KeyCoNet 2013 Literature Review:
Key competence development in school education in Europe

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Introduction

This literature review outlines the key issues in relation to the definition and implementation of key competences in school education in Europe, at the classroom/school as well as systemic level. In order to focus the areas explored by our network’s team of researchers, a matrix was formulated and agreed upon by all contributors to the literature review (see annex 1). As is evident from the matrix, the key focus is on analyzing implementation policies and practice, which constitutes the network’s core remit. The review examines the various interrelated dimensions of innovative learning environments (formal and non-formal), curriculum design, teacher training, pedagogy and socio-economic issues, across a wide range of sources including scientific reviews and books, reports from EU and other international organizations, as well as national key reports about specific relevant initiatives.

The literature review is divided into three sections, each with a specific focus. The first section written by the University of Helsinki examines the implementation of key competences across school education in Europe, from the point of view of practice. The classroom and non-formal learning environments are therefore considered in relation to technology enhanced as well as collaborative and multidisciplinary learning, and the key competences of teachers. The authors consider the approaches to implementation from the national, regional and school levels.

The second section of the review is written by the European Institute of Education and Social Policy (EIESP) and analyzes approaches to the implementation of key competences in school education at systemic level, focusing on curriculum design and implementation and socio-economic aspects, as well as taking a closer look at some of the literature on transversal and cross-curricular key competences.

The final section written by l’Institut Français de l’Éducation (IFE), belonging to l’Ecole Normale Supérieure de Lyon (ENS) provides a specific example of how key competence development has been framed in French-speaking countries, considering particularly the definition and integration of competences in schools in France, and the assessment approaches used.

This general literature review [D3.1 (a)] addressing a variety of issues related to key competence development in schools in Europe is complemented by another review [D3.1 (b) by D. Pepper] specifically on approaches used for the assessment of key competences. Considering the importance of assessment for the successful implementation of key competences in school education, it was decided this topic deserved separate attention.

This current version of the general literature review is in its first draft and will be updated yearly throughout the project’s lifetime. The aim of this first version was to cover the bulk of topics detailed in the matrix, and be guided on the basis of these initial findings as to which areas we would like to investigate further in 2013 and 2014. One such area which we plan to explore in next year’s update is the extent to which countries use research and evidence to inform the implementation of policy in this area. When such an evidence-based approach is used, what are the outcomes and where evaluations exist what do we learn from them? The intention is to analyze international influences, such as how the latest PISA student data has impacted on various countries’ formulation of key competence policy, also looking closely at a very pertinent OECD working paper1 (published as this first draft of the literature review was being finalized) concerning how diverse stakeholders at various levels are involved in curriculum innovations in different countries. In the forthcoming updates to the literature review the intention is to

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better integrate the results of the various sections, and to include more examples of relevant literature emanating from countries represented within the network.

**Defining competence – use of terminology**

In an attempt to clarify the concept of ‘competence’, Weinert (2001) relates the term to the Greek notion of *arete*, meaning excellence, in the sense of being the best; also with the Latin term *virtus*, a kind of moral excellence, while it is generally understood as being concerned with ‘what people can do rather than what they know’. The concept applies to individuals, social groups or institutions, and the words ‘competence’ and ‘competency’, or its plural form ‘competencies’, are often used interchangeably. This use neglects the large variety of meanings of ‘competence’, that can be captured by the terms ‘ability’, ‘aptitude’, ‘capability’, ‘effectiveness’ and ‘skill’. Resulting from this overgeneralisation, the notion of competence, and its plural ‘competences’, has been replaced by the narrower version of ‘competency’, or the plural form ‘competencies’ recently. The latter denote discrete skills and activities that individuals can perform (Allan, 2011).

The origin of the discussion on competence can be traced back to 1996 (Dabrowski et al., 2011) when the Council of Europe defined active citizenship as the capacity to accept responsibilities, participate in group decisions, resolve conflicts in a non-violent manner, and play a part in running and improving democratic institutions. In this way, competences are introduced in the rhetoric of official documents with a view to cover essential socio-political aspects in the life of the European citizen. The delineation of ‘critical judgment’ expresses the need to provide an argument-based ‘opposing’ force to information dissemination by the mass media and advertisers. Apparently, this policy aims to empower citizens with cognitive tools enabling knowledge expansion beyond the limits of information manipulation and propaganda of the media.

