challenges, such as environmental changes, migration crises, inequality, poverty, political and religious conflicts continue to threaten the potential of sustainable development.

Like countries in every region of the world, the Netherlands is facing the important question of how to best prepare its students for an unpredictable and uncertain future. Education systems that promote future-ready students need to ensure that not only the relevant types of knowledge are included in their curriculum, but also a range of skills, attitudes and values that can help students embrace (and drive) innovation, reconcile dilemmas and tensions, and exercise agency in the world. In doing so, they will need to be guided by values that respect and promote all forms of life, including their own well-being.

But revising curriculum to incorporate such emerging demands is not a simple task. Many governments - as reported by participating countries in the OECD Future of Education and Skills 2030 - are struggling to find the right balance between incorporating future-oriented competencies into their curriculum while also minimising potentially negative side effects, such as having an overcrowded curriculum or having a new curriculum that is conceptually sound but lacks support for implementation from key stakeholders. While the goals, scope, content and format of curricula across nations vary, some of the challenges they face when designing and implementing a future-oriented curriculum are common. That is where an international perspective to curriculum analysis can be informative.

In this context, the Dutch Ministry of Education, Culture and Science (OCW) has invited the OECD to conduct an independent analysis of their proposed curriculum, which is structured around "building blocks" (or core content) for nine subject areas. The building blocks will serve as the basis for the renewal of their primary and secondary school curriculum. They contain statements about the knowledge and skills that students should acquire in each of the subject areas and were developed through an iterative process by nine teams of teachers and schools administrators from primary and secondary education. The development teams collected feedback from stakeholders at different stages and 84 development schools were involved in the process by putting the interim versions of the building blocks into practice. Based on the feedback received from various stakeholders as well as on the insights from the OECD analysis, the preliminary building blocks are due to be revised by the development teams.

The focus of the present analysis by the OECD Future of Education and Skills 2030 project (also known as Education 2030) is to examine to which extent some key competencies (knowledge, skills, attitudes and values) included in the OECD Learning Framework 2030 are

represented in the Dutch proposed curriculum. For this, the project employed an instrument especially designed for this type of analysis named Curriculum Content Mapping (CCM).

The CCM tools and methodology are first-of-its kind as an international comparative analysis tool on curriculum, developed by the Education 2030 project in collaboration with world-renowned curriculum experts and country delegates to allow countries to compare and contrast their curriculum with others for peer learning as well as to do a reality check on how much their policy intentions are articulated explicitly for self-reflection through a document analysis, which is designed to reveal insights for their curriculum redesign process. The OECD curriculum analysis is limited in scope to the lower secondary level and its findings are not meant to be prescriptive in nature. On the contrary, they are shared as part of the Education 2030 project's mandate to bring a more evidence-based - rather than politically and ideologically driven - approach to curriculum reform. They are meant to provide countries with input for self-reflection as they design curriculum whose aim is to improve students learning as well as their learning experiences and well-being instead of perpetuating old habits in curriculum design that no longer stand the test of time.

The National Institute for Curriculum Development (SLO) has been appointed by the Dutch Ministry of Education, Culture and Science (OCW) to carry out the mapping of the building blocks presented in spring 2019 in accordance with the CCM methodology. The preliminary findings of the OECD analysis were presented at a national workshop in Utrecht on June 19, 2019 aimed at drawing conclusions collaboratively with the stakeholders involved in curriculum renewal. Insights from the experts' discussions at the national workshop were further incorporated into the analysis whose results are presented in this report. They will serve as part of the input to the development teams as they prepare for presenting the building blocks to the Minister of Education prior to parliamentary debate later this year.

The range of key competencies in the OECD Learning Compass mapped against the Dutch curriculum include, among others: key Education 2030 concepts (e.g. student agency and co-agency), cognitive skills (e.g. problem-solving, critical thinking), socio-emotional skills and values (e.g. collaboration, self-regulation, respect) as well as some emerging forms of literacy - ICT/digital literacy, data literacy and physical/health literacy– now considered part of core foundations (in addition to literacy and numeracy).

Through this study, some obvious strengths in the Netherlands curriculum proposal emerged. For example, reflection, literacy, global competency, anticipation and critical thinking are the competencies most frequently rated as main targets in the mapped content of the proposed curriculum across all learning areas. Global competency in particular is well aligned with one of the four "global themes" prioritised in the Dutch proposal, namely: globalisation, sustainability, technology and health. Competencies related to technology (i.e. ICT literacy/ Digital literacy) are also prominent across learning areas, while those related to sustainability and health, although present in the mapped curriculum, are rated at lower levels.

The findings also allow some insights with respect to the Netherlands's choices of "cross-curricular skills". In particular, communication (identified as literacy in the CCM mapping), critical thinking and problem-solving are well represented in the proposal compared to entrepreneurship, self-regulation and collaboration, which are to a much lesser degree identified across learning areas.

Further, the CCM analysis has shown that some subjects (e.g. Humanities) as they appear in the curriculum are more easily connected with broader themes in real life than others (e.g. Mathematics, whose primary competency is numeracy) and it shows where the Netherlands curriculum stands in relation to a number of similar findings from other countries.

The relative presence of key competencies in the proposed curriculum in itself does not indicate what steps should be taken from here, but they help make curriculum choices more evident and allow stakeholders to examine how findings compare to the original intent of their proposed curriculum as well as to trends in other countries. For instance, the curriculum trend of

encouraging interdisciplinarity as a way to foster 'deep learning' while avoiding curriculum overload is present in the Netherlands proposal. What the CCM analysis does is to identify which competencies are more easily embedded in which subject/learning areas and which ones have the potential to be further encouraged. Some concepts that are key in the OECD Learning Compass 2030, such as student agency, teacher agency and co-agency, while not frequently identified in the Dutch proposal, can be given further consideration either as part of the redesign or the implementation process so that students and teachers are motivated to continuously develop their own knowledge, skills, attitudes and values.

The Education 2030 project hopes that the present analysis will continue to serve as a basis for further reflection, stimulating discussions and actions that support the type of future-oriented curriculum that the Netherlands is aiming for. The report starts with an overview of the curriculum renewal process in the Netherlands (chapter 1) and an introduction to the Curriculum Content Mapping methodology (chapter 2), followed by the findings of the analysis in the subsequent chapters. Chapter 3 provides an overview of which competencies in the OECD Learning Compass 2030 are more prominent in the Dutch curriculum proposal across learning areas while chapter 4 focuses on how some future-oriented competencies are represented in specific learning areas. Chapter 5 discusses the findings from the perspective of "global themes" and "cross-curricular skills" prioritised in the Dutch curriculum proposal. Concluding remarks and insights are presented in chapter 6.

The main authors of this report are Miho Taguma, Esther F. S. Carvalhaes, Meritxell Fernández Barrera, Yubai Wu (OECD Secretariat) and Phil Lambert (E2030 curriculum expert). International curriculum experts, Hilary Dixon (Senior Manager, Australian Curriculum, Assessment and Reporting Authority) and Jenny Lindblom (Director of Education, Swedish National Agency for Education) shared their countries' experiences on curriculum redesign and reform during the national workshop on June 19, 2019. A group of experts from The National Institute for Curriculum Development (SLO) carried out the mapping of competencies against the curriculum proposal. Administrative support was provided by Kevin Gillespie and Leslie Greenhow (OECD Secretariat) who also helped with finalising the publication.

1. Background: Curriculum Renewal in the Netherlands

This chapter provides background to the Curriculum Content Mapping (CCM) methodology and its application as part of the curriculum reform processes taking place in The Netherlands.

The Netherlands

The Netherlands is currently undertaking a curriculum renewal process.

Nine development teams of teachers and school administrators are working on a proposal for the revision of the core content for primary and secondary education. After several development sessions and consultation with stakeholders, the development teams presented their full proposals in May 2019 to the public as preliminary results.

Consultation on the proposed new curriculum is currently underway and the Minister will be provided with interim results late this year as a proposal that can be used to revise the current curriculum for primary and secondary education.

The current curriculum renewal is intended to:

- strengthen **coherence** in the curriculum;

- improve the **alignment in the learning trajectory** for students and, as a consequence, improve students' transition between primary and secondary education;

- reduce the formal curriculum to **core content**, so that schools have ample room to make own decisions, and to define the core knowledge and skills more specifically so that it provides guidance and support to teachers; and

- arrive at a sound balance between the three **broader aims of education**: knowledge development, preparation for society, and personal development.

The proposed curriculum consists of nine learning areas:

- National Languages

- English/Foreign languages

- Mathematics

- Social Sciences

- Science

- Arts and Culture

- Citizenship Education

- Digital Literacy

- Physical Education

For each learning area, the proposal for the curriculum consists of:

- **vision statements** on the rationale and relevance of the learning area;

- the main "**essence of the learning area**", essentially the nature of the area and its key elements; and

- **building blocks or core content** within the learning area.

The vision and key concepts apply to both primary and secondary education (both lower and upper secondary education). The building blocks describe the knowledge and skills. There are

building blocks for primary education, whereby a distinction is made between the early and later years of primary education and building blocks for lower secondary education. In addition, there are recommendations for how the proposed vision statements, the main essence of each learning area and the building blocks of knowledge and skills can be applied to upper secondary.

The curriculum analysis in this report focuses on the proposed draft building blocks for lower secondary education presented in spring 2019.

In addition to the nine learning areas the development teams have defined **four common, cross-curricular themes** that are to be included in the different learning areas. The four themes are each related to global developments that, according to the development teams, are considered relevant for all students in view of their future work, education and life. These global themes are:

- Sustainability;

- Technology;

- Health; and

- Globalisation.

In addition to the nine learning areas and four global themes, the proposed curriculum includes **nine cross-curricular skills**. These skills are clustered in three categories: cognitive cross-curricular skills, personal cross-curricular skills and social cross-curricular skills. The nine cross-curricular skills organised under these categories are:

Cognitive skills

- Critical thinking;

- Creativity;

- Problem solving;

Personal skills

- Self regulation;

- Entrepreneurship;

- Reflection on personal and career development;

Social Skills

- Social and cultural skills;

- Collaboration;

- Communication.

The proposed curriculum does not include guidelines on pedagogy or assessment. The assignment for the development teams has been to focus on content only, and to avoid statements related to pedagogical approaches as schools will be afforded the autonomy to make their own choices in this respect based on their specific pedogical views.

2. Curriculum Content Mapping (CCM): What is it?

CCM: Purpose

Building on the OECD's multi-dimensional conceptual learning framework for the future (OECD Learning Compass for 2030), the OECD Education 2030 Curriculum Content Mapping (CCM) exercise has been designed to explore how knowledge is intended to be taught together with skills and to better understand how particular skills, attitudes and values are more/less relevant to certain learning areas.

In addition, the CCM exercise assists in identifying how emerging demands for interdisciplinary competencies can be accommodated in existing learning areas without further crowding the curriculum by adding new learning areas or subject areas.

The CCM process and tools have been developed by the OECD over a two-year period following an initial pilot study in 2017, one field trial and a main study in 2018 involving in total 14 countries and jurisdictions.

Value proposition

The data obtained from the CCM exercise enables those involved to consider:

- the extent (i.e. breadth and depth) to which their curriculum fosters different aspects and dimensions of competencies considered essential for future life and work as articulated in the OECD's Future of Education and Skills 2030 initiative;
- how other countries include particular aspects of competencies in their learning areas; and
- overarching information on the inter-relationships between different aspects of knowledge, skills, attitudes and values, which can assist the further analysis of specific learning areas and the curriculum as a whole.

In the context of curriculum reform in the Netherlands, the data and findings obtained from the CCM exercise provides a valuable resource at a key point in the curriculum development process as a source for self-reflection of the current proposal and in relation to the next steps in reform process.

CCM: Process

Educational Level

The scope of the target educational level for the CCM exercise is inclusive of all grades in ISCED 2[1], so as to explore how the competencies which are the target of the learning areas for this period of mandatory schooling in the Netherlands. It is thus important to note that although the proposal for a new curriculum applies to both primary and secondary education, the analysis in this report will only refer to lower secondary, which is the education level captured by the CCM instruments.

Learning areas

Seven learning areas have been identified as the basis for the mapping of the competencies.

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[1] ISCED is the acronym for International Standard Classification of Education, a framework agreed to by UNESCO Member States which provides a common categorisation of education schooling systems. ISCED 2 specifically refers to lower secondary education.

These learning areas were selected by the OECD to limit the amount of mapping for counties to a manageable number but also to ensure that an appropriate range of learning areas is included, reflecting the broad learning students typically undertake in schools in ISCED 2.

The learning areas selected for mapping are:

- Arts (Visual Art/Art, Music, Dance, Drama and Media Arts)

- Humanities (Geography, History, Civics/Citizenship, Economics/Business Studies)

- Mathematics

- National Language(s)

- Physical Education/Health

- Science (Biology, Physics, Chemistry, Earth Science/Space/Astronomy)

- Technologies/Home Economics (Craft/Design and Technology, ICT, Home Economics).

Content frameworks for these learning areas are at Annex A.

It is recognised that as for the Netherlands, the above names and categorisation of learning areas may be different to the titles and the way learning areas are arranged in different countries. Table 2.1below shows the correspondence between the 9 learning areas included in the proposal for a new curriculum and the 7 learning areas encompassed by the CCM instrument. All learning areas were mapped, except for English/foreign languages, which is not part of the CCM analysis. There was no exact match for the learning area Citizenship education but its content items were partly mapped to the CCM learning area Humanities and partly to Technology/Home Economics.

Table 2.1. Mapping between learning areas in CCM and in the Netherlands' proposal for a new curriculum

9 Learning areas in the proposal for a new curriculum	7 Learning areas in CCM
National language	National language
English/foreign languages	*Not included*
Mathematics	Mathematics
Social sciences	Humanities
Science	Science
Arts and Culture	Arts
Citizenship education	Partly mapped to Humanities and to Technology/ Home Economics
Digital literacy	Technology/ Home economics
Physical education	Physical/ Health education

As part of the CCM exercise undertaken by the Netherlands, the learning area experts, who were each familiar with the proposed curriculum for their particular learning area, were required to undertake the mapping process in a collaborative way to identify where coded content from the proposed curriculum was "located" across the OECD's seven learning area frameworks.

Further, as part of the CCM process, contextual information was collected so that particular approaches or policies that apply or are favoured in the Netherlands was both recognised and acknowledged. Such information provides insight into where certain values or other competencies might be expected to be developed in the family home, in the community, in school or in all three settings.

Scope and dimensions of Competencies

The OECD's CCM competencies to mapped against the content of learning areas in the CCM exercise have been developed through a process involving extensive consultation with various country representatives and experts from various fields. There are twenty-eight competencies in total.

These competencies have been grouped as "foundational literacies", "knowledge/ skills/ attitudes/ values for 2030", "key concepts of the E2030 learning framework", "competency development cycle for 2030", and "compound competencies" as follows:

Key Concepts of the 2030 Learning Framework
1. Student Agency
2. Co-agency

Transformative Competencies and Competency Development for 2030
3. Creating New Value
4. Taking Responsibility
5. Reconciling Dilemmas and Tensions
6. Anticipation
7. Action
8. Reflection

Foundational Literacies
9. Literacy
10. Numeracy
11. ICT Literacy/Digital literacy
12. Data Literacy
13. Physical/Health Literacy

Compound Competencies for 2030
14. Global Competency
15. Media literacy
16. Literacy for Sustainable Development
17. Computational Thinking/Coding/Programming
18. Financial literacy
19. Entrepreneurship

Skills, Attitudes and Values for 2030
20. Cooperation/Collaboration
21. Critical Thinking
22. Problem Solving
23. Self-regulation/Self-control
24. Empathy
25. Respect
26. Persistence/Resilience
27. Trust
28. Learning to Learn

Definitions for the twenty-eight competencies are provided in the OECD's Competencies Framework at Annex B.

It is recognised that a particular competency when applied in the context of learning in one learning area might involve a different set of behaviours in another learning area. For example, "Persistence/Resilience" exhibited in Mathematics would include the capacity to maintain engagement in a complex and challenging word problem (involving many sub-calculations) to arrive at a conclusion. However, "Persistence/Resilience" in Physical Education might involve enduring physical effort over a period of time in a physical exercise or sporting activity, or utilising skills to manage a difficult health issue.

Methodology

The CCM exercise was undertaken by the Netherlands using a five step process

Step 1

Learning area experts were trained in the curriculum content mapping process by the OECD CCM team. These experts were key to the production of "heat maps" for each of the seven learning areas. An example of what a CCM "heat map" looks like for a particular learning area is at Annex C. Please note, this example is not intended to represent what the "heat map" should look like, it provides an illustration of what the CCM exercise might reveal through the mapping process.

Step 2

Step 2 involved the production of seven "heat maps" by the learning area experts, one for each of the OECD CCM seven learning areas (referred to page 8) each illustrating the degree to which the twenty-eight competencies are embedded or expected to be attained by students based on the Netherlands' proposed curriculum[2].

The criteria for determining the degree to which a competency is embedded or expected to be attained by students is set out in Table 2 below.

Table 2.2. Criteria for determining heat map levels

Level	Degree Description	Criteria
1	Not targeted in this learning area.	The competency is not included in the written curriculum of this learning area/subject area and it is unlikely that teachers would include this as part of their own teaching
2	Not targeted in this learning area but there are some opportunities for teachers to include this when teaching this learning area/subject area.	The competency is not explicitly included in the written curriculum of a specific learning area/subject area, however, there is sufficient scope in the content for teachers to include the competency if they choose to do so. Please use this option only if such teaching opportunities are explicitly referenced in mandatory/recommended textbooks or other curriculum-related policy documents
3	Sub-target of the learning area's branches/strands or in specific grades only.	The competency is included in the written curriculum but only as a sub-target or the selected competencies are not clearly articulated in the curriculum.

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[2] As indicated previously, the proposed curriculum for The Netherlands consists of nine learning areas. Owing to this, the learning area experts from these areas were required to work cooperatively to identify where the content from these nine learning areas were identifiable in the OECD's seven learning area coding frameworks.

| 4 | Main target of the learning area's branches/strands. | The competency is included in the written curriculum as the main target or the selected competencies are clearly articulated in the curriculum |
| N/A | Not applicable. | This particular content area is not included in the country's curriculum |

Several documents were used to undertake the mapping process, namely:

1. the *OECD's Learning Area Framework* documents, one for each learning area (see Annex A)
2. The Netherland's proposed curriculum for each learning area
3. the *OECD's CCM Competencies Framework* document (see Annex B)
4. the relevant *Mapping Grid* for each learning area developed into a heat map.

The mapping process is illustrated in Figure 2.1 below.

Figure 2.1. CCM Process for developing each learning area heat map
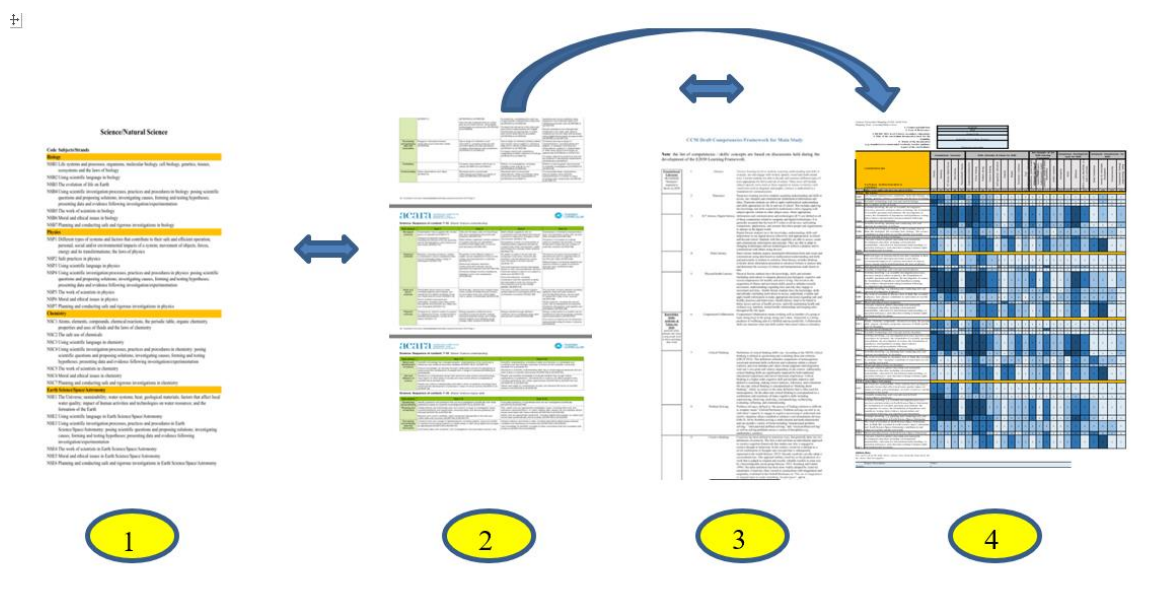
Step 3

Following the submission of the "heat maps" and reports on the process, independent analysis of the data were undertaken by the OECD's appointed experts to provide initial feedback regarding any apparent data anomalies or potential validity issues, if relevant, and to offer initial feedback on the preliminary data. Refinements and adjustments to the heat maps were then made, as required, and the data re-submitted to the OECD for further analysis.

