

Cross-curricular teaching: How does it work?

By Virginie Timmerman, Programme coordinator at the CIEP

The CIEP and its 7 partners on the European project entitled CROSSCUT, co-funded by Erasmus+, organised a European dissemination event on 7 November 2017 to present the first output of the project: the situational survey about interdisciplinarity which took place in five of the European countries involved in the project. This synthesis covers the main points of the discussion about cross-curricular teaching.

Stéphane Foin opened the seminar by introducing CROSSCUT, which started in September 2016, to support the shift of the European educative system towards cross-curricular approaches¹. In order to do so, the CIEP, as the project's coordinator, has gathered 7 teacher training and education research institutions specialized in cross-curricular methods and online training:

- The Laboratory for Coherent Education and Learning of the University of Southern Denmark
- CICERO Learning of the University of Helsinki, in Finland
- The Institut français de l'Education, in France
- The Norwegian Centre for ICT in Education, in Norway
- The Educational Research Institute, in Poland
- The University of Minho, in Portugal
- The University of Aberta, in Portugal.

CROSSCUT was designed to support secondary-level teachers' professional development by training them to implement innovative cross-curricular approaches and, also, by raising awareness among national and European institutions on how to stimulate and implement successful cross-curricular practices in schools.

1. Cross-curricular teaching: a European overview

1.1 Few key ideas about cross-curricular teaching

Dominique Rojat, Inspector-General at the French Ministry of Education, started his presentation with an **example of a cross – curricular approach**.

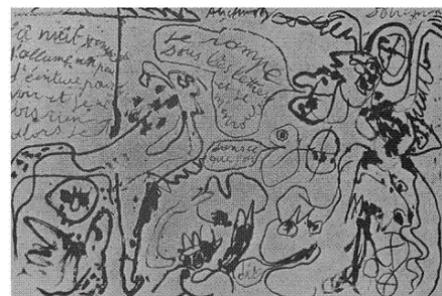


A biology teacher wants to teach a lesson about nutrition: what do human beings eat? He starts with a painting "Fruit and vegetables market" by Pieter Aertsz (1507 – 1575) to observe what could be eaten at this time and in this particular place. Students might be surprised not to find what they usually eat, so the teacher must study with them the historical context of the painting, which was painted in the 16th century in the Netherlands, to explain why, for instance, you cannot find tomatoes. He explains the etymology of the word to give an answer. The word tomato comes from the Aztec *tomatl*, and the

fruit was brought back to Europe when European explorers discovered South America. To teach human nutrition, the teacher used an interdisciplinary progression: biology, history of arts, history, etymology.

Our ancestors, homo habilis, when making stone tools, did not distinguish their skills as geologists or engineers. It was an **un-disciplinary era**.

Today, we are in a **discipline convergence period**, regarding the convergence in the arts for instance. The cobra movement was created in 1848 rejecting the defined categories. Artists created artworks combining several arts. Some artists even cooperated to create common artworks, the painting-poetry "I crawl under letters" created by Alechinsky and Dotremont for instance.



¹ The term cross-curricular has been used throughout this report. However, interdisciplinarity and interdisciplinary are often used interchangeably.

This convergence also happened in other subjects like science. While defining the possible structure of DNA molecule, James Watson and Francis Crick, two biologists, published an article in chemistry about molecular structure defined thanks to physical works (X ray diffraction by crystals) written by Rosalind Franklin.

The shift between the two eras can be explained through history. In the 4th century before our era, Aristotle started to think about subjects, but then he was at the same time a philosopher, a scientist, a poet, a mathematician and a politician. He was a savant, all his knowledge was in the same brain.

Then, in the 18th century, Diderot and d'Alembert wanted to gather all the knowledge in the world in the Encyclopaedia since the knowledge expanded, a brain was not big enough anymore to know everything.

The more knowledge increases, the more it fragments. Education follows the same pattern in teaching organisation and teachers' specialisation. Subjects and specialisations are the results of the increase in knowledge volume.

However, the convergence of knowledge and interdisciplinary approaches are explained by the need to understand the **complexity of the world**, as Edgard Morin, a French sociologist and philosopher, explains among other intellectuals. If subjects are necessary to investigate exhaustively one dimension of reality, understanding reality as a whole requires interdisciplinarity.