Recent studies and research demonstrate that there is a broad range of terminology used in the 27 member states linked to philosophies of education, history, approaches to learning and to curriculum development, recent reform processes and international influences whether research (e.g. DeSeCo) or policy "learning" through EU and other funded programmes, etc.² We have included below 2 boxes with quotes from Hoskins & Deakin Crick (2010) with their suggested definitions of competence and key competences (*our bold*).

Similar terms (once translated into English for the purposes of comparative work) may not cover the same content and approach. Different terms do not necessarily indicate different philosophies, approaches and content.

The level of influence of the vocational sector and the labour market is variable among the countries, but may be significant.

"What is a Competence?³

**A competence refers to a complex combination of knowledge, skills, understanding, values, attitudes and desire which lead to effective, embodied human action in the world in a particular domain.** One’s achievement at work, in personal relationships or in civil society are not based simply on the accumulation of second hand knowledge stored as data, but as a combination of this knowledge with

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² J. Gordon et al (2009)
skills, values, attitudes, desires and motivation and its application in a particular human setting at a particular point in a trajectory in time. **Competence implies a sense of agency, action and value.**

To understand competences, the spotlight is on the accomplishment of ‘real world tasks’ and on a multiplicity of ways of knowing – for example, knowing how to do something; knowing oneself and one’s desires, or knowing why something is important, as well as knowing about something. This is similar to Delors’ 4 pillars of learning developed for UNESCO: ‘learning to live together, learning to know, learning to do and learning to be.’ (Delors, 1996). Importantly, competences are expressed in action and by definition are embedded in narratives and shaped by values – this action, or way of doing something is more important or desirable than that one because it leads to a particular end. Just as a competence is recognised in the context of the real world, the development of competences is also based in real world experiences and takes into account the full spectrum of learning opportunities (informal, non-formal and formal learning) throughout the life span. Perhaps the most thorough recent exploration of the concept was undertaken by OECD in DeSeCo1. Drawing on this work, the term competence was defined by Rychen and Salagnick (2003, p. 43) as:

*the ability to successfully meet complex demands in a particular context through the mobilisation of psychosocial prerequisites (including cognitive and non-cognitive aspects)*

and as

*the internal mental structures in the sense of abilities, dispositions or resources embedded in the individual* in interaction with a ‘specific real world task or demand.’

Source: Hoskins & Deakin Crick (2010)

"What are key competences?*

The DeSeCo programme identified four analytical elements of key competences: **they are multifunctional; they are transversal across social fields; they refer to a higher order of mental complexity which includes an active, reflective and responsible approach to life; and they are multi-dimensional, incorporating know-how, analytical, critical, creative and communication skills, as well as common sense.** Within this project, a number of OECD countries were asked to list which competences they considered to be key competences. Four groups were frequently mentioned in the country reports: (i) Social Competences / Cooperation; (ii) Literacies/Intelligent and applicable knowledge; (iii) Learning Competences/Lifelong Learning; and (iv) Communication Competences (Trier, 2002).

Source: Hoskins & Deakin Crick (2010)

In terms of the logic that underpins competence development, A. Tiana et al (p308) refer to Basil Bernstein's work in the 1990s on the difference between the economic and social logics in the term competence with the social logic focusing on the democratic perspective of social development while the economic logic focuses on human capital. They quote from Bernstein on the characterisation of the social logic of competence:

a) The anticipation of a universal democracy of acquisition: all persons are intrinsically competent and they are all in possession of common procedures, so there is no deficit as such;

b) The individual is active and creative in building a valid world of meanings and practices: in this case, differences emerge between persons, but not deficit;

4 Ibid
c) The individual is self-regulating with a positive evolution, this development does not overtake via formal instruction: official socialisers become suspect, because the acquisition of these procedures constitutes a tacit, invisible act that is not subject to public regulation;

d) A critical and sceptical view of hierarchical relations, derived from the fact that, in certain theories, the role of socialisers should be limited to facilitation, adaptation and organisation of context: from this perspective, competence theories smack somewhat of emancipation." (Bernstein, 1996). P308

They go on to quote Ángel Pérez Gómez (Pérez Gómez, 1983) asserting in what has become a classic Spanish text on pedagogy, "the student’s learning in the classroom is much more complex than the learning gained from laboratory experiments. It is a situational learning, contextualised according to the structure of academic tasks and the ecological climate created through the negotiation of the social group" (Tiana et al 2011 p309).