Step 4

A workshop was then conducted on 19 June 2019 in Utrecht to consider preliminary findings from the CCM process and elicit further information and feedback regarding the CCM exercise. This workshop, which was facilitated by the Ministry of Education and conducted by OECD CCM team, involved teachers from the development teams, learning area experts, including those directly involved in the CCM process, and the representatives from two of the OECD's CCM main study.

Step 5

The final step in the process is the production of this report on the CCM exercise provided by the OECD outlining the findings with accompanying remarks and insights.

CCM: Challenges and Caveats of an International Perspective

Mapping curriculum content is not without some challenges, particularly when applying a process and tools in different country contexts. These challenges include:

- differences in the organisation of curricula as well as the curriculum terminology used;
- content – where what constitutes content varies in meaning and composition; and
- curriculum alignment – arising from the definitional and structural differences are variations where particular content is located in the curriculum.

Differences in the organisation of curricula and curricula terminology used (learning areas; content standards)

There are several ways formal curricula are specified. The use of learning areas is a common way to organise the curriculum with strands and sub-strands used to further specify its scope. However, there are also variations to this approach including different terminology used for learning areas, which may refer to either broad learning areas or individual subject areas, or a combination of both (where the structure of some learning areas includes separate subject areas). As this latter approach is inclusive of various forms of curricula the OECD has adopted this model for the CCM learning area frameworks.

The way content standards are specified in curricula also differs. One approach is to present content standards in language that describes what student will learn and be able to do in each learning area. A further development of this approach is to also describe levels of student achievement in relation to the standards. Another approach is to present content standards in each learning area that specify what teachers are required to teach.

Another structural matter concerns the degree of specificity provided for teachers in a curriculum document. One approach is to provide detailed standards in the form of a syllabus, essentially providing explicit direction regarding teaching and learning. A very different approach is to articulate standards in broad terms in a framework that can be used by schools or teachers to make local decisions regarding their teaching/learning programs based on the content in the framework. This latter approach was used for the development of the CCM learning area frameworks to accommodate the varying levels of specificity in formal curriculum documents including the building block approach used by the Netherlands for the purpose of the CCM exercise.

Defining "content"

The way "content" is defined also differs between countries. One definition, for example, limits content to the description of knowledge (i.e. concepts; facts) and topics (e.g. The Solar System) to be taught/ learnt. Another definition incorporates knowledge and skills and in some cases also values and attitudes to be taught, developed or acquired by students. In the case of the Netherlands, the proposed content articulated in the building blocks for the learning areas has been used as the basis for the content mapping process.

The OECD has decided to limit the description of content in each learning area to concepts, topics and in some cases activities typically addressed in or through curriculum content. In this way the competencies (inclusive of knowledge, skills, values and attitudes) can be mapped against the content in each learning area based on the above definition of content.

Content misalignments and exclusions

The use of an international mapping process such as the CCM to analyse national curriculum can result in the identification of what can be called "misalignments": the same content being located in different learning areas by different countries. It can also result in content exclusions: content not included by some countries.

Where content misalignments or exclusions were identified through the CCM exercise undertaken by the Netherlands these were noted and reported to the OECD.

These misalignments and exclusions are shown below in Table 2.3 and Table 2.4 respectively.

Table 2.3. Misalignments: Learning Areas

Content Items	Netherlands Learning Area	Mapped to CCM Learning Area
Citizenship	Citizenship Education	Located in Humanities
Morals, Values	Physical Education	Located in Humanities
Identity	Social Sciences	Located in Humanities
Safety, Food, Sexuality	Science, Social Sciences	Located in Physical Education/Health
Digital Literacy	Digital Literacy	Located in Technologies/Home Economics
Crafts and production	Science	Located in Technologies/Home Economics

Table 2.4. Exclusions: CCM content items not included in the proposed new curriculum

Learning Area (Coding Framework)	Content/Code
Arts	Moral, ethical and legal issues in visual arts
Arts	Moral, ethical and legal issues in music
Arts	Moral, ethical and legal issues in dance
Arts	Moral, ethical and legal issues in drama
Arts	Moral, ethical and legal issues in media arts
Humanities	Activities involving participation in entrepreneurial activities within and outside schools
Mathematics	The formal meaning of number using a number line
Mathematics	Complex numbers
Mathematics	Modelling and operations on vectors
Mathematics	Polynomials
Mathematics	Trigonometric functions
Mathematics	Concepts related to global citizenship and sustainable development education, including environmental sustainability
Physical Education/Health	Moral, ethical and legal issues in dance
Physical Education/Health	Human connectedness with nature
Physical Education/Health	Knowledge about stress management
Physical Education/Health	Strategies for dealing with difficulties encountered in life; knowledge of how to identify strengths; how to think positively; how to develop resilience and how to manage difficult situations; and how to maintain wellbeing through safe and healthy choices. Issues such as body image can also be included
Science	The safe use of chemicals

It is acknowledged that the content listed above in Table 2.4 as exclusions may actually be included in the proposed curriculum for earlier or later grades to ISCED 2.

In addition to the above data, it is also recognised that there will be content that is included in the proposed curriculum for the Netherlands that is not included in the OECD's CCM learning area framework. Examples of this include the Humanities, where for "identity" the students consider one's sexual, religious and political orientation; and in the case of Science where students learn about mining, production and process technology. As such, it is acknowledged that this content may also target the OECD's CCM competencies.

3. The Netherlands Curriculum Proposal – General CCM Findings

This chapter provides the results from the CCM process undertaken by the Netherlands.

The data, findings, remarks and insights presented in this chapter are based on the CCM learning area heat maps produced by curriculum expert analysts from the Netherlands matched to the country's proposed curriculum content building blocks and additional information provided by the participating experts. The submitted heat map data were analysed by the OECD CCM team and an independent expert, following the workshop conducted in June in Utrecht, and further refined, as appropriate.

The data and findings are organised in three sections:

- general findings concerning the overall results;
- findings presented according to each of the OECD's CCM seven learning areas; and
- findings concerning the proposed curriculum's four global themes and the nine cross-curricular skills.

In each of the above sections a comparative analysis has been undertaken using data obtained from the CCM main study involving twelve countries and jurisdictions[3].

It is important to note that the mapped items do not necessarily correspond to all of the content items in the Netherlands' curriculum proposal. However, they represent a comprehensive list of content items for ISCED 2 in the seven learning areas found to be appropriate for international comparisons.

In the final section concluding remarks and insights are provided.

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[3] Australia, Canada B.C., Canada Saskatchewan, China, Estonia, Greece, Japan, Kazakhstan, Korea, Lithuania, Russia and Sweden.

General

All twenty-eight of the OECD's CCM competencies were identified to varying degrees in and across the proposed learning areas for the Netherlands. The variation in the number of competencies targeted in learning areas is provided in Table 3.1 below:

Table 3.1. Number of competencies targeted by learning area

Learning Area	Targeted Competencies	Total
Arts	Student Agency; Creating New Value; Reconciling Dilemmas and Tensions; Taking Responsibility; Anticipation; Action; Reflection; Literacy; Numeracy; ICT/Digital Literacy; Physical/Health Literacy; Literacy for Sustainable Development; Global Competency; Entrepreneurship; Problem Solving; Critical Thinking; Learning to Learn; Co-operation/Collaboration; Empathy; Persistence/Resilience; Respect;	21
Humanities	Student Agency; Co-agency; Creating New Value; Reconciling Dilemmas and Tensions; Taking Responsibility; Anticipation; Action; Reflection; Literacy; ICT/Digital Literacy; Data Literacy; Physical/Health Literacy; Literacy for Sustainable Development; Global Competency; Media Literacy; Financial Literacy; Entrepreneurship; Problem Solving; Critical Thinking; Learning to Learn; Co-operation/Collaboration; Empathy; Self Regulation/Self Control; Respect; Trust	25
Mathematics	Anticipation; Reflection; Literacy; Numeracy; ICT/Digital Literacy; Data Literacy; Computational Thinking/Coding/Programming; Media Literacy; Financial Literacy; Problem Solving; Critical Thinking; Empathy	11
National Language	Student Agency; Creating New Value; Reflection; Literacy; Numeracy; ICT/Digital Literacy; Physical/Health Literacy; Media Literacy; Problem Solving; Critical Thinking; Learning to Learn; Empathy; Self Regulation/Self Control; Respect;	14
Physical Education/Health	Student Agency; Creating New Value; Reconciling Dilemmas and Tensions; Taking Responsibility; Anticipation; Action; Reflection; Literacy; Physical/Health Literacy; Literacy for Sustainable Development; Global Competency; Problem Solving; Critical Thinking; Co-operation/Collaboration; Empathy; Persistence/Resilience; Self Regulation/Self Control; Respect	18
Science	Student Agency; Creating New Value; Reconciling Dilemmas and Tensions; Taking Responsibility; Anticipation; Action; Reflection; Literacy; Numeracy; ICT/Digital Literacy; Data Literacy; Physical/Health Literacy; Literacy for Sustainable Development; Computational Thinking/Coding/Programming; Media Literacy; Problem Solving; Critical Thinking; Empathy; Persistence/Resilience; Self Regulation/Self Control; Respect	21
Technologies/ Home Economics	Student Agency; Co-agency; Creating New Value; Reconciling Dilemmas and Tensions; Taking Responsibility; Anticipation; Action; Reflection; Literacy; Numeracy; ICT/Digital Literacy; Data Literacy; Physical/Health Literacy; Literacy for Sustainable Development; Global Competency; Computational Thinking/Coding/Programming; Media Literacy; Financial Literacy; Entrepreneurship; Problem Solving; Critical Thinking; Learning to Learn; Co-operation/Collaboration; Empathy; Persistence/Resilience; Self Regulation/Self Control; Respect	27

Overall Results – Main Target Competencies

The following data illustrate both the degree to which individual competencies are identified as main targets in the curriculum proposal as a whole. These data also indicate the extent to which individual competencies are targeted across different learning areas.

In Figure 3.1 the competencies are arranged according to the OECD's CCM competencies groupings. In Figure 3.2 the competencies are ranked according to frequency, from most to least targeted. The open dots displayed in Figure 3.2 represent the average percentage of items rated as main targets across a sample of the OECD's CCM main study participants.

Figure 3.1. Percentage of content items in the overall mapped curriculum proposal targeting each competency rated as main target, and distribution by learning area
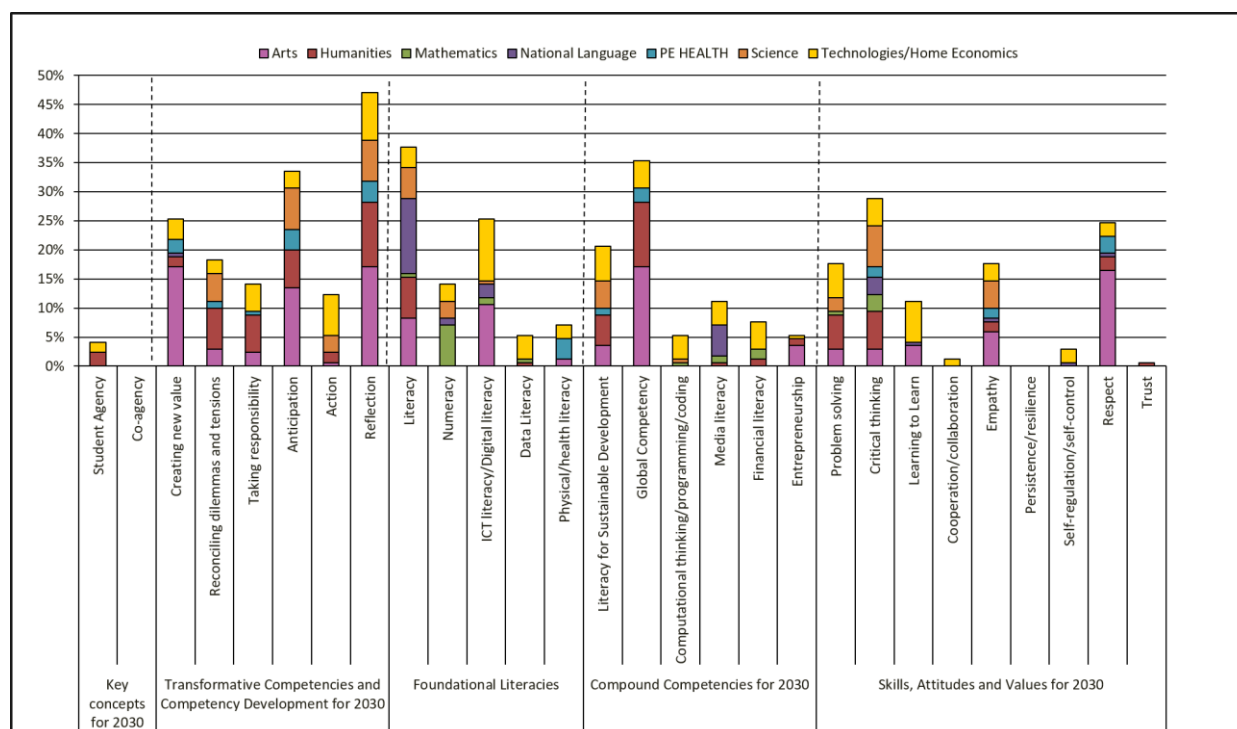
Figure 3.2. Percentage of content items in the overall mapped curriculum proposal targeting each competency rated as main target, and distribution by learning area (ranked by frequency)
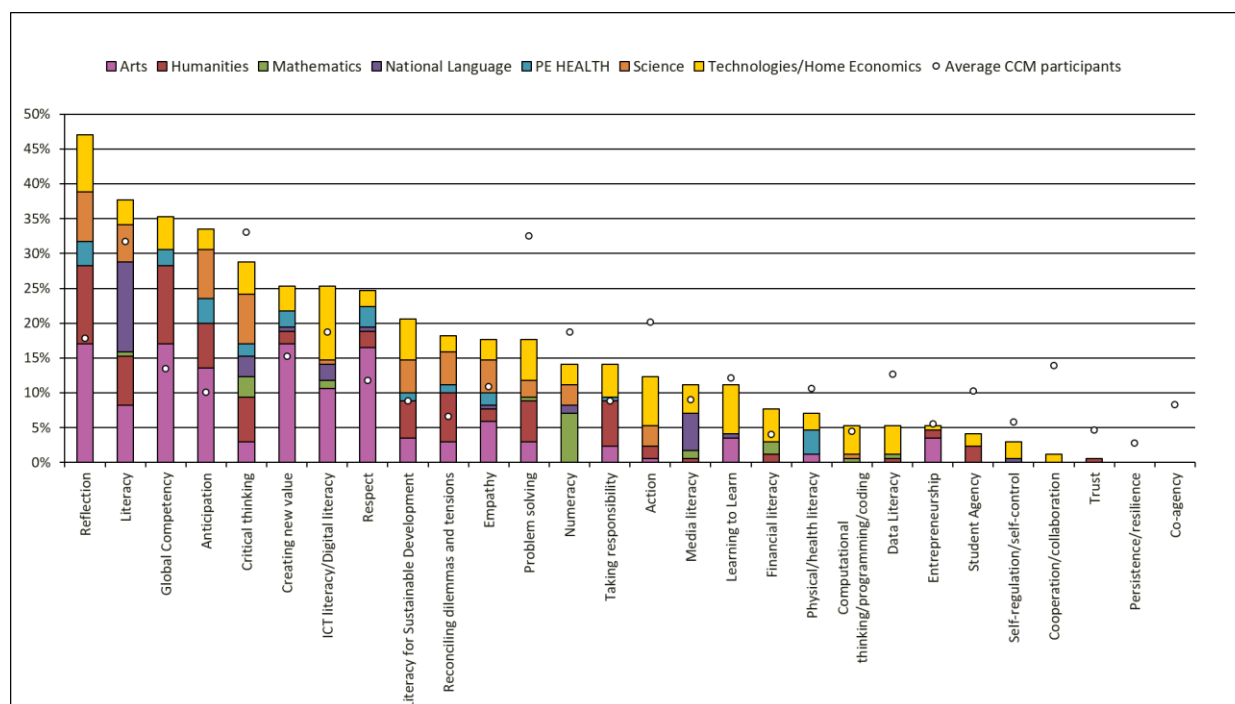
First, all but two of the twenty-eight competencies have been rated in the proposed curriculum for the Netherlands as main targets across learning areas, with the dominant main-target competencies being Reflection, Literacy, Global Competency and Anticipation. Two competencies, Persistence/Resilience and Co-agency, have not been rated as main targets in any of the learning areas.

There are two notable findings in these data.

The first is the extent to which the proposed curriculum reveals Reflection (47%) and Anticipation (34%) as two of the four most targeted competencies at a main level. This finding concerns the comparative data where both of these competencies are targeted at a greater frequency in the proposed curriculum of the Netherlands than found in the curricula for the comparative group, which were 18% and 10% respectively. Further, in contrast, the data for Problem Solving indicate that this competency is targeted as a main target less frequently than in the comparison group (18% compared to 33% for the comparison group).

It is worth noting that while Critical Thinking is a feature of all learning areas and the fifth most rated main-target competency, it has been identified less frequently in the proposed curriculum for the Netherlands than that found in the mapped content data of the comparison group.

It is particularly noticeable that the Arts, Humanities/Social Sciences and Technologies/Home Economics learning areas appear to include many of the twenty-eight competencies as main targets, at least to some degree. This is explained in part by the nature of these learning areas as inclusive of different subject area fields and partly owing to the noted misalignments and structural variations between the Netherland's nine proposed learning areas and the OECD's seven CCM learning area constructs (refer to Table 2.4). For example, the Arts includes five different arts subject areas which, while common in aspects related to creativity, also vary in the emphasis given to different competencies owing to the nature of each art form. The same applies to the four different subject disciplines in the Humanities, where there are some underlying commonalities as well as clear differences between each of the social sciences. In the case of Technologies/Home Economics, the extent of content from the proposed curriculum

for Civics Education, Digital Literacy and aspects of Science and Physical Education/Health identifiable in the different strands for Technologies/Home Economics means that this learning area is for the purposes of the CCM exercise a composite of content from various sources and with different highlighted competencies.

It is also quite noticeable that nearly half of the competencies are identified as main-targets in the proposed curriculum at a similar or higher frequency to that of the comparison group.

While the above findings provide interesting insight into varying degrees of emphasis given to competencies within and across learning areas both at the country and comparative group levels, it is important to note that the data represent main-targets only and not the overall targeting of the competencies (i.e. at both main and sub-target levels) in and across the learning areas. Figure 3.3 provides further insight when both levels are combined.