As far as education is concerned, several arguments support cross-curricular teaching:

- Schools must prepare students to the complexity of the real world. Interdisciplinarity turns knowledge into a coherent whole and bring lessons into the real world.
- It allows the study of objects, concepts and events from different angles and can put these various subjects into perspective in relation to each other.
- It is a tool to solve students' difficulties. The weakest pupils have an easier access to knowledge.
- At the same time, it is an excellence tool. It allows the development of tomorrow's knowledge.
- One of Dominique Rojat's major hypothesis is that interdisciplinarity can partly compensate the differences in social backgrounds. Students from disadvantaged backgrounds will make the connections mentioned earlier thanks to school, while students from privileged backgrounds will make them through their interactions with their environment.

In practical terms, cross-curricular teaching covers various activities. Teachers can plan it individually or collectively, links between subjects can be made as other subjects can partially be used to explain one concept in a subject, a large variety of projects can be led by teachers, and so on. The major fear of teachers can be defeated, subjects and interdisciplinarity are intrinsically linked. Teachers still need to be experts in their topics in order to set up cross-curricular approaches. He concluded that interdisciplinarity was not a miracle solution. It must be integrated in schedules. Yet, a combination of several types of pedagogical approaches is necessary to foster students' development.

1.2 Situational survey, an insight on interdisciplinarity in Europe today

1.2.1 Introduction

Claus Michelsen, a professor at the Laboratory for Coherent Education and Learning of Syddank University, presented the situational survey about cross-curricular teaching. It was conducted between October 2016 and May 2017 in five European countries: Denmark, France, Norway, Poland and Portugal.

The working **definition of cross-curricular teaching** in CROSSCUT is: "*Cross-curricular teaching is teaching that involves a conscious effort to apply knowledge, skills and competences to more than one subject area simultaneously with the rationale of forming autonomous citizens, solidary and responsible, intended for a democratic, inclusive and fair society.*"²

The performed investigations were exploratory and sought to offer an insight into the current status of cross-curricular teaching in European countries, provide examples of such teaching and identify enablers and obstacles for cross-curricular teaching.

European education systems were broadly represented in this survey. In total, **23 schools** were visited by CROSSCUT partners. 31 observations of teaching sessions, interviews with 26 school leaders, and focus group interviews with 119 teachers were carried out at each school. The survey included all core subjects of lower and upper secondary education.

² The CROSSCUT definition of cross-curricular teaching is inspired by several different definitions and descriptions of cross- and interdisciplinary teaching e.g. Amadio (2013) and Eurydice (2012)

The situational survey gives an overview of cross-curricular teaching in Europe today and underlines three main points: how school leaders and teachers translate interdisciplinarity in their school or, intended and realised cross-curricular teaching; obstacles and enablers of cross-curricular teaching, and skills and training required to implement it.

1.2.2 Intended versus realised cross-curricular teaching

Catherine Reverdy, an engineer at the French Education Institute of the Ecole Normale Supérieure in Lyon, presented intended and realised cross-curricular teaching in the countries studied.

Cross-curricular teaching is partially stated in national curricula³. Even though the concept is mentioned, national curricula are still subject-based and the definition and orientations about cross-curricular teaching are unclear. The situation is evolving, several reforms have been made, for instance in 2016 in the lower secondary education in France in order to institutionalise interdisciplinarity practices.

Therefore, **cross-curricular activities are diverse** in Europe, inside the same country, and even in the same school. It varies according to the level of teachers' motivation and involvement and their attitude towards the approach. It is often seen as something optional because of the lack of time. So cross-curricular teaching in practice can be: interdisciplinary projects, co-planning, co-teaching, shared themes between subjects, extra-curricular activities. Some questions and comments were raised about **traditional subject-based teaching, school pedagogical autonomy** and the **professional beliefs of teachers**. What would be the core motivation to implement cross-curricular teaching since the grading system is linked to subjects? A grading system based on competences could be an answer. During the focus group discussion with teachers and the observation of lessons, some teachers explained that implementing cross-curricular teaching was difficult. A Danish concrete example of co-teaching was used to illustrate how teachers find interdisciplinarity difficult while teaching the same concepts through biology and mathematics. To solve this kind of problem, teachers should be trained, through continuing education and mentoring for instance, to cross-curricular approaches and to understand other subjects. A competence framework on cross-curricular teaching should be created to support teachers who wish to improve their skills. School leaders are also involved. They need to support teachers in their schools by allocating material and time to the development of cross-curricular teaching.