And the purpose of key competences:

<table>
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<th>Adequate skills and competence are crucial to participate in working life, but also in social and civic life. They are the basis of community cohesion, based on democracy, mutual understanding, respect for diversity and active citizenship. Creativity, openness and interpersonal competences are also necessary for personal fulfillment and happiness.</th>
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<td>Source: New Skills for New Jobs. Action Now, EU 2010</td>
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**Competence frameworks and levels**

**The European Reference Framework and other international frameworks**

The European Reference Framework of Key Competences for Lifelong Learning (OJEU, 2006) defines key competences as knowledge, skills and attitudes applied appropriately to a given context (Pepper, 2011). The Framework identifies eight key competences as necessary for personal fulfilment, active citizenship, social inclusion and employment; communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; sense of initiative and entrepreneurship; and cultural awareness and expression. Each has a concise definition of its scope and all emphasise critical thinking, creativity, initiative, problem solving, risk assessment, decision taking, communication and constructive management of feelings. The latter are also known as ‘transversal skills’.

Seemingly, the need to interpret the concept of ‘competence’ leads to its fragmentation instead: key competences, competencies and transversal skills appear on stage. Moreover, considering the feature of cultural diversity that characterises Europe, a unifying pattern for a pan-European consistent application of the term constitutes a utopia rather than an achievable goal. To add to the blurriness of the situation, the central decision to leave further interpretation to Member States depending upon the specific contexts of their education systems acknowledges the incompatibility of a ‘melting pot’ ideology with the pluri-cultural nature of Europe.

The discussion surrounding key competences in Europe is related to a wider, international push for educators, policy makers, citizens, and learners to come to terms with the changing living and working ecologies of this 21st century. These frameworks share overlapping themes.
The transversal skills outlined in the European Reference Framework are in particular closely related to
the recommendations set by other organisations, as well as scholars. The OECD, for example, has focused
on three broad areas: The capability to use tools (including language) interactively, the capability to
interact in heterogeneous groups, and the capability to act autonomously (OECD, 2005). The organization
frames these competencies as a response to the demands of modern life.

Tapio Varis has emphasized the importance of critical thinking, problem solving capacity, improvements in
expression communication and interaction and civic participation and active citizenship, in the UNESCO
framework of competences for the 21st century, further stating that “Instruction must offer tools for
finding out the causes and effects of different phenomena and for drawing conclusions, which at its best
leads to growth into active, critical and media-critical world citizens” (Varis, 2011, p. 10). In the UNESCO
report, ICT Transforming Education (2010), technological development is seen as integral in the
development of new skills and ways of learning.

The World Bank has focused on Technology literacy, information management, communication, working
in teams entrepreneurialism, global awareness, civic engagement, and problem solving (Wagner, 2012).
Similarly the industry funded Assessment and Teaching of 21st Century Skills (AT21CS) consortium
advocates for four categories: ways of thinking, ways of working, tools for working, and living in the
world.

Wagner (2010) argues that the set of core competences every student must master before the end of
high school is:

- Critical thinking and problem solving (the ability to ask the right questions)
- Collaboration across networks and leading by influence
- Agility and adaptability
- Initiative and entrepreneurialism
- Accessing and analysing information
- Effective written and oral communication
- Curiosity and imagination

Critical scholars such as Gardner (2011) and Jenkins (2006) call for a focus both on creativity and critical
thinking.

Themes that underlie all these frameworks, include increased collaborative, student driven, and
technologically enabled learning, the cultivation of creative thinking, as well as fostering students’
problem solving abilities and meta-cognitive resources, which have all been major themes in education
science and scholarship.