Figure 3.3. Percentage of content items in the overall mapped curriculum proposal targeting each competency rated as main or sub targets, and distribution by learning area
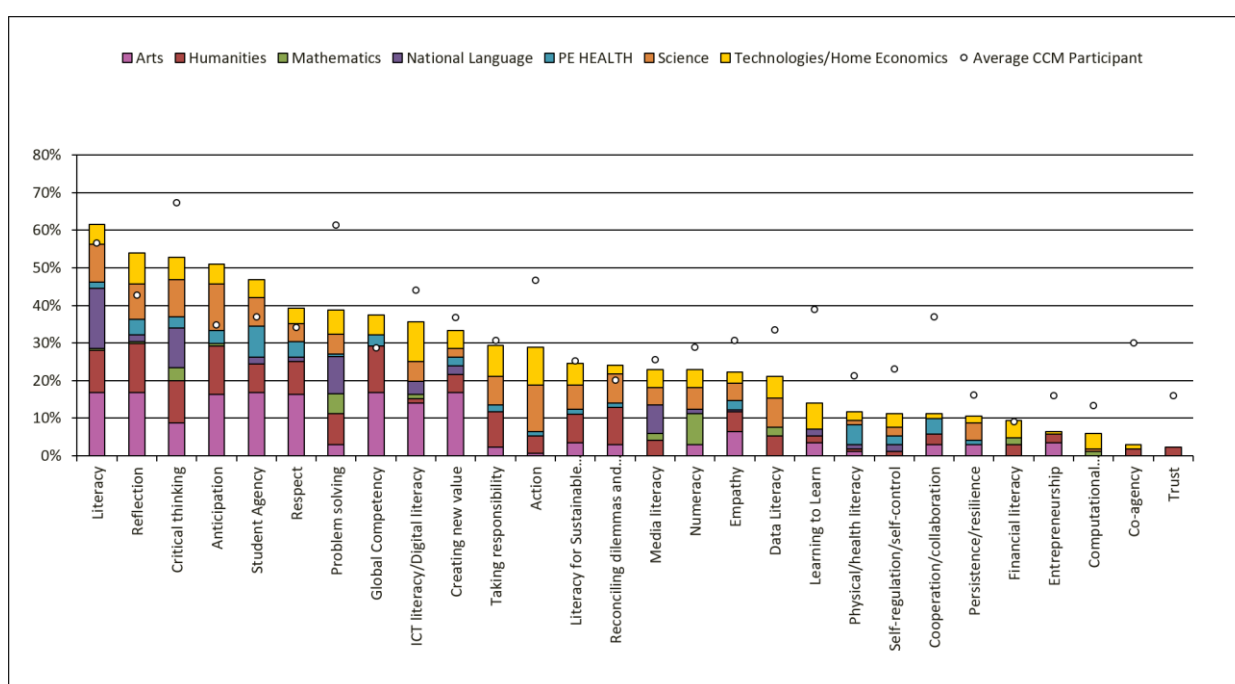
When the data for main and sub-targeted competencies are combined there are some noticeable variations in the findings for main targets.

While competencies such as Literacy, Reflection, Anticipation and Critical Thinking remain in the group of the most targeted competencies overall, Student Agency and Problem Solving are much more prominent in the proposed curriculum compared to the data presented in Figure 3.1 and Figure 3.2.

It is worth noting that while Global Competency continues to be targeted at a comparatively high level, both Respect and Creating New Value each retain a comparatively higher degree of targeting than the majority of competencies.

Worth noting too is the variation in the competencies regarding the extent to which they are targeted in all, several, few or a single learning area. For example, Critical Thinking, Problem Solving and Reflection are targeted in all seven learning areas, albeit to varying degrees. Competencies that are targeted in several learning areas include Literacy, Student Agency and ICT/Digital Literacy.

In contrast, competencies such as Entrepreneurship, Co-agency and Trust are each targeted at a low degree overall and in one or two learning areas only. This suggests that these particular

competencies may be learning area-specific and considered relevant to a limited number of learning areas rather than being cross-curricular in nature.

4. Mapping of the Netherlands Curriculum Proposal by CCM Learning Areas

The Arts

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in The Arts. The open dots displayed in Figure 4.2 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.1. Percentage of content items rated as main or sub targets in The Arts
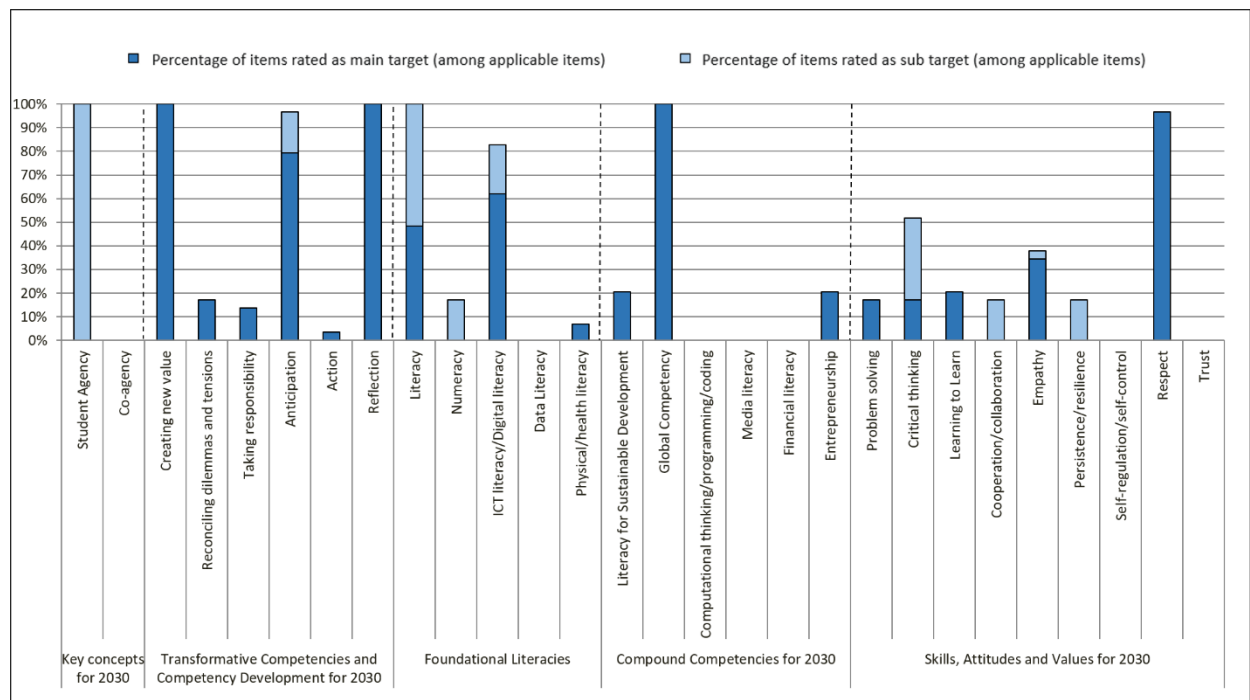
Figure 4.2. Percentage of content items rated as main or sub-targets in The Arts, ranked by frequency
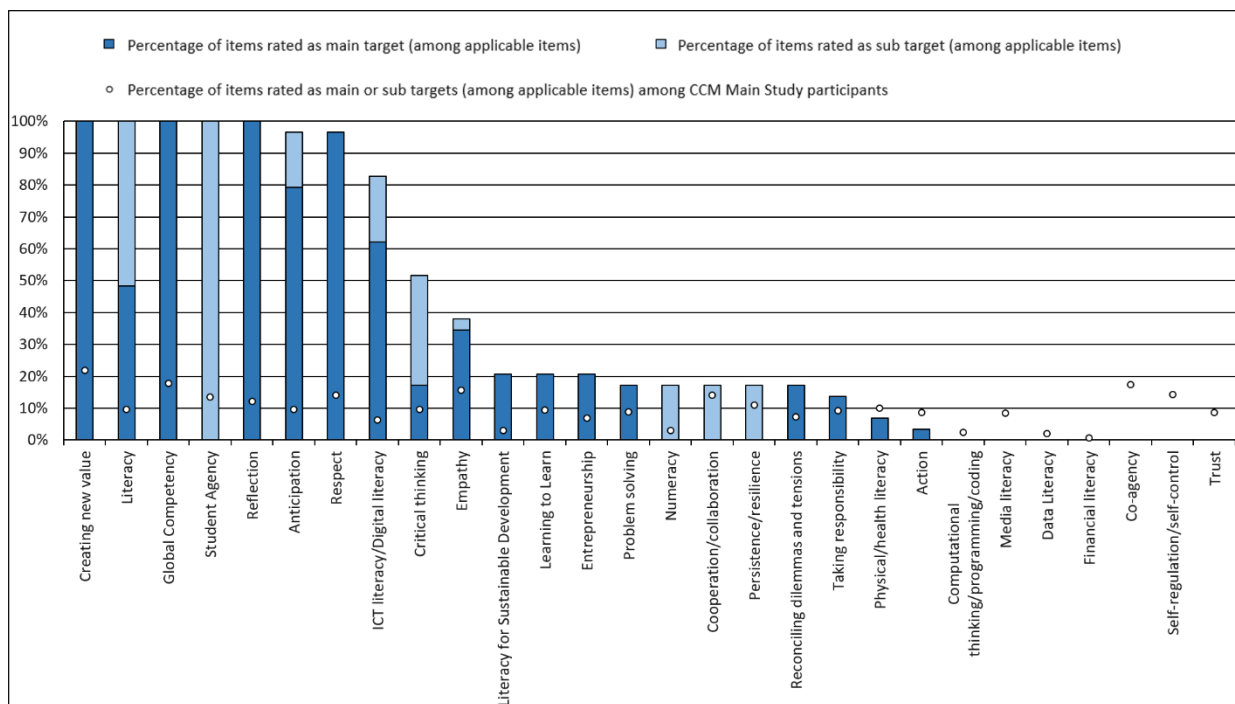
The Arts learning area is composed of content items from five different arts subject areas: Visual Arts, Music, Dance, Drama and Media Arts.

What is particularly striking in the data for the Arts is that the majority of competencies are targeted more frequently than is the case for the comparison group. Moreover, as main target competencies, Creating New Value, Global Competency and Reflection are identified in all five arts subject areas and embedded within all content items.

While it might be expected that the Arts provides a "natural home" for a competency such as Creating New Value, the targeting of Reflection, Anticipation, Respect and Global Competency indicate not only the dominance given to these competencies in the content items but additionally, it would appear, how appreciating and responding to artworks might be expected to be approached, most likely through a valuing of the work of artists at both local and international levels and knowledge regarding the place and contribution of art movements and styles over time.

Also worth noting is that Student Agency is identified as a strong sub-target in arts content. This possibly reflects a commitment in this learning area to students determining the artworks they create/produce, the choice of materials they make, and the preferred art forms and styles they explore.

A somewhat surprising finding is that Co-agency is not targeted in this learning area, given the potential for students to work, practise and compose artworks with peers, teachers or skilled artists. This, and the contrasting result for Student Agency, suggests the arts may be seen in the proposed curriculum as primarily individualised study, with the emphasis on personal interests and competency development rather than where skills are acquired or developed in concert with others.

The Humanities

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in The Humanities. The open dots displayed in Figure 4.4 represent the

average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.3. Percentage of content items rated as main or sub targets in The Humanities
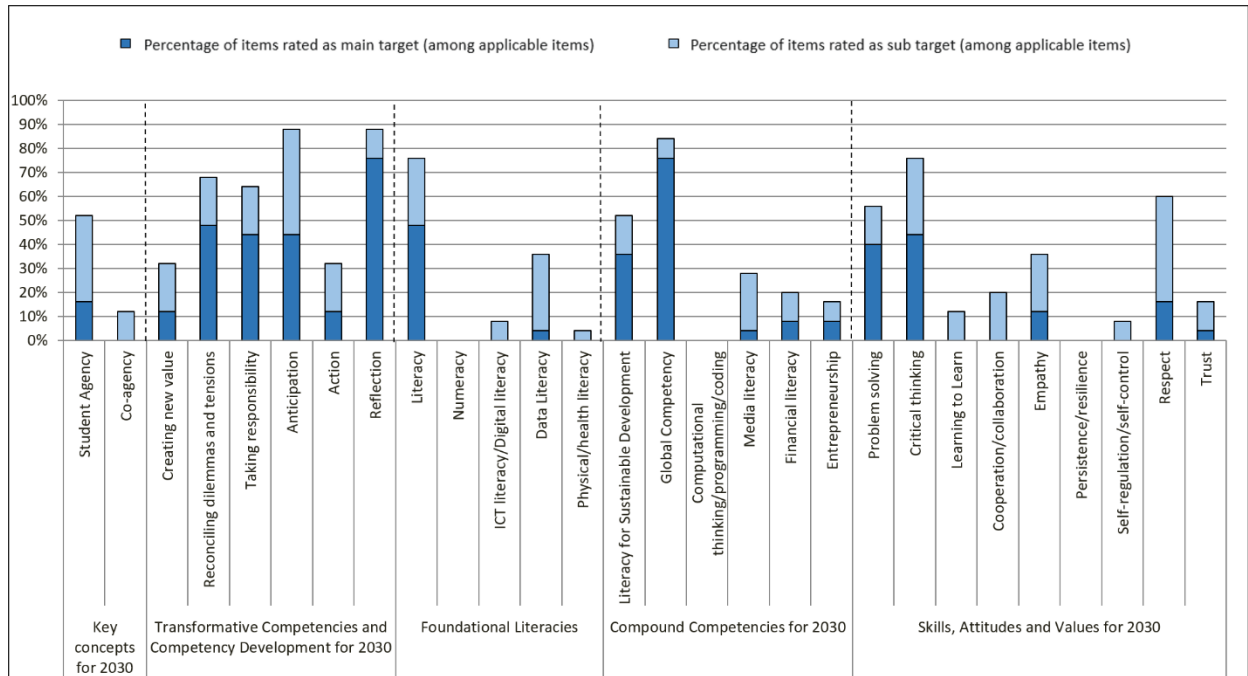
Figure 4.4. Percentage of content items rated as main or sub targets in The Humanities, ranked by frequency
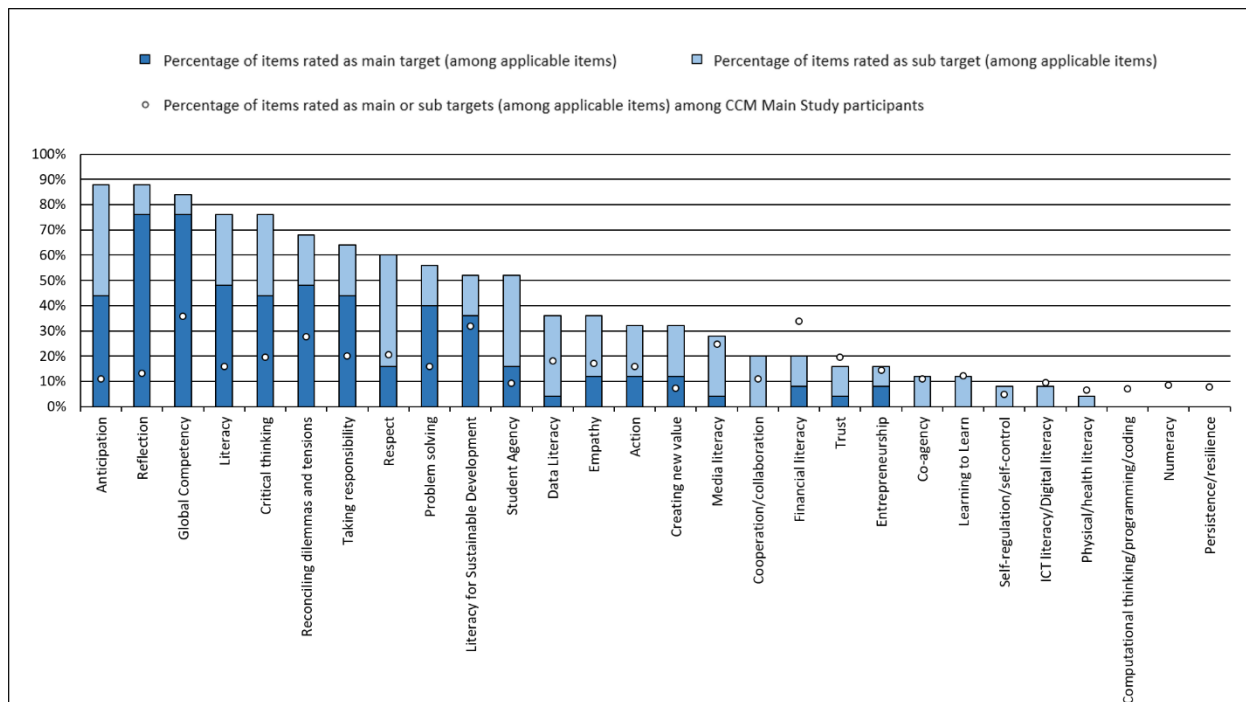
The Humanities learning area is composed of content items from four different subject areas: History, Geography, Civics and Citizenship, and Economics and Business.

A number of competencies are main targets in the proposed curriculum for the Humanities learning area. Unlike in the Arts, the Humanities appears to target competencies relevant to specific content items within each of the Humanities subject areas. For example, competencies such as Literacy for Sustainable Development and Reconciling Dilemmas and Tensions are identified as relevant to content dealing with global citizenship in Geography, History and Civics and Citizenship; and Respect and Problem Solving are identified as main targets when students explore content dealing with moral and ethical issues in Economics and Business, History and Geography.

As might be expected for this learning area given subject matter dealing with the world, its people and socio-political differences, Global Competency has been identified as the most frequent main target competency. Though not addressed to the same extent in and across the Humanities subject areas, it is also not surprising to see Entrepreneurship and Financial Literacy as main targets in the Economics and Business strand, though it should be noted in the case of the latter competency, this is addressed in the proposed curriculum less frequently than is the case in the curricula of the comparison group of countries.

Finally, Anticipation (88%), Reflection (88%), Critical Thinking (76%) and Problem Solving (56%), all of which would be compatible with inquiry-based approaches to teaching and learning, are well represented in the Humanities.