1.2.3 Obstacles and enablers of cross-curricular teaching

Claus Michelsen outlined the obstacles and enablers of cross-curricular teaching identified by teachers and school leaders during the investigations. The **main enablers** stated were: collaboration skills, teamwork, mutual understanding, reflections and experiences. Whereas the **main obstacles** raised were: teachers' attitude and capabilities and practical issues such as strict national curriculum or lack of time.

Enablers	Obstacles
<ul style="list-style-type: none"> • Time and space for collaboration • Curricular flexibility and greater autonomy • Evaluation of cross-curricular skills • Training in cross-curricular teaching • Mutual understanding and insight into other subjects • Open-minded teachers 	<ul style="list-style-type: none"> • Lack of time • Strict subject-oriented curriculum • Lack of evaluation of cross-curricular competences • Teacher's lack of interest and willingness • Teachers' insecurity and unfamiliarity

Enablers and constraints should be discussed by focusing one specific level at a time: system, management, individual or classroom level. Four main questions were raised:

- At the **system level**, how can we go beyond the contrast, in official documents, between the core-curriculum structured around mono-disciplinary school subjects and the overall learning objectives stating explicit or implicit cross-curricular dimension?

³ National curricula are the sets of basic skills and the common culture for teachers, school leaders and all education specialists.

- At the **management level**, how can school leaders facilitate professional trust among teachers to support team working, which is necessary to implement cross-curricular teaching?
- At the **individual level**, what kind of professional development is needed by teachers to spark an interest in cross-curricular teaching?
- At the **classroom level**, how can teachers familiarise themselves with cross-curricular activities and feel comfortable enough to contribute to further developments?

Some comments were made about the four questions. The first conclusion was the four levels were linked and should be addressed at the same time to support effective cross-curricular teaching.

Firstly, about the system level, the teaching context based on national curricula should be rethought. For instance, the assessment of students must evolve to take into account all pedagogical approaches. Secondly, at the management level, the school leaders do not really seem interested in cross-curricular teaching mostly because of national curricula. Yet, they should be facilitators and could coordinate the subject curricula so that all the teachers can know what their colleagues do; offer the proper surrounding environment with adequate material and time, paid and included in the timetables. Thirdly, at the individual levels, teachers should be trained so that they feel comfortable not to know everything and to be able to find answers. Finally, at the classroom level, teachers should share teaching practices. Working, teaching together, going in the colleagues' classrooms is essential to train teachers and share experiences. However, opening the classroom doors require teachers to adopt a new behaviour. Learning from each other needs to become a habit and that means mentalities will have to evolve.

1.2.4 Skills and training required to implement cross-curricular teaching

Marijana Kelentrić, a researcher at the Norwegian Centre for Information and Communication Technology in education, talked about the findings of the situational survey, and more particularly about the skills and training required in order to implement cross-curricular teaching.

During the interviews, the skills identified by school leaders and teachers were diverse and presented in the table below:

School leaders	Teachers
<ul style="list-style-type: none"> • Strong pedagogical competences • Solid subject knowledge • Willingness to collaborate • Openness to changes and development 	<ul style="list-style-type: none"> • Individual motivation for cross-curricular teaching • Insight into other disciplines • Curiosity and broad intellectual interests • Management skills and project competences • Good relations among colleagues • Broad life experience

To develop these skills, teachers' need for **training and professional development** would include:

- Common understanding of "cross-curricular teaching",
- Realisation of the learning potential of interdisciplinarity,
- Concrete example of cross-curricular teaching activities,
- Leadership in schools.

The situational survey underlined the diversity of pedagogical approaches and raised several questions: how would it be possible to make cross-curricular teaching universal? How to teach these competences to European teachers? The universal language in education is pedagogy, what does it bring to students?

All the competences described in CROSSCUT need further refinement. For instance, one important skill to develop is collaboration. Openness was also quoted, meaning the mindset of teachers must evolve. Teachers need to integrate the learning dimension of their job.

To enable teachers to understand cross-curricular teaching better, they also need examples of cross-curricular activities. It could mean examples on how to interact with students and colleagues about interdisciplinarity, activities on complex thinking and cross-curricular subjects. Plenty of contents and activities should be offered to teachers so that they can work on their attitudes, skills and competences.