**National sets and frameworks**

The European Reference Framework of key competences is generic in so far as it addresses all audiences
of learners, children and adults, no matter their age or stage in their learning journey. This raises
questions about its adaptability to different audiences. In the member states approaches skills,
competences, key competences, etc. are grouped in many different ways. The table annexed maps the
terminology used by the different member states with examples of how it is used in policy and
curriculum. As much as possible the terms used have been given in the language of the country (see
Annex 2).
An issue for reflection is what is meant by a "framework";

- In qualification terms it generally includes a notion of reference levels and progression routes. For example in the case of a National Qualification Framework (NQF) or a European Qualification Framework (EQF).
- Set of competences to be attained - by when?
- Set of competences with stages appropriate to ages/grades/levels and/or objectives.
- Foundation that underpins the curriculum (that may be otherwise subject based) or runs transversally across it.

This issue should be raised because of its likely implications for implementation and assessment.

The following table summarises the scope of the key competences as they are defined and used in different countries:

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<th>Types of approaches:</th>
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*Source: Gordon et al. (2009)*
Levels

A further issue raised by the notion of framework is that of levels or reference levels. The different frameworks in Europe (the Key Competences Framework, EQF, Common European Framework of Reference for Languages, the Common European Principles for Teacher Competences and Qualifications) contain two different approaches. Frameworks that serve for validation purposes identify reference levels and are linked to assessment systems (whether formal or through the validation of non-formal and informal learning). This is the case at EU level for EQF and the CEFRL. The other type describes learning outcomes desired at the end of a period of learning or discernible in an individual’s professional qualification. These competences are still under review in terms of if and how to measure them. This is the case for the framework of key competences, the teacher competences as well as the Tuning generic competences that were developed for for higher education. They all contain elements of cross-curricular key competences whether or not they are made explicit.5

Some of the country approaches include an adaptation appropriate to the age of the pupils though not all are specific about how this aspect is implemented (see Annex 2). A useful example of an approach to social and emotional learning competences that were fully developed across a set of levels is contained in the report prepared in 2006 for the Welsh Assembly Government, *Developing a Universal Toolkit for Measuring the Impact of Provision on the Outcomes Achieved by Young People for Extending Entitlement and Learning Pathways 14-19* 6 (AlphaPlus 2006). A table showing an example of competences and levels from this report is in Annex 3.

The issue for further examination and implementation is about if and how countries build into their curricula age or grade appropriate adaptations of the skills/competences. Theoretically choices could move towards a level approach where pupils in the same year may have attained different levels for certain competences or an age-linked approach. There is an input and an output element to this discussion: whether competences are broken down by expectations in each school year/grade or whether pupils’ attainment of the competence is assessed against a set of reference levels that is not totally based on the year/grade. This question is relevant for the transversal key competences in particular rather than for those that tend to be linked to a school discipline. In terms of implementation, the need to adapt the EU key competences to be acquired by all pupils by the end of, for example, compulsory education, is an area for further reflection.

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6 AlphaPlus Consultancy Ltd (2006)
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Authors: Siewiorek, A., Vivitsou, M., & von Reis Saari, J. (University of Helsinki)

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1. Key Competences for Europe

The interconnectedness sustained by technological advancement in the 21st century allows for the creation of a trans-European educational space mobilized by networks of institutions and experts (Lawn & Grek, 2012). These transnational flows of people, ideas and practices across borders also generate the necessity for a unifying pattern of principles targeting a consensus in terms of educational goals, teacher accreditation and comparable learning outcomes. Toward this end, the concept of competence has been embedded in the rhetoric of official documents and influenced the curricula of teacher education since the early 1990s, thus mapping out standards and frameworks across Europe.

The implementation of these intentions, however, is far from unproblematic. Research findings conducted by the Council of Europe indicate that, in many parts of the continent, initial teacher education did not adequately prepare beginning teachers to cope with the diversity they met in their classrooms (Council of Europe, 2008). On the contrary, the application of competence-based standards acted as enabler of stratifications encouraging a rigid over a complex type of thinking. According to the survey results, existing standards firmly entrench teachers’ novice and incompetent identities rather than promote student teachers’ thinking (Roy, 2003).

The problem that arises then (through our reflections upon Allan’s (2011) considerations of the ways teachers integrate competences to diversity) addresses the multiple appearances of the concept. Does a competence-oriented pedagogy embrace educational needs across member-states? Does such targeting cater for a 21st century pedagogy committed to performance and values rather than being dissociated from the latter?