Mathematics

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in Mathematics. The open dots displayed in Figure 4.6 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.5. Percentage of content items rated as main or sub targets in Mathematics
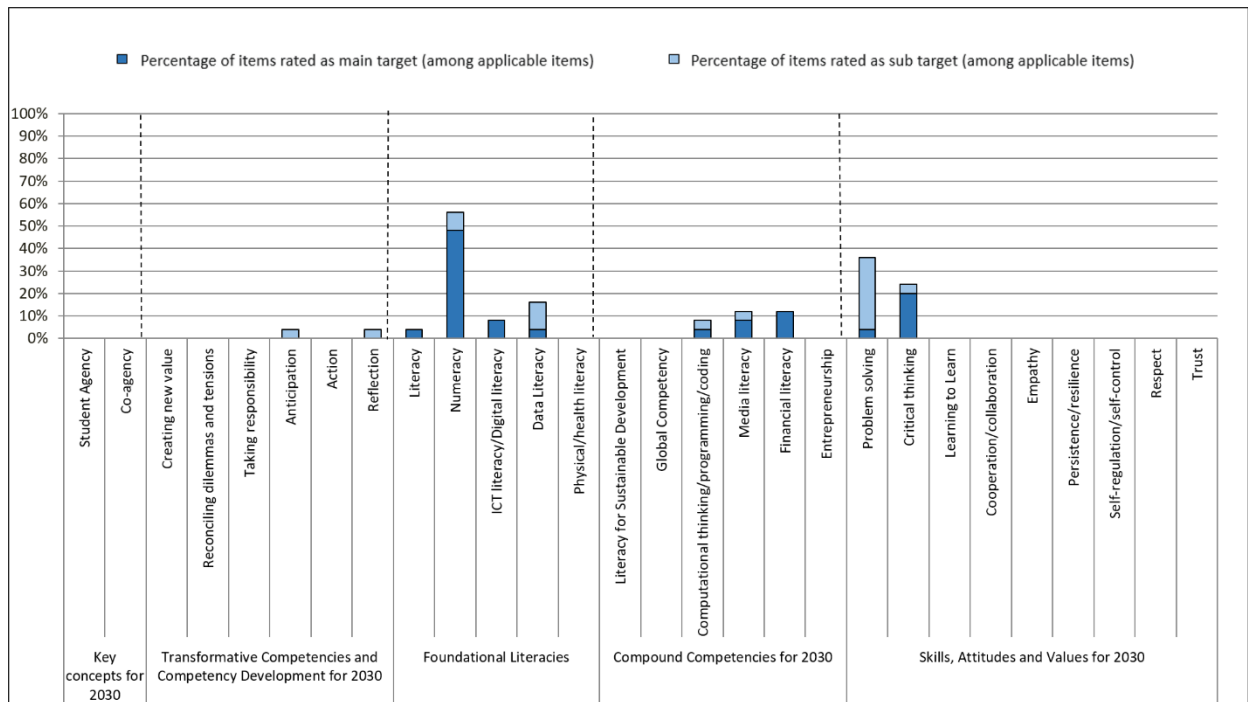
Figure 4.6. Percentage of content items rated as main or sub targets in Mathematics, ranked by frequency
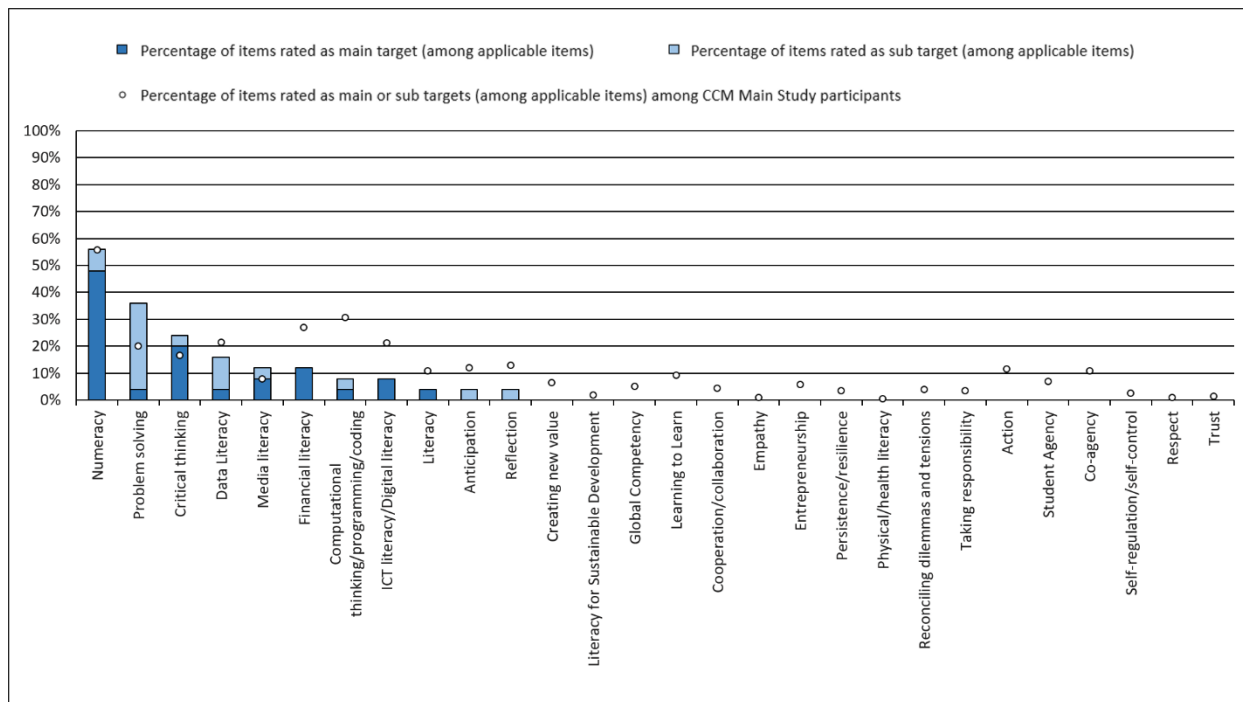
Not surprisingly, numeracy is the top rated competency: it is rated as either main or sub-target in 56% of the mapped content items in the framework for this learning area. This is similar to the average results from the international comparison group confirming the fact that Mathematics is a natural home for numeracy across countries. But Mathematics can also include content items that are largely theoretical and which do not relate specifically to numeracy as a competency. This is somewhat reflected in the other highly rated competencies, namely problem solving and critical thinking.

To a lesser degree, the mapped content items also show that the proposed Mathematics curriculum already explicitly incorporates a number of so-called emerging competencies. Specifically, data, media and financial literacy are rated as either main or sub-targets in 8 to 12% of the mapped content items.

When compared to the average results of the international comparison group, three competencies stand out as being less frequently rated as main or sub-targets in the proposed curriculum. These are financial literacy, computational thinking and ICT/digital literacy. The differences in the percentage of items that target these competencies are 15%, 23% and 13%, respectively, a remarkable difference between the two groups.

The lower prominence of computational thinking/coding/programming in Mathematics when compared to other CCM countries may be explained by the fact that this competency is targeted in two of the other learning areas in the proposed curriculum, namely Technologies/Home Economics and Science. Similarly, Financial literacy is also articulated in the Humanities (Economics and Business). This underlines the different choices countries make when deciding where and how to incorporate new and future-oriented demands into their curriculum.

Another noteworthy finding when comparing the Netherlands findings with the trends observed in other CCM countries is the fact that, unlike all other areas, Mathematics seems to concentrate its efforts on a rather narrower subset of competencies. This narrow focus can be explained by the fact that a broad range of competencies are already developed in the Mathematics curriculum for primary education, which is out of the scope of the CCM mapping

exercise. The narrower or broader focus on certain competencies has implications for considering which learning areas (and within learning areas, which content items) lean themselves more naturally to interdisciplinary efforts.

National Language

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in National Language. The open dots displayed in Figure 4.8 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.7. Percentage of content items rated as main or sub targets in National Language
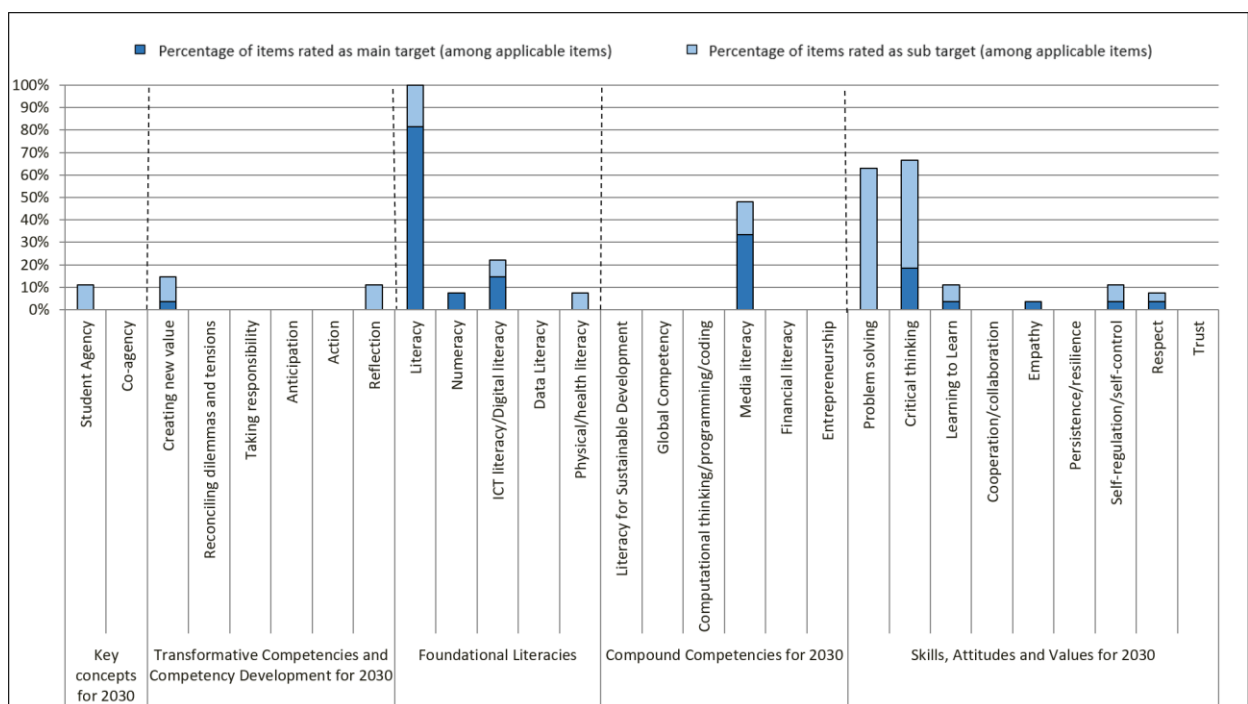
Figure 4.8. Percentage of content items rated as main or sub targets in National Language, ranked by frequency
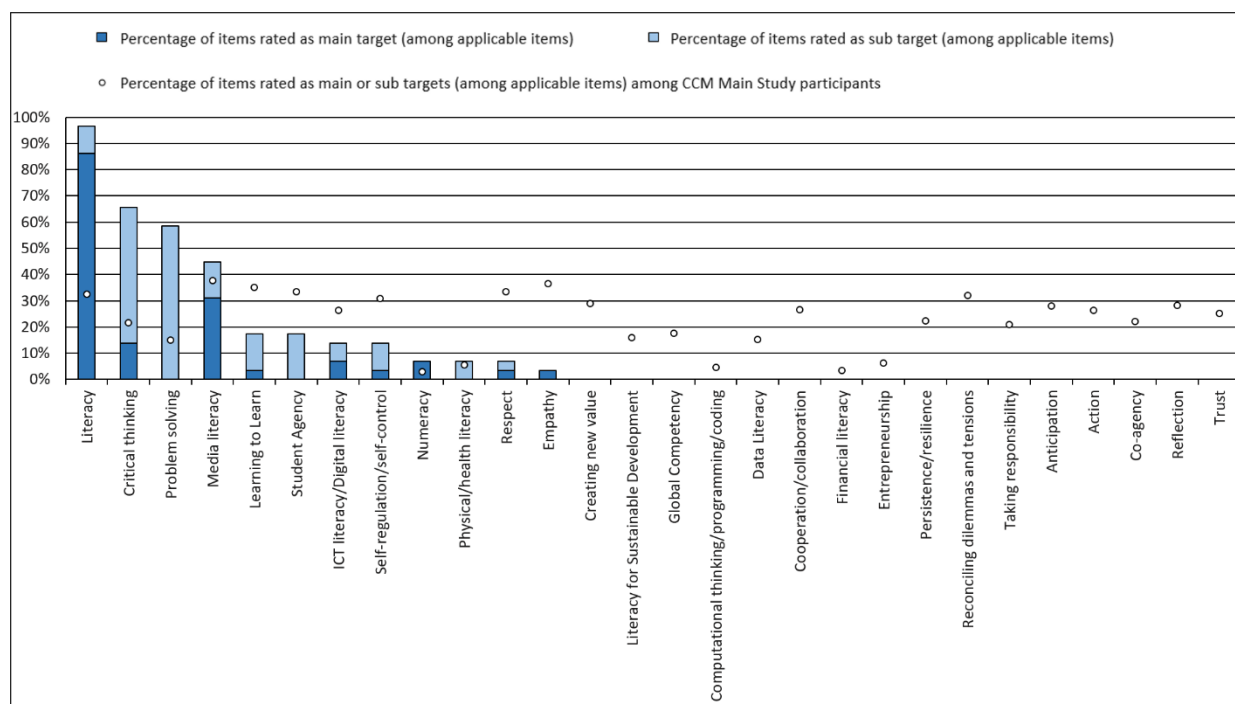
National Language is a learning area that addresses both the productive (speaking and writing) and receptive (listening and reading) knowledge and skills. When learning the national language students are typically exposed to the work of authors, to both classical and contemporary literature and different genres, and learn about the structural features of texts written or spoken for different purposes and audiences.

As with numeracy in Mathematics it is not surprising to see literacy as the dominant competency in the proposed National Language curriculum. The data indicate that 81% of all the mapped content items in this learning area explicitly aim at literacy as the key competency to be developed. All the remaining content items also concentrate heavily on literacy development albeit at a sub-target level making literacy the overwhelming competency expressed in all content items mapped in the National Language curriculum.

While the match between a competency and a learning area (e.g. literacy/National Language) may seem natural when looking at the results of a particular country, this close correspondence is a lot more nuanced when looking at the curriculum mapping of other CCM countries. On average, literacy – although highly relevant - is rated as a main or sub-target in the mapped curricula of these countries in only 33% of the content items. Expert ratings from the international comparison group show instead that a much broader range of competencies is articulated in this learning area across similar content items.

This may reflect the common effort that other countries are making in explicitly articulating emerging forms of literacy in their National Language curriculum, such as media literacy, ICT/digital literacy, literacy for sustainable development, data literacy and financial literacy, all of which are much more prominent in the average international results when compared to the Netherlands findings. In fact, the last three forms of literacy (sustainable development, data and financial literacy) are not targeted at all in this learning area in the Netherlands. They are rather placed in other learning areas, such as the Humanities (sustainable development and data literacy) and Mathematics (financial literacy).

A set of two other competencies are frequently rated as either main or sub-targets in National Language, critical thinking (identified in 67% of all content items) and media literacy (identified in 48% of the content items). In both cases, the Netherlands ratings are higher than

the average results observed across other CCM participating countries/jurisdictions. In the Netherlands, nearly 7 in 10 content items identify critical thinking as a main or sub-target for competency development while this figure corresponds to slightly more than 2 in 10 content items, on average, across the international group. Problem solving is also frequently identified in the National Language proposed curriculum (63% of the content items) although at a sub-target level.

In addition to the comparatively low number of competencies targeted in the proposed curriculum (only half of the CCM competencies) it is worth noting the extent to which particular competencies are being addressed (or not) in national language/s curricula. For example, while some CCM skills, attitudes and values for 2030 are somewhat targeted in this learning area - such as self-regulation, respect and empathy - others that are prominent in the average results of the international group are not, such as cooperation/collaboration, persistence/resilience and trust. Similarly, other CCM countries find opportunities to develop additional competencies across similar content items in their National Language curriculum, which is not the case in the mapped Netherlands' proposal: take, for example, the case of global competency, action, anticipation or helping students take responsibility for their learning/actions as well as develop the ability to reconcile dilemmas[4]. The international results showcase the approach that various countries are taking by finding ways to embed future-oriented competencies in their existing curriculum without overcrowding it with new contents.

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[4] These competencies are not observed in the mapped written proposal but they may well be incorporated in the curriculum in other ways.

Physical Education/Health

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in Physical Education/Health. The open dots displayed in Figure 4.10 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.9. Percentage of content items rated as main or sub targets in Physical Education/Health
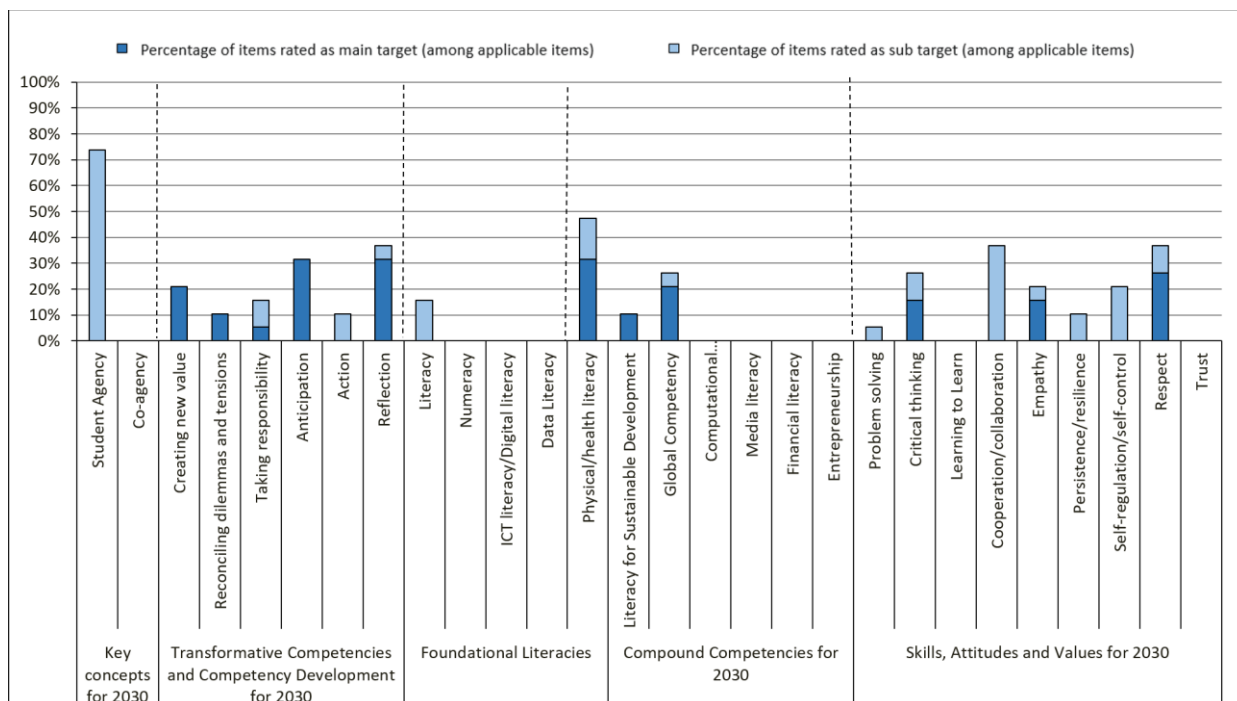
Figure 4.10. Percentage of content items rated as main or sub targets in Physical Education/Health, ranked by frequency
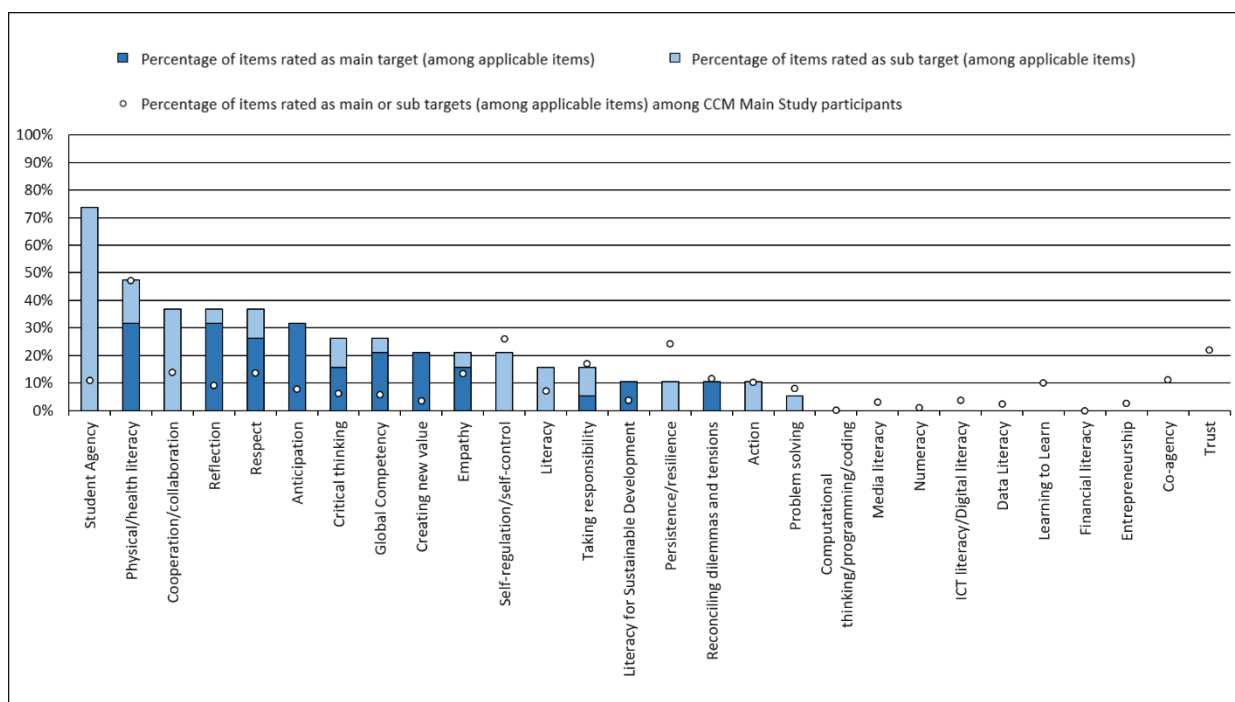
Physical Education/Health is composed of content items that address games and sports; concepts about movement; dance and rhythmic movement; outdoor education, recreation activities and lifestyle activities; food and nutrition; relationships education; safety; and wellbeing (physical fitness, mental health and managing stress).

Physical/health literacy is, unsurprisingly, one of the most prominent competencies in this learning area, with a presence as main target in about 30% of the mapped content items, and as either main or sub-target in almost 50% of the items. Also reflection and anticipation, both identified as main targets in about 30% of the mapped content items, are among the top rated competencies in Physical Education/Health.