2. How to implement cross-curricular teaching?

2.1 A common competence framework

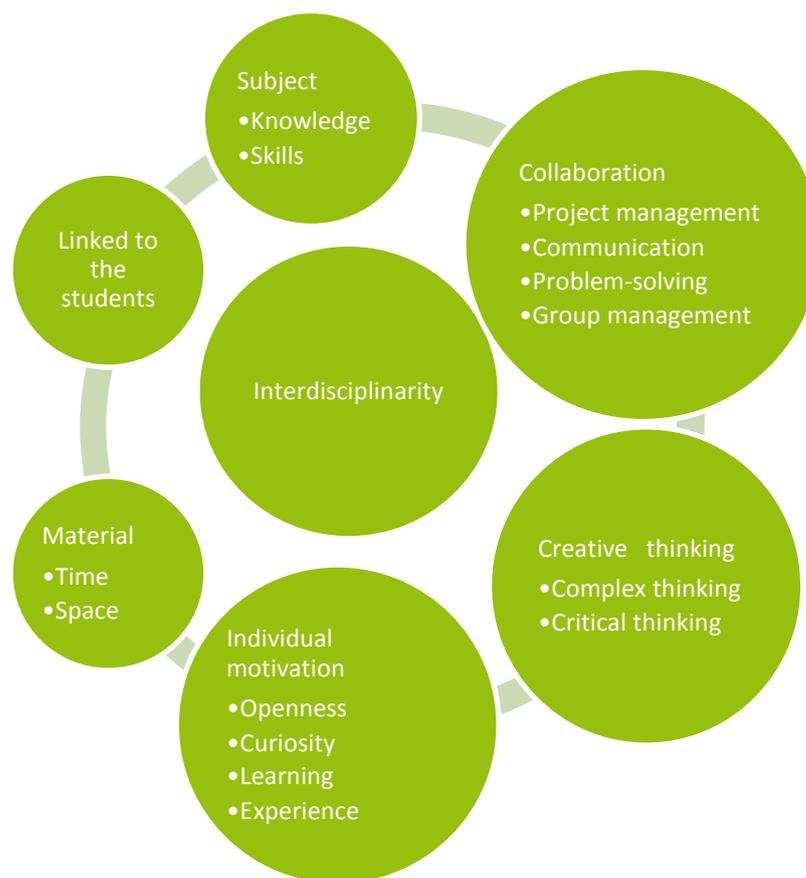
The next step of CROSSCUT is the creation of a common competence framework. It aims at defining competences that teachers should acquire, during their initial training and throughout their career, to implement cross-curricular activities in their classroom and in their school. The document will be an exhaustive list of the required competences, subdivided in precisely described skills, attitudes and knowledge. The target is teachers and school leaders. This tool will be useful for the project itself and beyond: it will develop the next project's tools, strengthen European curricula and describe European standards for cross-curricular teaching.

Common competence frameworks on transversal competencies already exist: there is for instance the 21st century skills and competences

for New Millennium Learners in OECD countries⁴, the European principles for teacher competences and qualifications by the Directorate General for Education and Training of the European Commission⁵, etc.

The common competence framework on cross-curricular teaching could be based on the study of the existing competence frameworks, on the national curricula and on the situational survey. It should draw on the constraints, the needs and the facilitators identified during the investigations.

The graphic on the right summarizes the reflections around the competences to develop, the transversal issues that can be linked to the questions and that should be addressed by the training since the common competence framework will be the base of the learning platform.



2.2 A Learning platform

The situational survey and the common competence framework will lead to the development of a learning platform. It will equip teachers and school leaders with the necessary competences, skills and tools to implement innovative interdisciplinary activities that enhance the pupils' development of key competences. It will be designed as a multilingual learning virtual environment, which will host training modules and teaching resources. The learning process will combine autonomous self-study and collaborative activities.

The learning platform will develop skills for cross-curricular teaching, encourage interdisciplinary innovative activities and collaborative working and improve pupil motivation and engagement and support their development of key competences.