In this chapter, in view of the complexity associated with defining competences as referred to in the introduction of this literature review, we understand ‘competence’ as a generic term which denotes the knowledge, skills and attitudes that enable learners to cope with the requirements generated by rapid socio-technological changes in the new era.

1.1. Challenges to the situated competence-based learning perspective

Defining learning in terms of competences underscores the importance of considering knowledge in action and highlights the need for tying up knowledge acquisition with task resolution. In this respect, the development of key competences requires situated learning, or learning linked to a specific context and to concrete tasks to acquire the necessary competence.

The situated learning perspective emerged during the 1980s, when social scientists began to analyse cognitive processes as aspects of interaction, and some cognitive scientists to consider the social arrangements of learning as fundamental in determining what is learnt. Suchman (1987) argued that the cognitive concept of action, a process governed by plans with adaptations to unanticipated aspects of situations, is inferior to an account in which plans constitute resources but do not determine the course of situated action. Therefore, the perspective for the organisation of action as an emergent property of interactions between actors, and between actors and the action environment was established (Suchman, 1987; Lave et al., 1991). Analysis of problem solving in everyday settings indicated that problems involving mathematical reasoning were better understood as emerging from interactions between people and resources than as products of mental operations with and on symbolic representations. Hutchins’ (2000) studies of reasoning and representational practices by navy ship-navigation teams and of remembering by the system of people and technological resources in an airplane cockpit constitute influential analyses of cognitive processes as aspects of social practice.
The application of the situated competence-based model to practice, however, resists the consistency and systematic approach required for a unifying European educational space. In a discussion on the findings of an OECD report concerning a survey conducted in 17 EU countries in 2009, Pepper (2011, pp. 340-41) reveals that few of the participating countries appeared to have either specifically defined the terms or developed clear assessment policies in relation to them. As Pepper (2011, p. 341) argues, difficulties in assessing competences arise from unpacking learning outcomes. This, in turn, is linked to a multiplicity of interconnected factors, such as the need to address knowledge, skills and attitudes, the application of competences to a range of real or authentic contexts and the threshold at which a certain level of competence is acquired.

Another challenge relates to the specification of key competences in sufficient detail to plan and assess learning on the one hand. On the other, this specification process should not exceed beyond the level where competence development is reduced to a series of procedural tasks that are completed without full appreciation of underlying concepts.

The subsequent implication of varying interpretations of competence between and within countries couples with varying unpacking of learning outcomes in relation to competences. To add to these, the consideration of the previously discussed dissociation of teachers from their own value system for the benefit of performance, as expressed by Allan (2011) is in agreement with Pepper’s (2011) underpinning the need to prioritise concept understanding over procedural knowledge.

The issue of delineating the optimal conditions for learning key competence arises. According to Tiana et al (2011, p. 318), a new professional culture based on a shared desire of all educational agents to create the most favourable learning conditions is essential for the future of education.

1.2. Toward a new school culture

Educational research emphasizes the need to understand the learners’ active cognitive operations (Dewey, 1938), strategies, stages of conceptual development and the nature of the experiential processes of assimilation and accommodation. Perception-conception and action are seen to mutually interact (Dewey, 1896: coordination). A social perspective emphasizes the view that the environment includes (often physically but always conceptually) other people with whom the learner participates in activity systems (Vygotsky, 1978; Wertsch, 1991). The individual and society are mutually interchanging: ‘culture is the capacity for constantly expanding the range and accuracy of one’s perception of meanings’ (Dewey, 1916, p. 123).

At a European level, therefore, the emergence of a culture supportive of the reframing and reorientation of a competence framework would need to incorporate:

- integrated curricular development
- changes in practices towards environments that facilitate learning
- coordinated teaching, and
- teaching models leading to tasks aiming to generate competence and experiences through different forms of cultural expression (e.g., knowledge, values, rules etc.)