Student agency stands out as the most prominent sub-target of the learning area: 70% of the content items identify it as a sub-target. This contrasts with the average results of the international comparison group, where student agency is rated as a sub-target in only about 10% of the mapped content items. This could possibly be owing to flexibility being a feature of the proposed curriculum in relation how the choices and interests of students are promoted when engaging in movement activities, sports, games and dance and also in relation to how lifestyle choices are considered and explored.

Persistence/resilience and trust have a low prominence, particularly when compared to the average results from the international group. Indeed, if these competencies are rated as main or sub-targets in above 20% of the mapped content items, in the Dutch curriculum proposal persistence/resilience is targeted in 11% of the content items and trust is absent. These results echo the average results across learning areas reported in Figure 3.2. While these competencies may not be a priority for other learning areas, the development of trust and persistence/resilience might be expected to be given greater prominence in Physical Education/Health, particularly in relation to content dealing with respectful relations and strategies for managing stressful situations typically addressed in this area.

Science

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in Science. The open dots displayed in Figure 4.12 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.11. Percentage of content items rated as main or sub targets in Science
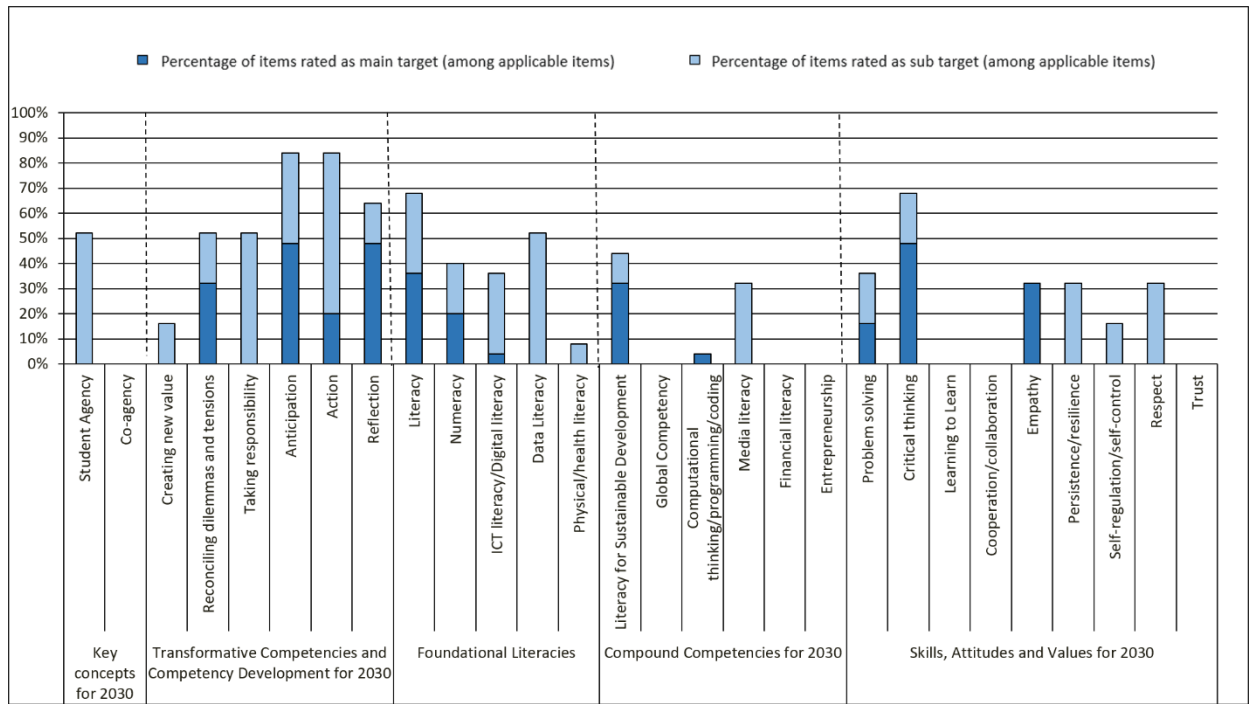
Figure 4.12. Percentage of content items rated as main or sub targets in Science, ranked by frequency
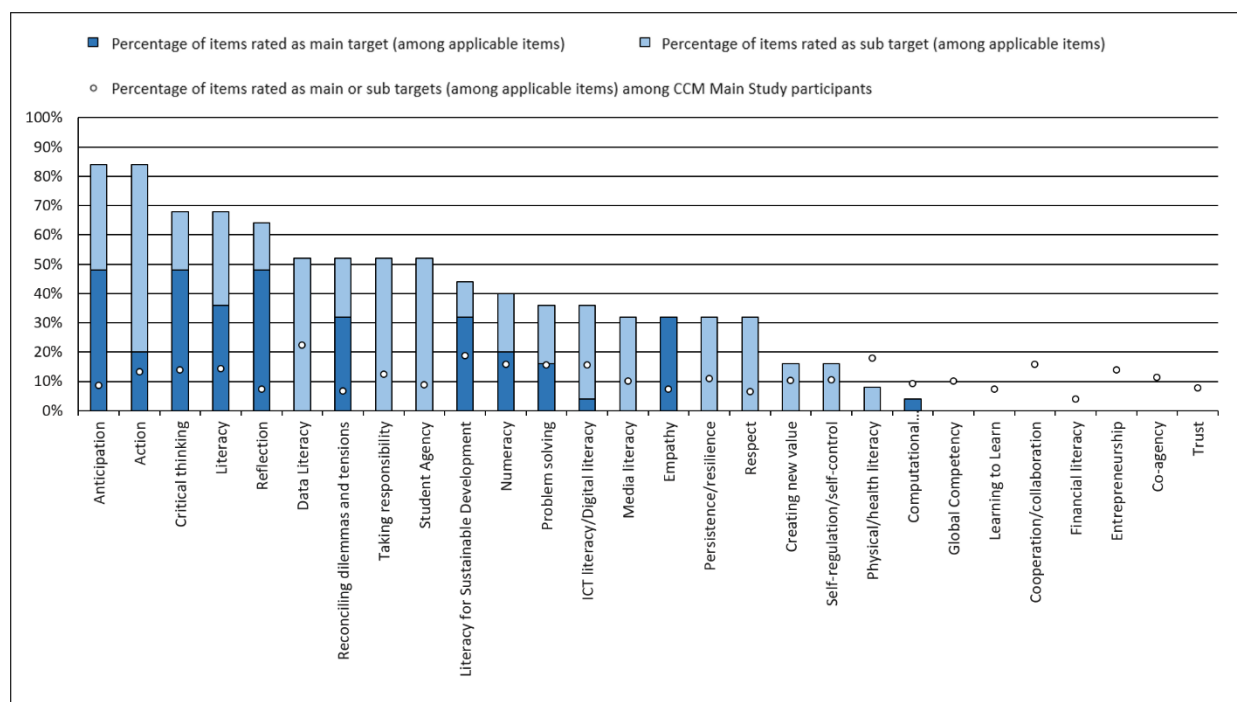
Science is a learning area composed of several science subject areas or sciences: Biology; Chemistry; Physics; and Earth Science/Space/Astronomy.

Anticipation and Action feature prominently in the proposal for the new curriculum (as main or subtargets in over 80% of the mapped content items), followed by Critical Thinking, Literacy and Reflection (targeted in over 60% of the mapped content items).

It is also worth noting that a number of other competencies are rated higher in frequency than those of the comparison group. These competencies include Literacy for Sustainable Development (44%), Empathy (32%), Reconciling Dilemmas and Tensions (52%), Student Agency (52%) and Taking Responsibility (52%). This might suggest that environmental and ethical issues and considerations relevant to the different sciences (Biology, Physics, Chemistry, Earth Sciences) are to be explicitly addressed in this learning area.

However, it might be worth considering why Entrepreneurship is not targeted in this learning area given the contribution science has and continues to make to innovation and technological advancement in society.

Technologies/Home Economics

The following data illustrate the degree to which individual competencies are identified as main or sub-targets in Technologies/Home Economics. The open dots displayed in Figure 4.14 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Figure 4.13. Percentage of content items rated as main or sub targets in Technologies/Home Economics
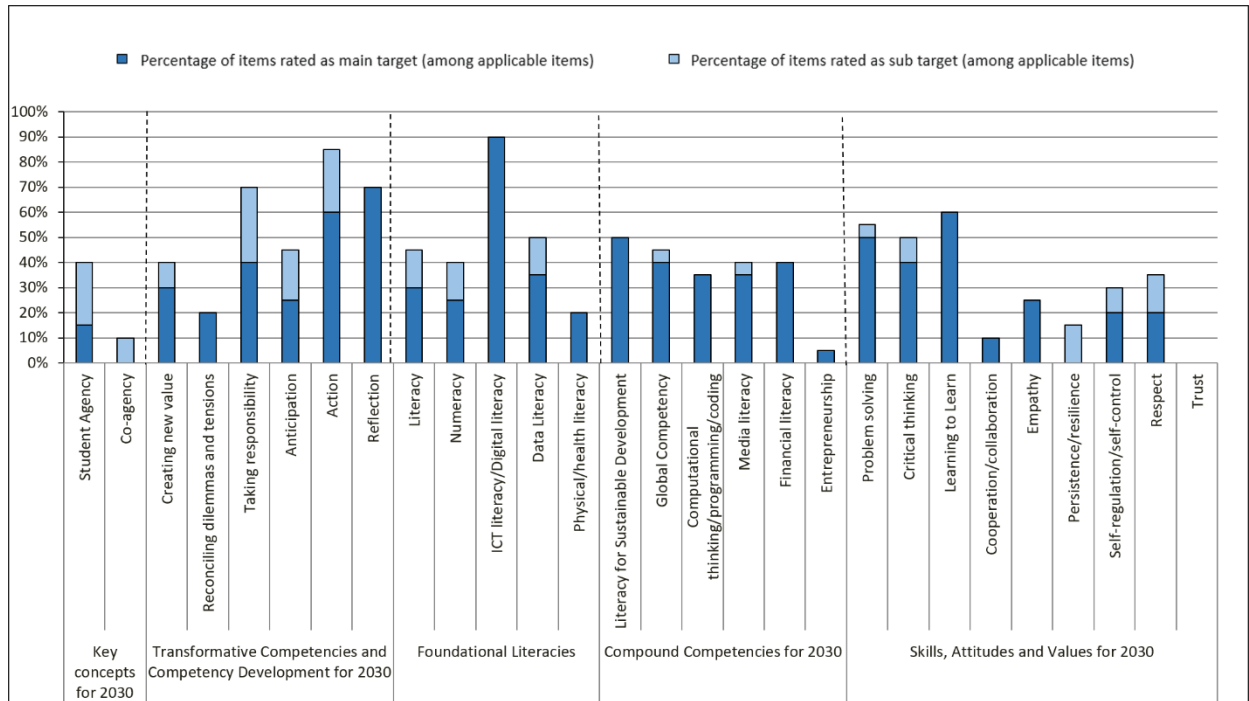
Figure 4.14. Percentage of content items rated as main or sub targets in Technologies/Home Economics, ranked by frequency
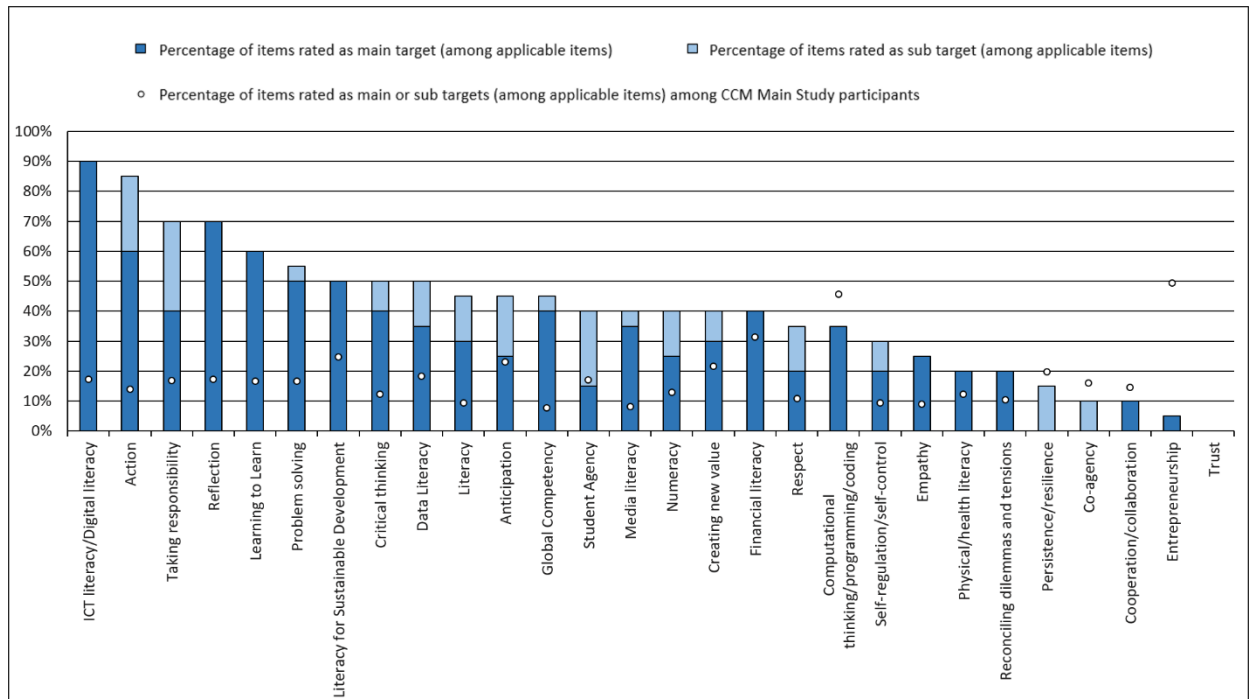
The Technologies/Home Economics learning area is composed of content concerning craft/design and technology (which for some countries can involve the development of skills related to traditional craftwork and for other countries involving students in designing and

making products and services); information and communication technologies (ICT), inclusive of digital technologies and coding/programming; and home economics (which for some countries can involve the development of skills related to managing the home and family life).

With the exception of trust, all of the competencies are targeted at least to some degree, and most of them (20 out of the 27 mapped competencies) are rated as main or sub-targets in at least 30% of the mapped content items. It is also noteworthy that most competencies are predominantly rated as main targets. ICT literacy/digital literacy is the top rated competency, being identified in 90% of the mapped content items as a main target. The second and third top rated competencies as main targets are reflection and learning to learn, identified in 70% and 60% of the content items, respectively. Of particular interest is the emphasis put on some of the emerging competencies such as literacy for sustainable development, global competency, media literacy and financial literacy, all of them rated as main or sub-targets in at least 40% of the mapped content items. These findings might suggest that in the new curriculum Technologies/Home economics not only accommodates a broad range of competencies but also leans itself well to the introduction of future-oriented competencies.

When compared to the international group, most competencies are identified as main or sub-targets more frequently in the new proposed curriculum. In contrast, entrepreneurship and computational thinking/coding/programming stand out as being considerably less prominent in the new proposed curriculum than in the international comparison group. Entrepreneurship is targeted only in 5% of the mapped items whereas in the international average the percentage goes up to 49% of the mapped items. Computational thinking/coding/programming is also targeted at a lower level (35% of the mapped items in the Dutch curriculum proposal and 46% in average in the international group). While these competencies may be addressed in other learning areas, the development of Entrepreneurship as a competency might be expected to be given prominence in Technologies/Home Economics content dealing for instance with designing products and services and creating digital solutions to satisfy needs.

5. The Netherlands Curriculum Proposal and CCM: Global Themes and Cross-Curricular Skills

In addition to the analysis of data submitted for each of the learning areas, findings have been developed concerning the proposed Global Themes and Cross-curricular Skills. These findings are set out below.

Global themes

The four global themes in the proposed curriculum appear to align with five of the OECD's CCM competencies as shown in Table 5.1[5]:

Table 5.1. Alignment of the Netherlands' Global Themes and the OECD's CCM competencies

Global themes	OECD CCM competencies
Sustainability ➡	• Literacy for Sustainable Development
Technology ➡	• ICT/Digital Literacy • Computational Thinking/Coding/Programming
Health ➡	• Physical/Health Literacy
Globalisation ➡	• Global Competency

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[5] Each global theme was mapped to the most relevant CCM competency or competencies but the global themes might consist of further competencies not captured by the CCM instrument.

Figure 5.1. Percentage of content items in the overall mapped curriculum proposal targeting each competency rated as main or sub-targets and distribution by learning area – Global Themes
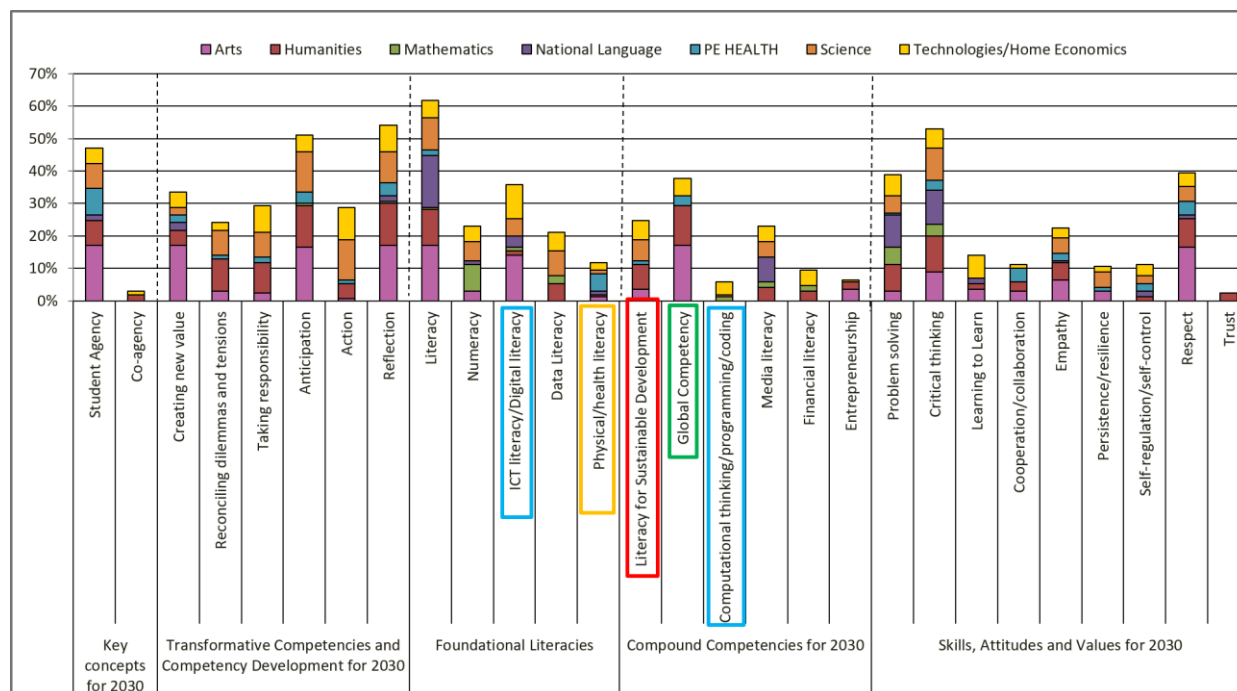
The degree to which the four themes are targeted in the proposed curriculum and the extent to which they are identifiable in the learning areas are illustrated in Figure 5.1 (the CCM competencies aligned to the 4 global themes are highlighted by coloured boxes).

All themes are addressed to varying degrees in the proposed curriculum with Technology and Globalisation being identifiable in about 40% of the mapped content items. Sustainability is represented in over 20% of the mapped content items. The theme Health is identified at a considerably lower level, in about 10% of the mapped content items, although it also emerges in the expected learning areas of Physical Education/Health and Technologies/Home Economics (and specifically in the Home Economics strand).

In terms of their presence in different learning areas, all four global themes are developed through a number of learning areas ranging from six for Technology (with Physical Education/Health being the exception) to four for Globalisation (with this theme not identified in the content for Mathematics, National Language or Science).