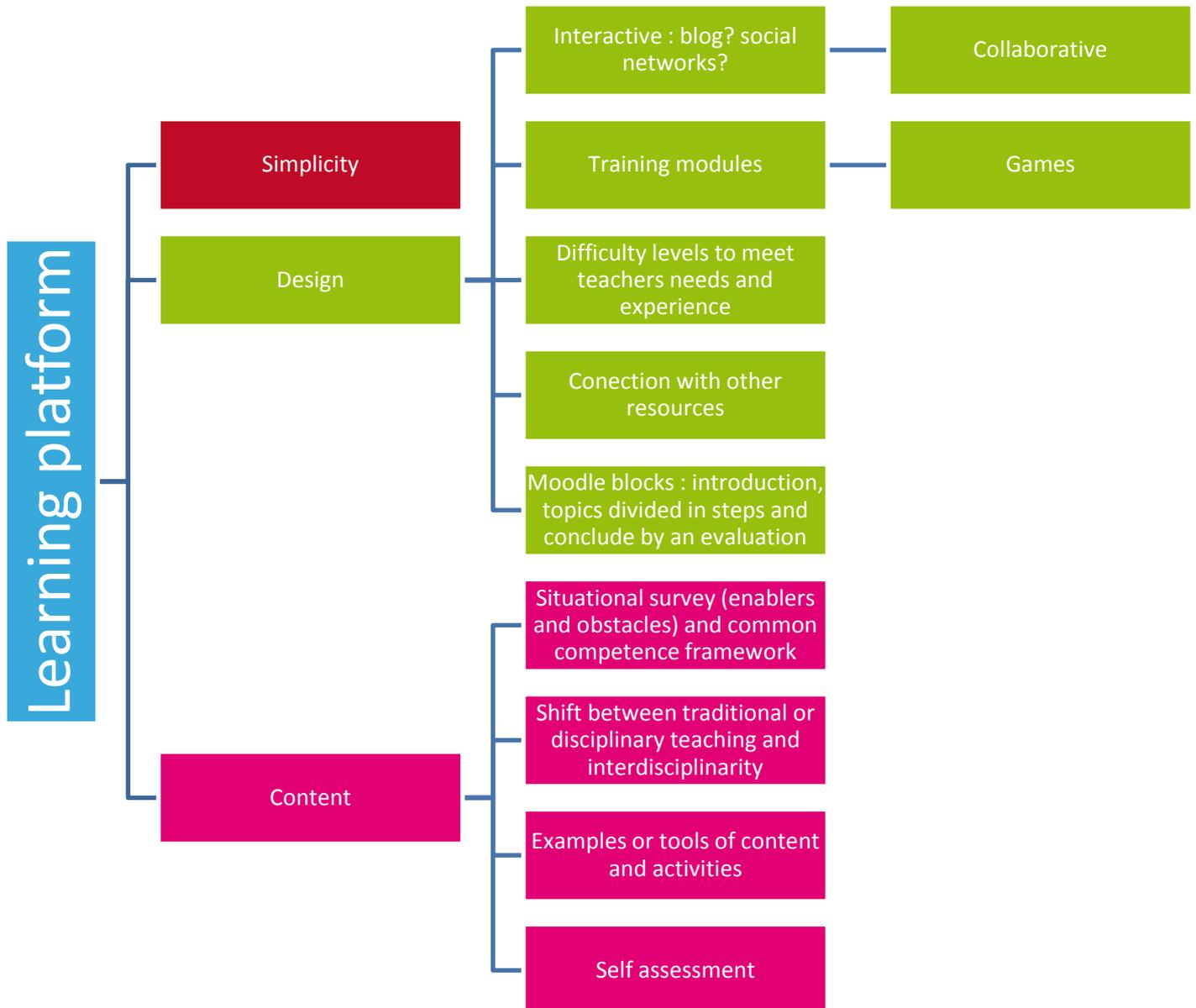
⁴ Ananiadou K. and M. Claro (2009), "21st century skills and competences for New Millennium Learners in OECD countries", *OECD Education Working Papers*, No41, OECD Publishing, Paris. <http://dx.doi.org/10.1787/218525261154>

⁵ 2006/962/EC : RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on key competences for lifelong learning, of 18 December 2006, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32006H0962&from=EN>

The graphic below summarizes the different approaches discussed around the content and the design of the platform.

Among the transversal questions asked, the opportunity of creating a new platform was raised. And if a new platform must be created, what would be its specificities? Could it be created on an existing platform? How the platform would be different from others? The issue of its referencing and ranking needs to be discussed.

The CROSSCUT learning platform could be modeled on existing famous platforms such as Arte one, Google, and so on.



The seminar concluded with the working group on the common competence framework and the learning platform and with a discussion on the next steps for CROSSCUT.