While inspired in part by a radical shift in the structure of labour and technology, the Key Competences relate to long-standing educational theories, as we shall discuss further in the following section. However, we also propose that in order to encourage the development of transversal skills, the cross-disciplinary competences that are echoed as well in other frameworks, learners, teachers and communities should be supported in developing new concepts through innovative, non-traditional avenues and venues in which learning can take place.
Considering the Knowledge, Skills, Attitudes, Values, and Ethics (KSAVE) model (Binkley et al., 2012) that conceptualises 21st century skills as a framework of four overarching categories, in the following sections we discuss ways of thinking, and ways and tools for working that can be part of educational curricula across Europe. This integration allows for the necessary conditions to emerge so that teaching and learning environments contribute to the development of competences aiming for improved life and career opportunities at the individual level. And, at the collective level, for improved well-being through active citizenship, and an enhanced personal and social responsibility.

1.3. Pedagogy for competence development and the importance of transfer

One of the underlying aims of Key Competence development is fostering life-long learning, the capability of students to use what they have learned in schools, but more importantly, to continue learning throughout the lifespan. This is intrinsically linked to the idea of transfer (Thorndike and Woodworth, 1901), that is, the capability of students to transfer knowledge, skills, and meta-cognitive skills to new situations, and ultimately to the “real” world outside of school. This is a long-term goal of educational theorists, which educational science has been actively addressing. The key outcomes of this research emphasize the need for contextualised learning, constructivist approaches that combine student experimentation with explicit content teaching, and dynamic assessment—aspects of what Bransford and Schwartz (1999) have called Preparation for Future Learning.

Pedagogy, therefore, that would aim for competence development would also enhance learner efforts for meaningful experiences through goal-directed, active, authentic and collaborative tasks (Jonassen et al., 2008). These would tie with flexible national curricula that consider project-based learning as an organic part along with systems of evaluation catering for the needs of innovative learning environments. The teaching methods, then, required for the development of key-competences should be oriented towards interdisciplinary, cross-subject teaching, and team oriented learning blended with individualised approaches and project-based work. (Gordon, Halasz, Krawczyk et al., 2009, p. 162).

In this way, as Gordon, Halasz, Krawczyk et al. (2009, p. 227) argue, effective pedagogy in competence development can become an attainable goal, given that it is life-long oriented; promotes active engagement; fosters individual and social processes and outcomes; depends on the learning of all those who support the learning of others; and is built upon consistent frameworks that focus on convergent aims.

2. Key competences and transversal skills: examples from education research

2.1. Key competences

The framework of key competences and transversal skills underscores the need for complex, collaborative and trans-disciplinary learning environments. In this section, brief examples of such environments are given relating to each of the eight key-competences, as well as examples of particular schools and curricular reforms that have fostered the development of key competences. Within Europe and worldwide, there is an established wealth of research to draw upon regarding the development of key competences. While emerging technologies present exciting ways to transform the teaching of key competences, and broaden students’ educational experiences, methods for developing key competences should also draw from established programs that have shown to be successful over time. Thus it should be noted that barriers to implementation, addressed again below, are more likely to be those of
administration, evaluation, and fiscal resources; many schools are already engaged in exemplary teaching of Key Competences.

The key themes in teaching Key Competences for the twenty-first century relate to creating meaningful education based on real problems and engagement, interdisciplinary environments, and the explicit teaching of self-management (meta-cognition and self-regulatory skills).

**Communication in the mother tongue**

Using location-based technologies and the story-telling approach, Hansen and colleagues (2012) investigate the development of drama spanning from pure art pieces to structured learning experiences. According to the researchers (Hansen et al., 2012), the evidence of the whole operation indicates the educational value of the technology-based intervention that, rather than focusing on the use of technology, uses the technology to transform an educational experience. Moreover, the application of drama techniques opens up perspectives for mother language teaching and learning.

**Communication in foreign (multiple) languages**

Within European educational systems, the issue of education for competence in multiple languages moves past the idea of foreign languages. It includes language education in nations that have a plurality of official and unofficial languages. Multilingualism is a key goal for maintaining national languages, and in many respects shares the pedagogy of first language learning.

Students can be engaged in multiple language learning through experiencing its usefulness. Travel and study abroad are not economically feasible for all students, however, the ability for technology to facilitate intercultural communication where travel is not possible is promising. Fisher, Evans and Esch (2004) report on a program that encouraged the structured use of communications technology to enhance student learning of French, involving students in Belgium, England, France and Senegal. This program encouraged young people to learn autonomously and communicate freely, but with scaffolding and stimulated activities to inspire their work. Not only did students have the opportunity to communicate with native speakers, the research suggested they developed self-management skills, collaborative skills, and intercultural learning. Thus, an environment was created that was also conducive to the development of other key competences and transversal skills.