Cross-curricular skills

The nine cross-curricular competencies in the proposed curriculum appear to align with six of the OECD's CCM competencies[6], as shown in Table 5.2. The cross-curricular skills are in general aligned with the scope of competencies CCM countries are aiming to embed into their written curriculum. However, it is important to note some differences:

– The Dutch construct "communication" is interpreted as part of what the CCM exercise defines as "literacy": the ability to evaluate, use and engage with written, spoken, visual and

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6   The OECD Future of Education and Skills 2030 project defines *competencies* as a holistic concept that includes knowledge, skills, attitudes and values. For further details please see the concept note on the OECD Learning Compass 2030 (http://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/OECD_Learning_Compass_2030_concept_note.pdf).

multi-modal texts. Literate students are able to decode and construct different types of texts appropriate for life in and out of school. These texts will include subject-specific texts (such as those required in science or history) and visual texts such as diagrams and graphs. Literacy is understood as a foundation for communication.

– The Dutch construct "creativity" is interpreted as part of a wider concept of "creating new value", defined in CCM as the ability to add value to the society by identifying new sources of growth to prepare for 2030 such as developing new solutions, products and services, new jobs, new processes and methods, new ways of thinking and living, new enterprises, new sectors, new business models and new social models.

– The Dutch category of "social and cultural skills" is in the CCM exercise a taxonomy, not a construct; therefore, relevant constructs, i.e. "respect" and "empathy" were chosen for this analysis. "Respect" is defined in CCM as the valuing of self and others and the environment we are all in, and giving due regard for the feelings, wishes, or rights of self and others as well as those surrounding us that may not express wishes (e.g. environment, animals). "Empathy" is defined as the capacity to share, understand, and respond with care to others. We need to note that the Dutch curriculum could have considered other constructs than these two, given that the domain "social and cultural skills" can cover a wider range of specific constructs.

– The Dutch construct "reflection on personal and career development" is interpreted as a CCM construct "learning to learn" for this analysis, while the construct is a wider concept than the selected construct. For example, the CCM construct "reflection" was not included in the analysis. Also, the CCM concept of "student agency" could have been included in the analysis. "Learning to learn" is defined in CCM as the awareness and understanding of the phenomenon of learning itself, which enables students to take control of one's own learning.

Table 5.2. Alignment of the Netherlands' cross-curricular skills and the OECD's CCM competencies

Cross-curricular skills	OECD CCM competencies
Critical Thinking	• Critical Thinking
Creativity	• Creating New Value*[7]
Problem Solving	• Problem Solving
Self-regulation	• Self-regulation/self-control
Entrepreneurship	• Entrepreneurship
Reflection on Personal and Career Development	• Learning to Learn*
Social and Cultural Skills	• Respect* • Empathy*
Collaboration	• Cooperation/Collaboration
Communication	• Literacy

[7] Items marked with an asterisk (*) refer to potential matches of cross-curricular skills with CCM competencies.

Figure 5.2. Percentage of content items in the overall mapped curriculum proposal targeting each competency rated as main target and distribution by learning area ranked by frequency – Cross-curricular skills
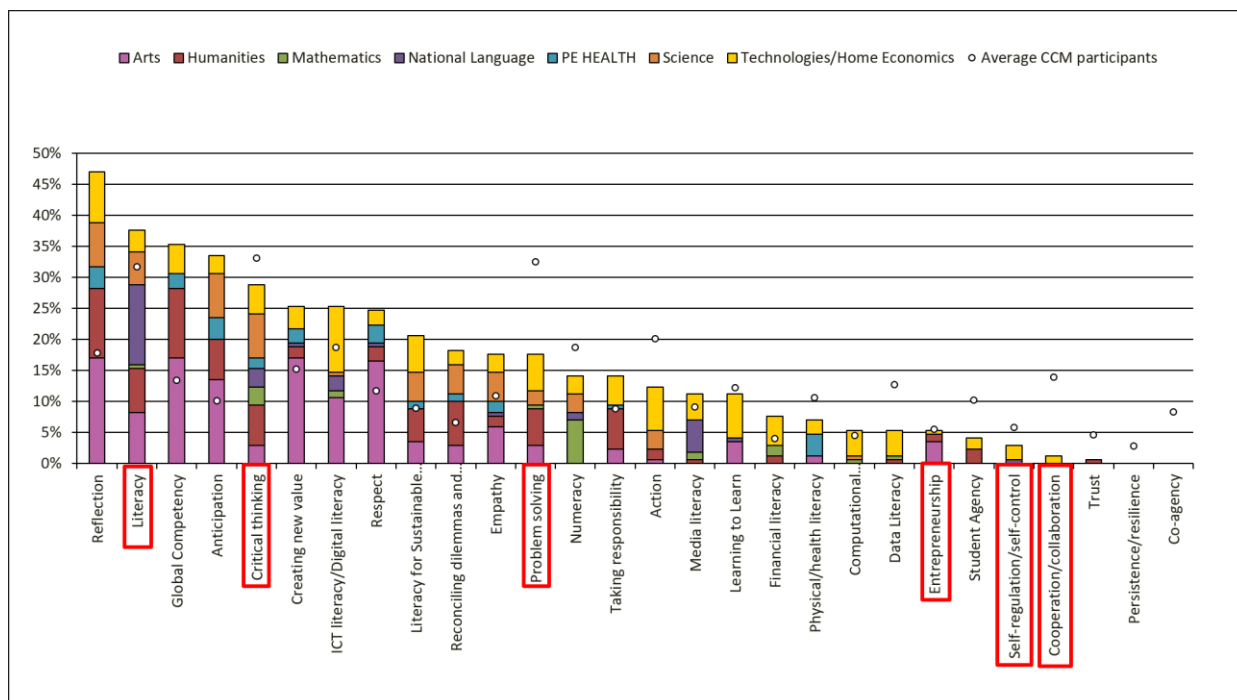
The degree to which the six matched cross-curricular competencies are targeted in the proposed curriculum and the extent to which these are each identifiable in the learning areas are illustrated in Figure 5.2. The open dots displayed in Figure 5.2 represent the average percentage of items rated as main and sub-targets across a sample of the OECD's CCM main study participants.

Communication (mapped to the CCM competency literacy) and critical thinking are the two most targeted cross-curricular skills, with a presence in over 35% and just under 30% of the mapped content items, respectively. They are followed by Problem Solving, which is embedded in almost 20% of the mapped items. Entrepreneurship, Self-regulation and Collaboration have a lower presence in the curriculum (around or below 5% of the mapped items).

Communication, critical thinking and to a lesser degree problem solving are identifiable across most learning areas and, as such, could be considered as cross-curricular in nature in relation to the proposed curriculum. In contrast, both self-regulation and cooperation, in addition to being identifiable in less than 5% of the mapped content items, are limited to only two and one learning areas respectively. It is therefore difficult to consider these competencies as being cross-curricular in nature in terms of the current curriculum proposal.

It is particularly noteworthy that of the six matched competencies illustrated in Figure 5.2, only communication (literacy) is targeted at a level above that of the international comparison group. Moreover, the targeting of problem solving (18%) and cooperation (1%) are each rated less frequently than those of the comparison group (33% and 14% respectively) as main or sub-targets.

Further, while the result for Entrepreneurship indicates that the targeting of this competency is similar to that rated for the comparison group it is, nonetheless, identifiable in only five percent of the content items and in only three of the seven learning areas. Given that this is one of the

nine cross-curriculum competencies highlighted for the proposed curriculum, it might be worth considering how Entrepreneurship might also be addressed in greater number of learning areas and possibly to a greater degree within some learning areas.

6. Concluding remarks and insights

Insights on curriculum design

The OECD Education 2030 working group members and partners have identified "12 design principles"[8] that can guide curriculum redesign, can be relevant in different countries and can endure over time, of which the following design principles are considered as highly relevant for reflections on next steps for the Dutch curriculum change.

Insights on 4 global themes

- The CCM exercise has also generated insights by using the principles "**Inter-disciplinarity (Inter-relatedness)**" and **"Authenticity"** as a means to reflect on the **4 global themes (sustainability, technology, health, and globalisation)** which the revised Dutch curriculum aims to mainstream. Learners should be given opportunities to discover how a topic or concept can link and connect to other topics or concepts within and across disciplines, and the curriculum should provide links to the real world where appropriate.

  – To ensure common understandings among all stakeholders involved in curriculum design and implementation, it is important to **articulate the goals and expectations** of these "4 cross-curricular themes", and thus to **ensure common understandings,** e.g. is it expected that these 4 themes are policy priorities and thus are expected to be embedded into all learning areas, or is it expected that certain themes are more likely to be naturally taught in certain areas, if yes, where, etc.

  – An increasing number of countries have high aspirations to identify cross-cutting themes as a way to promote interdisciplinary learning for students. The CCM exercise has shown some different patterns with regards to the scope of certain themes and the nature of certain subjects: i.e. some themes (e.g. globalisation) **are more widely mainstreamed** than others (e.g. health). It has also shown that some subjects (e.g. Humanities) are **more easily connected with broader themes in real life** than others (e.g. mathematics, which is considered to be abstract in nature and with a hierarchical structure is one of the areas where several global themes, such as sustainability, or health, are not embedded at all, neither in the Dutch curriculum proposal neither in the curricula of CCM participating countries (Table 6.1))[9]. Therefore, it is important, as mentioned above, to ensure common understandings of the intention and scope of this cross-curricular thematic approach. To this end, the current CCM comparison can serve as a "mirror" for self-reflection.

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[8] Focus, rigor, coherence, transferability, authenticity, student agency, choice, flexibility (adaptability), inter-disciplinarity (inter-relatedness), alignment, teacher agency, engagement.

[9] This is in line with the discussions held at the OECD E2030 MCDA (Mathematics Curriculum Documents Analysis), i.e. it is more challenging to integrate Mathematics into the movement of STEM.

Table 6.1. Coverage of global themes in the Netherlands' curriculum proposal and in CCM participating countries' curricula

Percentage of mapped content items including the competencies linked to the 4 global themes as main or sub-targets and number of learning areas covered by those content items

The 4 global themes highlighted in the Dutch curriculum[10]	Netherlands' curriculum proposal			Average of CCM participating countries		
	Coverage (percentage of mapped content items)	Learning areas covered	Unrelated learning areas	Coverage (percentage of mapped content items)	Learning areas covered	Unrelated learning areas
Sustainability	25	5	Mathematics, National language	25	6	Mathematics
Technology	42	6	Physical education/ health	57	7	All covered
Health	12	6	Mathematics	21	6	Mathematics
Globalisation	37	4	Mathematics, National language, Science	29	7	All covered

– **Sustainability** is embedded at the same degree in the Dutch curriculum proposal and in the mapped curricula of CCM participating countries, i.e. both at the degree of 25% of the mapped content items. Also, in both cases, mathematics is not linked to the theme, while in practice, education for sustainable development (ESD) often reports good practices such as ESD involving mathematics and science when discussing environmental sustainability. The difference between the Dutch curriculum proposal and the curricula of the CCM participating countries is, however, the coverage in national language. Here too, we could anticipate that in practice, learning in literature, the contents could include issues of sustainability. As mentioned in the methodology, the scope of CCM is limited to "intended/ written curriculum" and, therefore, it may have implications for supporting implementation without furthering curriculum overload. This said, it is important to note what is intended/ written, and what is not.

– **Technology** is more articulated in the written curriculum of CCM countries than that of the Netherlands, the former covering 57% while the latter, 42%. While the former cover this theme in all learning areas, the Dutch curriculum proposal does not link the theme in the physical education/ health learning area. When this theme is addressed in this learning area in other countries, the emphasis includes, e.g. in Estonia, areas of "relationship education", "safety", and "well-being (fitness, mental health, managing stress", including the association with the digital space.

– **Globalisation** is embedded more articulately in the Dutch curriculum proposal than in the international comparison group, i.e. 37% coverage of the mapped Netherlands' curriculum proposal, while 29% in average in the mapped curricula of CCM participating countries. The insights are, however, that the theme is covered in a wider diversity of learning areas in CCM participating countries, i.e. 4 areas (Technology/ Home Economics, PE, Humanities and Arts) are covered in the Netherlands curriculum proposal while all areas are covered in the international comparison group. As discussed earlier, in the implementation phase, the "inter-relatedness" could be also shown with other subjects to support students to be able to "connect dots" across a wide range of disciplines such as mathematics (e.g. projecting future migrant population), national language (e.g. comparing language structure across different cultures) and science (e.g. discussing the impact of environmental issues at the global level).

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[10] The percentages reported in Table 6.1 correspond to the competencies mapped to each of the global themes, as shown in Table 5.1.

- Of the 4 themes, **health** is the least embedded in both the Netherlands and in CCM participating countries, to a much lesser extent for the former than the latter, i.e. 12% for the Netherlands and 21% for the CCM countries (Table 6.2). The learning areas in which this theme is included and excluded (i.e. Mathematics) are the same in both groups. These findings may reflect the fact that some health-related content items in the CCM framework are not treated as such in the Netherlands' curriculum. Specifically, the expert's mapping identified the following CCM content items that are not part of their curriculum proposal:

  a) Strategies for dealing with difficulties encountered in life; knowledge of how to identify strengths; how to think positively; how to develop resilience and how to manage difficult situations; and how to maintain wellbeing through safe and healthy choices. Issues such as body image can also be included

  b) Knowledge about stress management (recognising causes, indicators and strategies and actions to be taken to manage stressful situations)

  These two items are treated as part of what Dutch experts call the *how* in education and not *what* is to be learned. That being said, the international comparison can shed light on the extent to which other countries are more heavily embedding the development of health across similar Physical/Health Education content items in addition to finding more opportunities in the Science, Technologies/Home Economics and the Arts curriculum for fostering this competency.

Table 6.2. Coverage of the global theme Health

Percentage of mapped content items including physical health literacy as main or sub-target per learning area in the Netherlands' curriculum proposal and in the CCM participating countries' curricula

	Arts	Humanities	Mathematics	National Language	PE/ Health	Science	Technologies/Home Economics	**Total**
CCM participating countries	2%	1%	0%	1%	10%	4%	3%	**21%**
Netherlands	1%	1%	0%	1%	5%	1%	2%	**12%**

Insights on 9 cross-curricular skills

- When comparing the mapping results of the Netherlands curriculum proposal with those of the other CCM countries, in addition to the findings already discussed in chapter 5 some trends can be further identified in regards to the 9 cross-curricular skills (Table 6.3).

  - The constructs that are **more articulated and widely** embedded in the Dutch curriculum than in the CCM documents are: "communication" and "respect".

    - **Communication:** as mentioned above, the scope of the definition is slightly different and therefore we need to caution the interpretation. That said, the biggest difference occurs in the learning area "Arts"; the Dutch curriculum embed "communication" into the 17% of content items in Arts; the CCM countries, 5%.

    - **Respect:** similarly, the "Arts" appears to be also home for accommodating the contrast "respect; the Dutch curriculum embed it into the 16% of the content items in Arts; CCM countries, 5%. An interesting comparative observation is that the CCM countries embed it more in national language than in the Dutch curriculum; 11% in CCM countries, 1% in the Dutch curriculum.

  - The constructs that are **less articulated in the Dutch curriculum** than in the CCM documents are all the rest, in particular, "problem solving", "collaboration", and "reflection on personal and career development". The CCM workshop discussed if

"problem solving" and "critical thinking" should be made more articulate in the written curriculum. If we focus on the difference points between the Dutch curriculum and the CCM countries, the difference is larger in problem solving, collaboration and reflection than critical thinking.

- **Critical thinking (14% difference)**: the Dutch curriculum is less articulate on this construct than the CCM counties, 53% and 67% respectively. The highest difference is observed in "Mathematics" (4% and 11%). It is not surprising that the percentage is lower in Mathematics than in other learning areas such as National language, in line with the preliminary findings of the OECD Mathematics Curriculum Document Analysis 2030 which has implied that constructs such as critical thinking and creativity are harder to translate into mathematical textbooks. However, there are jurisdictions who embed this construct in various Mathematics content items, such as Greece and British Columbia, Canada. They could provide some food for thought for peer learning reflections.

- **Problem solving (22% difference)**: the Dutch curriculum has less content items covered for this construct than in the CCM countries, 39% and 61% respectively. The main differences appear to come from "mathematics" (5% and 12% respectively), "science" (5% and 10%), and "technology/ home economics" (6% and 10%). This is an interesting observation as CCM countries are likely to embed "problem solving" more articulately in written curriculum in the areas of STEM, while the Dutch curriculum does not seem to articulate it. It could be that this is picked up in the implementation process by teachers and schools. And therefore, it is important to articulate this construct in the implementation process (see Section 6.1).

- **Collaboration (26% difference)**: The Dutch curriculum covers less content items than in CCM countries, 11% and 37% respectively. The main differences come from "National language" (0% and 10%), "Science" (0% and 5); "Mathematics" (0% and 2%), and "Technologies/ home economics" (1% and 5%). Interesting comparative observations include: a) while CCM countries embed this construct in National language to a quite visible degree, it was not found in the Dutch content items, b) while a few CCM countries relate collaboration to the STEM field, no or very few were found in the Dutch content items. These countries include Australia, Greece and Japan, among others.

- **Reflection on personal and career development (25% difference)**: The Dutch curriculum covers 14% of the content items while CCM countries cover 39% of the content items. In interpreting this construct, as mentioned above, it is important to note the difference in the scope of the comparison. Therefore, it is important to note the observations on the construct of "reflection" (see Section 6.1). It is also interesting to note that countries, including those who are not taking part in the CCM exercise, are increasingly paying attention to the importance of meta-learning skills such as "learning to learn" in curriculum documents (such as "meta-learning" in Norway), it is not explicitly associated with the 9 cross-curricular skills. Again, this could be some food for thought in the implementation process.

Table 6.3. Cross-curricular skills per learning area

Percentage of content items including the 9 cross-curricular skills as main or sub-targets in the Netherlands curriculum proposal and in the CCM participating countries' curricula

		Arts	Humanities	Mathematics	National Language	PE/ Health	Science	Technologies/Home Economics	Total
Critical thinking	CCM participating countries	6%	13%	11%	15%	4%	9%	8%	67%
	Netherlands	9%	11%	4%	11%	3%	10%	6%	53%
Creativity (Creating new value)	CCM participating countries	8%	3%	2%	11%	1%	4%	8%	37%
	Netherlands	17%	5%	0%	2%	2%	2%	5%	33%
Problem solving	CCM participating countries	5%	10%	12%	9%	5%	10%	10%	61%
	Netherlands	3%	8%	5%	10%	1%	5%	6%	39%
Self-regulation	CCM participating countries	4%	1%	1%	7%	6%	2%	2%	23%
	Netherlands	0%	1%	0%	2%	2%	2%	4%	11%
Entrepreneurship	CCM participating countries	1%	2%	1%	1%	0%	2%	8%	16%
	Netherlands	3%	2%	0%	0%	0%	0%	1%	6%
Reflection on Personal and Career Development (Learning to learn)	CCM participating countries	4%	5%	4%	14%	4%	3%	7%	39%
	Netherlands	3%	2%	0%	2%	0%	0%	7%	14%
Social and Cultural Skills (Respect, Empathy) — Respect	CCM participating countries	5%	7%	0%	11%	5%	2%	4%	34%
	Netherlands	16%	9%	0%	1%	4%	5%	4%	39%
Social and Cultural Skills (Respect, Empathy) — Empathy	CCM participating countries	5%	5%	0%	11%	4%	2%	3%	31%
	Netherlands	6%	5%	0%	1%	2%	5%	3%	22%
Collaboration	CCM participating countries	5%	4%	2%	10%	5%	6%	5%	37%
	Netherlands	3%	3%	0%	0%	4%	0%	1%	11%
Communication (Literacy)	CCM participating countries	5%	9%	6%	18%	4%	8%	5%	57%
	Netherlands	17%	11%	1%	16%	2%	10%	5%	62%

Insights on curriculum implementation

Some of the relevant principles associated with curriculum implementation for the Netherlands include the following.

- While the OECD Learning Compass 2030 places the concept of "**Student agency"/ "Co-agency"** as the underlying key concepts, the CCM exercise for the Netherlands has shown that these concepts are less embedded in the written curriculum as main targets. Student agency is embedded as a main target in 4% of the mapped content items and co-agency in no content items at all in the Netherlands' curriculum proposal whereas in the case of CCM participating countries student agency and co-agency are included in average in 10% and 8%, respectively, of the mapped content items (Table 6.4). The implementation of the

curriculum should be designed around students to motivate them and recognise their prior knowledge, skills, attitudes and values.

Table 6.4. Student agency and co-agency per learning area

Percentage of mapped content items including student agency as main target in the Netherlands' curriculum proposal and in the CCM participating countries' curricula

		Arts	Humanities	Mathematics	National Language	PE/ Health	Science	Technologies/Home Economics	**Total**
Student agency	CCM participating countries	1%	1%	0%	3%	0%	1%	4%	**10%**
	Netherlands	0%	2%	0%	0%	0%	0%	2%	**4%**
Co-agency	CCM participating countries	2%	0%	1%	1%	1%	1%	2%	**8%**
	Netherlands	0%	0%	0%	0%	0%	0%	0%	**0%**

- The CCM workshop participants discussed if the degree of articulating "**reflection**" was too high e.g. at the expense of valuing other constructs such as "problem solving" and "critical thinking". Reflection is indeed emphasised to a greater extent in the Dutch curriculum proposal than in the mapped curricula of CCM participating countries. This competency is embedded in 54% of the mapped content items in the Netherlands curriculum proposal and in 43% of the items in the mapped CCM countries' curricula (See table 6.5). Furthermore, if compare the two by "main targets", the difference becomes more articulate; 47% for the Netherlands and 18% for the CCM countries (Figure 3.2). CCM countries have explained that one of the reasons for the low frequency is that "reflection" is suggested as part of "implementation" and therefore not necessarily articulated as the main target in the written / intended curriculum. This was discussed among the participants at the Dutch CCM workshop and, therefore, some reflections could be made on prioritising which constructs could be more explicitly suggested. At the same workshop, as was mentioned earlier, some participants discussed a possible need to increase the articulation of some other constructs, such as "problem solving" and "critical thinking".

  - Interesting observations at the subject-level are: 1) The largest difference between the two is observed in the learning areas such as Arts (17% in the Netherlands, 5% in CCM countries); Humanities (13% and 6%) and Science (9% and 3%).

  - Of particular interest are National language and Mathematics, where, conversely, CCM countries' curricula place a greater emphasis on reflection than the Dutch curriculum proposal. The share of content items embedding this competency in National language (2% in the Dutch curriculum and 12% in the CCM countries) and Mathematics (1% and 5%, respectively).

Table 6.5. Reflection per learning area

Percentage of mapped content items including reflection as main or sub-target in the Netherlands' curriculum proposal and in the CCM participating countries' curricula

		Arts	Humanities	Mathematics	National Language	PE/ Health	Science	Technologies/Home Economics	**Total**
Reflection	CCM participating countries	5%	6%	5%	12%	4%	3%	7%	**43%**
	Netherlands	17%	13%	1%	2%	4%	9%	8%	**54%**

- As was also discussed at the CCM workshop in the Netherlands, the importance of "Teacher agency" should be clearly articulated in the communication during the planning and execution of curriculum implementation. Teachers should be empowered to use their

professional knowledge, skills and expertise to deliver the curriculum effectively. In doing so, the idea of 150 teachers involved in the curriculum redesign process acting as the "ambassadors for change" could be a good idea, reflecting on the successful case adopted by British Columbia, Canada.

- In addressing the needs for "Teacher Agency", as was discussed also at the CCM workshop, it is also important to consider:
  - striking a balance between teacher autonomy and regulations
  - focusing on enhancing the pedagogical quality in all schools, in the highly decentralised governance structure

- Considering the relevance of the teacher-focused implementation issues in the context of OECD E2030 project for Phase 2, it would be relevant to look into the following issues at the time of designing curriculum:
  - **Managing curriculum change as part of the larger eco-system in education**
  - **Aligning curriculum change and changes in pedagogies and assessment and**
  - **Aligning curriculum change and changes in teacher education curriculum, teacher professional development courses, and teacher competencies for teacher licensing, etc.**

Annex A: CCM Learning Area/Subject Area Coding Frameworks

Arts (inclusive of Visual Arts/Art, Music, Dance, Drama and Media Arts)

Humanities/Social Science/Studies (Geography, History, Civics/Citizenship, Economics/Business Studies)

Mathematics

National Language/s

Physical Education/Health

Science/Natural Science (Biology, Physics, Chemistry, Earth Science/Space/Astronomy)

Technology/Home Economics (Craft/Design and Technology, ICT, Home Economics)

Arts

Content Codes	Subjects/contents/concepts/activities
Visual Arts/Art	
AVA1	The contribution of locally and globally recognized artists, their works and art movements to cultural heritage
AVA2	The history of visual arts, including major visual arts styles
AVA3	Artistic techniques and aesthetic qualities used in different artworks (e.g. paintings, sculpture, ceramics, textiles etc)
AVA4	Activities involving the production and creation of different kinds of artworks (e.g. paintings, sculpture, ceramics, textiles, etc)
AVA5	Activities involving feelings and ideas expressed through visual artworks
AVA6	The work of artists in visual arts/arts, how to think like artists, how visual arts/arts contribute to and relate to real life/real world (epistemic knowledge)
AVA7	Moral,ethical and legal issues in visual arts/art (e.g. copyright)
Music	
AMU1	The contribution of locally and globally recognized musicians and composers and their works (contemporary and classical) to cultural heritage
AMU2	The history of and knowledge about music, including major musical styles and compositions used in different music works
AMU3	Activities involving the production and creation of music and the performance of musical compositions (instrumental and vocal) for a variety of purposes
AMU4	Activities involving feelings and ideas expressed through music.
AMU5	How to think and appreciate music like musicians, how music contributes to and relates to real life/ real world (epistemic knowledge)
AMU6	Moral, ethical and legal issues in music (e.g. copyright)
Dance: * Note: if countries include "dance" in physical education, please note "n.a." here but mark the answers in physical education.	
ADA1	The contribution of locally and globally recognized dancers, choreographers and their works (contemporary and classical) to cultural heritage

ADA2	The history of dance, including major performance styles
ADA3	Dance forms, dance pieces and the elements of dance used in different dance performances.
ADA4	Activities involving the production and creation of choreographed and unchoreographed dance
ADA5	Activities involving feelings and ideas expressed through dance
ADA6	The work of dancers, how to think like dancers, how dancing contributes to and relates to real life/real world (epistemic knowledge)
ADA7	Moral, ethical and legal issues in dance (e.g. copyright of choreography, prejudice against some forms of dance)
Drama	
ADR1	The contribution of locally and globally recognized actors, playwrights and their works (contemporary and classical) to cultural heritage
ADR2	The history of drama, including major dramatic styles
ADR3	The elements and conventions of drama used in different drama performances
ADR4	Activities involving the use of the body, gestures and voice as well as the production and creation, rehearsal and performance of scripted and unscripted drama
ADR5	Activities involving feelings and ideas expressed through drama
ADR6	The work of artists in drama (actors/actresses/ script writers etc), how to think like artists in drama, how drama contributes to and relates to real life/real world (epistemic knowledge)
ADR7	Moral, ethical and legal issues in drama (e.g. copyright of scripts, expression and prejudice)
Media Arts	
AMA1	The contribution of locally and globally recognized media artists
AMA2	The history of media arts, including major media styles
AMA3	Technical and symbolic elements of media arts used in different media artworks
AMA4	Activities involving the production, creation and presentation of media artworks
AMA5	Activities involving feelings and ideas expressed through media artworks
AMA6	The work of artists in media arts, how to think like artists in media arts, how media arts contribute to and relate to real life/real world (epistemic knowledge)
AMA7	Moral, ethical and legal issues in media arts (e.g. copyright, personal data protection)

Humanities/Social Studies/Social Sciences

Content Codes	Subjects/contents/concepts/activities
Geography	
HGE1	The Earth and its major regions, landforms; climate patterns; natural impact on places
HGE2	Human impact on places; cultural differences; social, economic and cultural diversity of the world; human settlement patterns
HGE3	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
HGE4	The work of geographers, how to think and write like geographers, how geography contributes to and relates to real life/real world (epistemic knowledge)
HGE5	Activities involving information analysis; search of relevant source material (written and oral); the identification and use of different viewpoints, observations and accounts (both primary and secondary sources); inferences and conclusions from source material; communication of findings following inquiry (e.g. the preparation of reports on places based on collected data evidence)
HGE6	Moral, ethical and legal issues in geography (e.g. environmental protection)
History	
HHI1	Local, national and global tangible heritage (places; objects)
HHI2	Significant events or periods in the history of humankind along with symbols and commemorations (local, national and global intangible heritage)
HHI3	Individuals who have made or are making contributions at local, national and global levels
HHI4	Concepts related to citizenship
HHI5	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
HHI6	The work of historians, how to think and write like historians, how history contributes to and relates to real life/real world (epistemic knowledge)
HHI7	Activities involving information analysis; search of relevant source material (written and oral); the identification and use of different viewpoints, observations and accounts (both primary and secondary sources); inferences and conclusions from source material; communication of findings following inquiry (the preparation of reports on events based on collected data evidence).
HHI8	Moral and ethical issues in history (e.g. one incident can be told differently by different people)
Civics/Citizenship	
HCC1	Political structures and forms of government (local, national and global)
HCC2	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms (e.g. gender equality, peace and non-violence, cultural diversity)

HCC3	How to think and behave as a citizen of a nation, as a global citizen; how citizenship contributes to and relates to real life/ real world (epistemic knowledge)
HCC4	Activities involving information analysis; search of relevant source material (written and oral); the identification and use of different viewpoints, observations and accounts (both primary and secondary sources); inferences and conclusions from source material
HCC5	Activities involving participation in responsible citizenship activities within and outside schools
HCC6	Moral and ethical issues in citizenship (e.g. collective interest versus individual interest)
Economics/Business Studies	
HEB1	Basic principles of economics and business practices (producers and consumers; markets; costs and benefits; profit and loss; employers and employees); economic development (different types of economic systems and sectors; quality of life)
HEB2	Concepts related to global citizenship and sustainable development education, including environmental and economic sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
HEB3	How to think and write like economists, how to think and behave like entrepreneurs, business people etc; how economics, entrepreneurship, businesses contribute to and relate to real life/real world (epistemic knowledge)
HEB4	Activities involving e.g. information analysis; search of relevant source material (written and oral); the identification and use of different viewpoints, observations and accounts (both primary and secondary sources); inferences and conclusions from source material
HEB5	Activities involving participation in entrepreneurial activities within and outside schools
HEB6	Moral and ethical issues in economics and businesses (e.g. free-riders, bandwagon advertisement, individual economic interest at the expense of others' well-being)

Mathematics

Content Codes	Strands/Branches/contents/concepts/activities
Number	
MNU1	The formal meaning of number using a number line
MNU2	Real numbers (rational and irrational numbers)
MNU3	Complex numbers
MNU4	Computational strategies to solve problems involving whole and real numbers
MNU5	Computational strategies to solve problems involving common and decimal fractions
MNU6	Proportion, percentage and ratio
MNU7	Modelling and operations on vectors
Measurement	
MME1	Units of measurement and scale
Data and Probability	
MDP1	Random sampling
MDP2	Organising, displaying, and interpreting data
MDP3	Chance processes
MDP4	Probability models
MDP5	Centre and variability in different data sets
MDP6	Linear models
MDP7	Bivariate associations (and correlations)
Expressions, Equations and Algebra	
MEA1	The use of patterns to represent relationships
MEA2	Algebraic expressions
MEA3	Radicals
MEA4	Polynomials
MEA5	Linear equations and inequalities
Functions	
MFU1	The use of functions to model relationships

MFU2	Quadratic functions
MFU3	Exponential functions
MFU4	Trigonometric functions
Geometry	
MGE1	Spatial relationships: 2D and 3D geometric theorems and properties
MGE2	2D and 3D geometric rotation and transformations, including similarity transformations
MGE3	Pythagorean Theorem
General description, where relevant	
MGE1	The work of mathematicians, how to think like mathematicians, how mathematics contributes to and relates to real life/real world (epistemic knowledge)
MGE2	Moral and ethical issues in mathematics (e.g. reporting "average" or "median" to tell a different story)
MGE3	Concepts related to programming, data science, computational thinking
MGE4	Concepts related to global citizenship and sustainable development education, including environmental sustainability (e.g. reducing the cost of reducing carbon emissions by X & Y); education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms

National Language(s)

Content Codes	Modes/strands/contents/concepts/activities
Reading	
NLR1	Knowledge about authors and their work; whose contributions (contemporary and classical literature) are locally and globally recognized as cultural heritage
NLR2	The structural and linguistic features of different types of written and digital texts (including factual texts, imaginative texts, persuasive texts) for different purposes
NLR3	Grammatical features and linguistic techniques that are used to persuade, describe, explain, review, express feelings, ideas and emotions and present information
NLR4	Words to increase both everyday and technical vocabulary
NLR5	Words and cueing systems to improve reading and/or fluency
NLR6	Activities involving reading an extended range of texts for different purposes (summarizing, evaluating), audiences and contexts; different types of texts and writing styles
NLR7	Activities involving search of texts and documents (online; in libraries, etc)
NLR8	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
NLR9	Concepts related to programming, data science, computational thinking
Writing	
NLW1	The structural and linguistic features of an extended range of written and digital texts (including factual texts, imaginative texts, persuasive texts) for different purposes
NLW2	Activities involving processing text (forming the purpose, organize ideas); intended purpose and audience
NLW3	Drafting and editing texts for intended purpose, audience and context
NLW4	Activities involving feelings and ideas expressed through written texts
NLW5	Activities involving the use of rhetoric and layout to present texts in an accessible and purposeful format, use of different tools (handwriting and keyboarding)
NLW6	Activities involving the production and creation of an output using written texts (e.g. written, visual, digital)
NLW7	The work of writers (e.g. literature, newspapers, opinion papers, scientific writing, essays, poems, etc), how to think and write like writers, how written and digital texts contribute to and relate to real life/real world (epistemic knowledge)
NLW8	Moral and ethical issues (e.g. plagiarism, personal data protection and online sharing)

Speaking (Oracy)	
NLS1	The structural and linguistic features of different types of oral texts and how oral texts differ from written texts
NLS2	Formal and informal oral texts (different texts for different purposes, audiences and contexts e.g. prepare speeches/presentations on various topics; exchanging ideas and opinions)
NLS3	Grammatical features and linguistic techniques in oracy that are used to persuade, describe, explain, review, express feelings, ideas and emotions and present information
NLS4	The use of extended vocabulary in the context of oral texts (compared to written texts, including both everyday and technical words)
NLS5	Activities involving the use of rhetoric and presentation to deliver oral texts in an accessible and purposeful format
NLS6	Activities involving body language when presenting texts orally
NLS7	Moral and ethical issues in speaking (e.g. responsible and irresponsible use of certain expressions and vocabulary leading to bullying, violent, hate speech; oracy leading to responsible citizenship and social participation)
Listening	
NLL1	The structural and linguistic features of different types of oral texts, and how oral texts differ from written texts, which can help listening for accuracy, meaning and intent
NLL2	Grammatical features and linguistic techniques used in oracy to persuade, express feelings, ideas and emotions and present information and how these features and techniques differ from those used for written texts, which can help listening for accuracy, meaning and intent
NLL3	Activities involving processing information (e.g. purpose, rhetoric, etc) when listening to oral texts
NLL4	Activities involving body language when listening to others
NLL5	Activities involving listening to others' oral texts (e.g. give feedback or personal opinions)

Physical Education/Health

Content Codes	Strands/branches/contents/concepts/activities
Games and Sports	
PHG1	Activities involving games (e.g. ball skills, hitting/striking balls) and fundamental skills for such games and participating in specific games for individuals, pairs and teams
PHG2	Appropriate practices and behaviours (e.g. fairness) as a player and a referee/umpire
Concepts about movement	
PHM1	Movement concerning the body through space (e.g. running, hopping, skipping, gymnastics, swimming)
PHM2	Key movement concepts (e.g. force, speed, projection, etc)
Dance, Rhythmic Movement * Note: if countries include "dance" in arts, please note "n.a." here but mark the answers in arts.	
PHD1	The contribution of locally and globally recognized dancers, choreographers and their works (contemporary and classical) to cultural heritage
PHD2	The history of dance, including major performance styles
PHD3	Dance forms, dance pieces and the elements of dance used in different dance performances
PHD4	Activities involving feelings and ideas expressed through dance
PHD5	The work of dancers, how to think like dancers, how dancing contributes to and relates to real life/real world (epistemic knowledge)
PHD6	Activities involving the production and creation of choreographed and unchoreographed dance
PHD7	Moral,ethical and legal issues in dance (e.g. copyright of choreography, prejudice against some forms of dance)
Outdoor Education/Recreation Activities and Lifestyle Activities	
PHO1	Knowledge about human body related to physical, mental and spiritual practices (e.g. meditation, yoga and martial arts, such as judo)
PHO2	Activities and pastimes that students can engage in outside of school (e.g. hiking, skating, skiing, surfing, etc)
PHO3	Human connectedness with nature

Food and Nutrition	
PHF1	Food groups and healthy food choices
Relationships Education	
PHR1	The formation and maintenance of relationships; positive relationships and strategies for managing negative relationships or identifying inappropriate relationships
PHR2	Human sexuality, including reproduction
Safety	
PHS1	Safe practices and the risks and dangers (e.g. road safety, water safety, sun protection, fire safety, first aid, sanitation, protective behaviours such as child protection, drug education such as alcohol and illicit drugs)
Wellbeing (Physical fitness, Mental health and Managing Stress)	
PHW1	Concepts about fitness and well-being for a healthy lifestyle (e.g. daily fitness exercises)
PHW2	Knowledge about taking breaks (e.g. daily breaks and recess between classes, playgrounds)
PHW3	Strategies for dealing with difficulties encountered in life; knowledge of how to identify strengths; how to think positively; how to develop resilience and how to manage difficult situations; and how to maintain wellbeing through safe and healthy choices. Issues such as body image can also be included
PHW4	Knowledge about stress management (recognising causes, indicators and strategies and actions to be taken to manage stressful situations)
PHW5	Moral and ethical issues related to personal behaviour and its impact on others

Science/Natural Science

Content Codes	Subjects/strands/contents/concepts/activities
Biology/ life science	
NSB1	Life systems and processes, organisms, molecular biology, cell biology, genetics, tissues, ecosystems and the laws of biology
NSB2	Activities involving scientific investigation processes, practices and procedures in biology: the formulation of scientific questions and solutions; the investigation of causes, the formulation of hypotheses and hypotheses testing; data/evidence interpretation and presentation following investigation/experimentation
NSB3	Activities involving planning and conducting safe and rigorous investigations in biology
NSB4	The work of scientists in biology or life scientists, how to think and write like biologists/ life scientists, how biology/life science contributes to and relates to real life and the real world (epistemic knowledge)
NSB5	Moral and ethical issues in biology
NSB6	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
Physics	
NSP1	Different types of systems, and factors that contribute to their safe and efficient operation; personal, social and/or environmental impacts of a system; movement of objects, forces, energy and its transformations; the laws of physics
NSP2	Safe practices in physics
NSP3	Activities involving scientific investigation processes, practices and procedures in physics: the formulation of scientific questions and solutions; the investigation of causes, the formulation of hypotheses and hypotheses testing; data/evidence interpretation and presentation following investigation/experimentation
NSP4	Activities involving planning and conducting safe and rigorous investigations in physics
NSP5	The work of scientists in physics, how to think and write like scientists in physics, how physics contributes to and relates to real life and the real world (epistemic knowledge)
NSP6	Moral and ethical issues in physics
NSP7	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
Chemistry	
NSC1	Atoms, elements, compounds, chemical reactions, the periodic table, organic chemistry, properties and uses of fluids and the laws of chemistry

NSC2	The safe use of chemicals
NSC3	Activities involving investigation processes, practices and procedures in chemistry: the formulation of scientific questions and solutions; the investigation of causes, the formulation of hypotheses and hypotheses testing; data/evidence interpretation and presentation following investigation/experimentation
NSC4	Activities involving planning and conducting safe and rigorous investigations in chemistry
NSC5	The work of scientists in chemistry, how to think and write like scientists in chemistry, how chemistry contributes to and relates to real life and the real world (epistemic knowledge)
NSC6	Moral and ethical issues in chemistry
NSC7	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms
Earth Science/Space/Astronomy	
NSE1	The Universe; sustainability; water systems; heat; geological materials; factors that affect local water quality; impact of human activities and technologies on water resources; and the formation of the Earth
NSE2	Activities involving scientific investigation processes, practices and procedures in Earth Science/Space/Astronomy: the formulation of scientific questions and solutions; the investigation of causes, the formulation of hypotheses and hypotheses testing; data/evidence interpretation and presentation following investigation/experimentation
NSE3	Activities involving planning and conducting safe and rigorous investigations in Earth Science/Space/Astronomy
NSE4	The work of scientists in Earth Science/Space/Astronomy, how to think and write like scientists in Earth Science/Space/Astronomy, how Earth Science/Space/Astronomy contributes to and relates to real life and the real world (epistemic knowledge)
NSE5	Moral and ethical issues in Earth Science/Space/Astronomy
NSE6	Concepts related to global citizenship and sustainable development education, including environmental sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms

Technologies/Home Economics

Content Codes	Subjects/contents/concepts/activities
Craft/ Production/ Design and Technology	
TCD1	Using different materials (e.g. textiles, wood, food) and knowledge on how to select and use them (e.g. in a responsible way)
TCD2	Activities involving planning and development of a product or service, including the use of a design process (planning, organizing, making, evaluating)
TCD3	Activities involving design and the making of products, objects, artifacts, etc for particular purposes
TCD4	Knowledge of how to apply manual skills, tools and technologies to construct objects for specific uses, to satisfy needs or to solve problems
TCD5	Safe practices and procedures when using materials
TCD6	Activities involving evaluation of products or services in relation to specifications, user-requirements and operating conditions
TCD7	Economic, environmental and social impacts of selected materials when designing and making objects or solutions
Information and Communication Technologies	
TIC1	Knowledge about appropriate use of computer-based technologies
TIC2	Knowledge about ICT skills to locate, retrieve and generate information to complete specific tasks
TIC3	Different computer-based devices and software (spreadsheets; databases; graphics, etc.), and knowledge on how to use and apply them
TIC4	Computer-based systems and tools for communicating and collaborating safely with others
TIC5	Key concepts on computational thinking for programming/coding
TIC6	Key concepts on computational thinking for the creation of digital solutions
TIC7	Moral, ethical and legal issues related to ICT (e.g. the impact of communication and information technologies on work, life, society; risks; appropriate and inappropriate/illegal behavior associated with the use of computer-based technologies, such as copyright, intellectual property, privacy, ethical and respectful on-line behaviour)
Home Economics	
THE1	Knowledge about daily domestic life (e.g. cooking, clothing, housing); practical knowledge for living independently and in families (e.g. food choices; the use of household resources and equipment; consumer behavior and choices; family wellbeing and relationships)

THE2	Knowledge about financial literacy, consumer literacy, etc
THE3	Knowledge about citizenship
THE4	Academic and career guidance
THE5	Moral and ethical issues (e.g. gender equality, professional codes of conduct, bullying and relationships)
THE6	Concepts related to global citizenship and sustainable development education, including environmental and economic sustainability; education for international understanding, co-operation and peace; and education relating to human rights and fundamental freedoms

Annex B: CCM Draft Competencies Framework for Main Study

Note: the list of concepts/ competencies / constructs is based on discussions held during the development of the E2030 Learning Framework.

Foundational Literacies the "essential foundations"[11] required to thrive in 2030	1	Literacy	Literacy is defined as the ability to evaluate, use and engage with written, spoken, visual and multi-modal texts. Literate students are able to decode and construct different types of texts appropriate for life in and out of school. These texts will include subject-specific texts (such as those required in science or history) and visual texts such as diagrams and graphs. Literacy is understood as a foundation for communication.
	2	Numeracy	Numeracy is defined as the ability to access, use, interpret and communicate mathematical information and ideas. Numerate students are able to apply mathematical understanding and skills appropriate for life in and out of school. This includes applying the knowledge and skills acquired in mathematics when engaging with subject-specific content in other subject areas, where appropriate.
	3	ICT literacy/Digital literacy	Digital literacy is defined as the ability to use information and communication technologies effectively and appropriately in school and beyond school. Students with this capability are able to access, create and communicate information and concepts. They are able to adapt to changing technologies and use technologies to achieve a purpose and to communicate with others using devices in an ethical and responsible way.

[11] NOTE: For the purposes of the CCM exercise the five different literacies listed under this category refer to the competencies (knowledge and understanding, skills, attitudes and values) considered fundamental and from which further and enhanced learning can occur.

			Information and communication technologies (ICT) refer to all devices, networking components, applications, and systems that allow people and organizations to interact in the digital world.
	4	Data Literacy	Data literacy is defined as the ability to acquire meaningful information from and create and communicate using data based on mathematical understanding and skills and particularly in relation to statistics. Data literacy includes thinking critically about information presented in statistical formats or visualised format to analyse data and determine the accuracy of claims and objective interpretations made based on data.
	5	Physical/Health Literacy	Physical/Health literacy is defined as the ability and motivation to integrate physical, psychological, cognitive and social competencies for healthy and active living. This involves the acquisition of fitness and movement skills; positive attitudes towards movement and understandings regarding how and why to engage in movement activities. Physical/Health literate students have the knowledge, skills and attitudes (including motivation) to access, understand, evaluate and apply health information to make appropriate decisions regarding safe and healthy practices and behaviours. Health literacy tends to be linked to better access and use of health services, and with maintaining health and wellness (e.g. nutrition, mental health, relationships and keeping safe) throughout the life span.
Skills, Attitudes & Values for 2030-Constructs particular skills, attitudes and values young people need to thrive and shape their world)	6	Critical Thinking	Critical Thinking is defined as questioning and evaluating ideas and solutions (OECD 2016). This definition embodies components of metacognition, social and emotional skills (reflection and evaluation within a cultural context), attitudes and values (moral judgment and integration with one's own goals and values), as well as a combination of many cognitive skills including experiencing, observing, analyzing, conceptualizing, synthesizing, evaluating, reflecting, and communicating. Critical thinking is a higher order cognitive skill and includes inductive and deductive reasoning, making correct analyses, inferences, and evaluations.

7	Problem Solving	Problem-solving is defined as "the process of finding solutions to difficult or complex issues" (Oxford Dictionary). Problem-solving can refer to an individual's capacity to engage in cognitive processing to understand and resolve situations where a method or solution is not immediately obvious (OECD, 2016). Problem-solving is multi-faceted and multi-dimensional and can include a variety of forms including "interpersonal problem-solving," "intra-personal problem-solving," and "social problem-solving" as well as solving problems across a variety of disciplines (e.g. mathematics, science).
8	Cooperation/Collaboration	Cooperation/Collaboration refers to the ability to work well as member of a group or team, being loyal to the group, doing one's share. Teamwork is a strong predictor of wellbeing and of a fulfilled and successful life. Collaboration skills are character traits and skills (rather than moral values or attitudes).
9	Self-regulation/Self-control	Self-regulation/Self-control is defined as the ability to delay gratification, control impulses and modulate emotional expression. Self-control is an umbrella construct that bridges concepts and measurements from different disciplines (e.g. impulsivity, conscientiousness, delay of gratification, inattention-hyperactivity, executive function, willpower, intertemporal choice).
10	Empathy	Empathy is the capacity to share, understand, and respond with care to others. People tend to have more empathy with others who are more similar (with regard to culture and living conditions) to themselves and with people with whom they are more frequently interacting. Empathy is a multi-faceted construct, e.g. it involves perspective taking (cognitive skills) as well as social and emotioanl skills.
11	Respect	Respect is the valuing of self and others and the environment we are all in, and giving due regard for the feelings, wishes, or rights of self and others as well as those surrounding us that may not express wishes (e.g. environment, animals). Respect is demonstrated through behaviour and communication which will vary based on cultural context. Respect for

			cultural diversity, for example, means valuing the many differences and similarities of others that may be present. Respect for nature involves environmental ethics.
	12	Persistence/Resilience	Persistence/Resilience is the disposition required to maintain effort or interest in an activity in the face of difficulties encountered, the length of time or steps involved or when opposed by someone or something. The American Psychological Association defines resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress — such as family and relationship problems, serious health problems or workplace and financial stressors. It means "bouncing back" from difficult experiences.
	13	Trust	Trust is an attitude developed towards individuals and institutions/organisations based on a belief in the reliability and integrity of actions taken or planned. Trust is formed when one is confident that the actions of others are primarily based on good intentions and ethical considerations rather than being specifically aimed to impact negatively on individuals or groups. Trust is a multi-dimensional construct which is formed when care, competence and openness are exhibited by individuals and institutions/organisations. The degree of personal and/or societal wellness is closely related to the level of trust held within a community.
	14	Learning to Learn	Learning to learn or meta-learning is defined as the awareness and understanding of the phenomenon of learning itself, which enables students to take control of one's own learning. Implicit in this definition is the learner's perception of the learning context, which includes knowing what the expectations of the discipline are and, more narrowly, the demands of a given learning task"[2]. Learning to learn strategies aim to equip each student with the ability to reflect on her/his own learning; the skills required to understand, analyse and regulate her/his thinking, attitude and behaviours when engaged in learning; the ability to set goals for learning, to monitor progress, and to take steps and adjust to improve learning.

Key Concepts (concepts underpinning the 2030 Learning Framework)	15	Student Agency (e.g. motivation, purposefulness, growth mindset, self-directed learning, self-efficacy)	Student agency is the capacity and propensity to take purposeful initiative—the opposite of helplessness. Young people with high levels of agency do not respond passively to their circumstances; they tend to seek meaning and act with purpose to achieve the conditions they desire in their own and others' lives. They have the belief that they can have impact and influence over their learning and future. Agency involves having a sense of purpose, planning and taking action to achieve goals, reflecting on feedback and advice, and taking responsibility for actions. This competency is acquired through the development of knowledge, skills, attitudes and values concerning goal setting, monitoring progress, coping with set-backs, reflecting and evaluating. Student agency is closely linked to: • Having a growth mindset, which refers to the understanding and appreciation that one's learning potential is not limited or pre-determined and that abilities can be developed through both effort and persistence. • Student active participation in the direction of one's own learning (rather than passively sitting in the classroom) • Student motivation as part of student agency in the curriculum context is defined as being purposeful and behaving or taking action for intrinsic or extrinsic reasons and includes constructs such as pro-activeness, self regulation and curiosity. • Self-directed learning, which involves a process whereby students (either with or without assistance) take initiative, form learning goals, select learning activities, accept the associated risks and assess their achievements. • Self-efficacy, which is a key aspect of student agency in that it is related to self confidence and entails beliefs that one can understand what is required, make appropriate judgements, navigate the possible setbacks and influence and make a difference concerning learning pathways and trajectories

	16	Co-agency (e.g. student-teachers; student-peers; student-parents; student-community outside of school).	"Co-agency" refers to the interactive, mutually supportive relationships that help learners to progress towards their valued goals. To help develop agency, educators must not only recognise learners' individuality, but also acknowledge the wider set of relationships – with their teachers, peers, families and communities – that influence their learning. In this context, everyone should be considered a learner, not only students but also teachers, school managers, parents and communities.
Transformative Competencies and Competency Development for 2030[12]: considered essential for transforming society for a better future and competencies necessary for the development of student agency	17	Creating new value (including a construct "creative thinking")	Creating new value refers to the ability to add values to the society by identifying new sources of growth to prepare for 2030 such as developing new solutions, products and services, new jobs, new processes and methods, new ways of thinking and living, new enterprises, new sectors, new business models and new social models. Creativity is one of the key constructs underpinning the competency creating new value. Known as "outside the box thinking," creativity is defined as the ability to approach problems or situations with fresh perspectives resulting in seemingly unorthodox solutions. Creativity can be approached from two perspectives: firstly, as the individual's ability to produce a novel combination of thoughts and concepts that is subsequently expressed in the world (Sawyer, 2012); secondly, as the production of a work that is judged as original and socially valuable (useful) in some way by a knowledgeable social group (Sawyer, 2012; Sternberg and Lubart, 1999).
	18	Taking responsibility (including a construct "responsibility")	Taking responsibility refers to the ability to act responsibly for a good cause, principles and integrity for individual and collective welll-being. A responsible person demonstrates the willingness to accept praise, blame, reward, or punishment for an act or omission and to accept the consequences of their behaviour, they have a commitment to the group and others, they can be depended on, and they have integrity.

[12] NOTE: Depending on how the constructs of Anticipation, Action, Reflection are actually represented in learning area curricula, mapping of these might indicate each at varying levels and/or as an intended cycle (AAR)

| 19 | Reconciling tensions and dilemmas (including a construct "conflict resolution") | Reconciling tensions and dilemmas requires the ability to deal with tensions, dilemmas, trade-offs, nexus, ambiguity, non-simultaneity, and non-linear processes in a constructive, future-oriented way; take a long-term perspective, going beyond the either-or; avoid rushing to a single answer, to an either-or solution, but rather deal with tensions, dilemmas and trade-offs – for instance, between equity and freedom; autonomy and solidarity; efficiency and democratic processes; ecology and simplistic economic models ; diversity and universality; and innovation and continuity – by integrating seemingly contradictory or incompatible goals as aspects of the same reality.

A person who can reconcile tensions and dilemmas can cope with tensions and dilemmas reflectively with multiple, dynamic and often conflicting aspects and recognizing that there may be more than one solution or solution method.

Conflict resolution requires purposeful listening, clarification of viewpoints, finding common understandings or viewpoints, identifying solutions and evaluating outcomes asmethods and processes involved in facilitating the peaceful ending of conflict and retribution. This competency involves acquiring and utilizing skills such as |
| 20 | Anticipation | Anticipation is the the ability to understand others' intentions, actions and feelings and anticipate short- and long-term consequences, but also the ability to widen one's perspectives and preparedness to create and influence the future.

From a subject-specific perspective, in mathematics, for example, anticipation is a key competency for certain types of data analysis involving predictions, simulations and forecast; in sciences, it can be captured as part of the scientific process of hypothesis making.

Anticipation enables individuals to reach a level of social maturity that allows them to adopt different perspectives, make independent judgments and take responsibility for their decisions and actions. Students should be able to feel excitement about real life and the future, instead of believing |

			that the future is already determined by nature or by others outside of their control. Without this, students will have difficulty coping with challenges and opportunities of the world. They should feel prepared to anticipate and influence change with confidence. For this, they should have not only the knowledge base (such as history, environmental changes, current demographic changes, current news events), cognitive skills (such as analytical or critical thinking skills, or general problem-solving skills) to anticipate future needs or the consequences of today's action on future; but also social and behavioural components such as motivation, emotions, commitments, and values.
21	Action		Action as a competency involves the ability to act with a willingness and capacity for a defined purpose. It involves the individuals' disposition to act on what they are learning or want to learn or in response to a situation; to utilize skills acquired to act or contribute to a situation or circumstances and to evaluate the impact of one's action/s. In a subject-specific context, as in science, for example, action can be captured as part of the scientific process of hypothesis testing and running experiments in a laboratory.
22	Reflection		Reflection the ability to take a critical stance before deciding, choosing and acting, such as, by stepping back from the assumed, known, apparent, and accepted, comparing a given situation from other, different perspectives, and looking beyond the immediate situation to the long-term and indirect effects of one's decisions and actions. This enables individuals to reach a level of social maturity that allows them to adopt different perspectives, make independent judgments and take responsibility for their decisions and actions. The reflective approach is based on a model of human development in which individuals are able to integrate increasing levels of complexity into their thinking and actions. It involves linking a current experience to previous learnings. Reflection also involves drawing forth cognitive and emotional information from several sources: visual, auditory, kinaesthetic, and tactile. To reflect, we must act upon and process the information, synthesizing and evaluating the data. In the end, reflecting also means applying what we've learned to contexts beyond the original situations in which we learned something. The reflective approach is based on a model of human development in which individuals are able to integrate increasing levels of complexity

			into their thinking and actions. In a subject-specific context, as in science, for example, it can take place as part of the scientific process as one reflects on the research findings of an experiment.
Compound Competencies for 2030: competencies that are inclusive of knowledge, skills, attitudes and values essential for individual, social and environmental wellbeing in 2030	23	Global competency	Global competency is the capacity to examine local, global and intercultural issues, to understand and appreciate the perspectives and world views of others, to engage in open, appropriate and effective interactions with people from different cultures, and to act for collective well-being.
	24	Media literacy	Media literacy is defined as the ability to think critically and analyse what one reads in the media, including social media and news sites. This includes recognising "fake news" or the ability to distinguish what is true from what is not as well as to be able to assess, evaluate and reflect on the information that is given in order to make informed and ethical judgements about it.
	25	Literacy for sustainable development	Literacy for sustainable development refers to the knowledge, skills, attitudes and values needed to promote sustainable development. To be literate in sustainable development requires understanding how social, economic and environmental systems interact and support life, recognising and appreciating different perspectives that influence sustainable development and participating in activities that support more sustainable ways of living.
	26	Computational thinking/Programming/ Coding	Computational thinking involves formulating problems and developing solutions that can be carried out by computer-based technologies. Programming and coding involve the development of knowledge,

			understanding and skills regarding the language, patterns, processes and systems needed to instruct/direct devices such as computers and robots.
	27	Financial literacy	Financial literacy is the ability to apply financial knowledge and skills to real-life situations involving financial issues and decisions. It involves knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts. Financial decisions are part of everyone's lives at all ages, from spending pocket money, to entering the world of work, managing one's own budget, purchasing goods, saving for future expenses, understanding credit and loan payments, and to retirement planning. Financial literacy helps individuals to navigate these decisions and strengthens their individual financial well-being as well as that of society as a whole as it promotes inclusive growth and more resilient financial systems and economies.
	28	Entrepreneurship	Entrepreneurship is defined as the ability to add value. It involves evaluating situations, organising resources, creating and developing opportunities for adding value. This value might be a product, service, idea or a solution to address an issue or satisfy a need.

Annex C: Example of mapping grid

	COMPETENCIES → TECHNOLOGIES CONTENT	Foundational Literacies					Skills, Attitudes & Values for 2030									Key Concepts of the 2030 Learning Framework				Competency Development Cycle for 2030				Compound Competencies for 2030			
Course Codes	Subjects/contents/concepts/activities	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
Craft/ Production Design and Technology																											
TCD1	Activities involving the use of different materials (e.g. textiles, wood, food) and knowledge on how to select and use them (e.g. in a responsible way).																										
TCD2	Activities involving e.g. planning and development of a product or service, including the use of a design process (planning, organising, making, evaluating).																										
TCD3	Activities involving e.g. design and the making of products, objects, artefacts, etc. for particular purposes using different materials (e.g. textiles, wood, food).																										
TCD4	Knowledge on how to apply manual skills, tools and technologies to construct objects for specific uses, to satisfy needs or to solve problems. Actual activities can follow.																										
TCD5	Safe practices and procedures when using materials.																										
TCD6	Activities involving e.g. evaluation of products or services in relation to specifications, user-requirements and operating conditions.																										
TCD7	Economic, environmental and social impacts of selected materials when designing and making objects or solutions.																										
Information and Communication Technologies																											
TIC1	Knowledge about appropriate use of computer-based technologies. Actual activities can follow.																										
TIC2	Knowledge about ICT skills to locate, retrieve and generate information to complete specific tasks. Actual activities can follow.																										
TIC3	Different computer-based devices and software (spreadsheets, databases, graphics, etc.), and knowledge on how to use and apply them. Actual activities can follow.																										
TIC4	Computer-based systems and tools for communicating and collaborating safely with others. Actual activities can follow.																										
TIC5	Key concepts on computational thinking (the programming/coding).																										
TIC6	Key concepts on computational thinking for the creation of digital solutions.																										
TIC7	Moral and ethical issues related to ICT (e.g. the impact of communications and information technologies on work, life, society; Risks; appropriate and inappropriate/illegal behavior associated with the use of computer-based technologies, such as copyright, intellectual property, privacy, ethical and respectful on-line behaviour).																										
Home Economics																											
THE1	Knowledge about daily domestic life (e.g. cooking).																										
THE2	Practical knowledge and skills for living independently and in families (e.g. food choices and food preparation; the use of household resources and equipment; consumer behavior and choices; family wellbeing and relationships).																										
THE3	Knowledge about financial literacy, consumer literacy, etc.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
THE4	Knowledge about citizenship.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
THE5	Academic and career guidance.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
THE6	Moral and ethical issues (e.g. gender equality, professional code of conducts, bullying and relations).	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
THE7	Concepts related to global citizenship and sustainable development education, including environmental and economic sustainability; education for international understanding, co-operation and peace; and educators relating to human-rights and fundamental freedoms.																										