**Foreign language learning**

Mobile learning has been used to support a range of learning activities, for example language learning using text messaging (Cavus & Ibrahim, 2009; Kennedy & Levy, 2008; Lu, 2008).

**Math competence and basic competences in science and technology**

Games have been widely implemented in teaching children math. For example, Moreno & Durán (2004) conducted a study about discovery-based learning through computer game. Other examples of successful integration of games into math curriculum could be found in the literature, such as, Clements and Sarama (2007) and Kebritchi, Hirumi, and Bai (2010).

Another key example for mathematics is the Realistic Mathematics Education curriculum, developed in the Netherlands by Frueudenthal and colleagues to address the problem of transfer (Frueudenthal, 1968) and discussed further below. This shares the theme of offering students with real problems that promote transfer, problem solving skills and engagement.

Similarly, Schwartz and Moore (1998) find students better understand and are able to transfer their statistical learning when it is grounded first in their own experimentation. Grounded in several different
fields of learning science, student experimentation with meaningful problems combined with explicit instruction has been shown to be a strong model for competence development. The idea of engaging students in inquiry and experimentation in mathematics and science is further discussed in the section on innovative learning environments below.

**Digital competence**

Digital competence moves past the idea of simply being able to consume digital media, but to have the critical thinking and creative skills that citizens need in order to be effective receivers and creators in the digital realm.

Zahn, Pea, Hesse and Rosen (2010, p. 410) describe students developing websites for an online history museum while developing skills in critical thinking, creativity and collaboration. Trans-disciplinary, inquiry based learning can foster key competences and content learning at the same time that transversal skills are developed.

It is important to note the digital competence increasingly is important to general literacy, as well as to social and civic competence, discussed further below.

**Learning to learn**

Uncertain economic outlooks and the need for flexibility in working life have inspired a European focus on life-long learning. True lifelong learning is centred on the idea of learning how to learn, that is, the problem solving skills, self-regulation, self-efficacy and creative flexible thinking needed to master new tasks and environments.

Blending a problem-based estimation scenario in a mobile-device-supported cooperative learning environment, Lan and colleagues (2010) examined the ways elementary students’ cooperative skills and estimation strategies improved. This creative intervention benefited the development of metacognition knowledge of the students’ estimation strategies.

Ultimately, learning to learn comes back to the idea of transfer (Bransford & Schwartz, 1999), a key theme in the education research discussed here, and one that points towards certain modes of education: constructivist and experiential surely, but also grounded in explicit teaching and teaching of self-management.

**Social and civic competences**

Social and civic competences can on one hand be seen as building the capacity for young people to function in a pluralistic society where collaboration and cooperation are important. An example of such a project is when digital storytelling techniques on mobile devices were applied in a project that involved guiding visits to cultural heritage sites (Lombardo & Damiano, 2012). The experience confirmed the importance of the approach in the emotional engagement of the audience. This indicates the presence of aspects of embodied cognition on the one hand; on the other, the potential of mobile technologies to contribute to the establishment of social bonds among the members of a group is made visible.

Another important aspect of social and civic competences is the potential for citizens to contest policy, resist influence and develop their sense of agency (or self-efficacy, see Bandura, 2000) as democratic citizens. This is a difficult goal for traditional some structures. In this report, innovative environments that foster creativity and agency, and technology learning that fosters critical literacy, both discussed further below, are also seen as key elements of social and civic competences.
Sense of initiative and entrepreneurship

Initiative and entrepreneurship are dependent on students’ development not only of skill, but of a sense of agency. That is, they are highly dependent on students’ self-efficacy and perseverance in difficult tasks. It is not only individual self-efficacy that is important, but collective self-efficacy as well as Bandura (2001, pp. 17—18) argues:

“As globalization reaches ever deeper into people’s lives, a strong sense of collective efficacy to make transnational systems work for them becomes critical to furthering their common interests...The magnitude of human problems also undermines perceived efficacy to find effective solutions for them. Worldwide problems of growing magnitude instil a sense of paralysis that there is little people can do to reduce such problems. Global effects are the products of local actions”

Self-efficacy and collective efficacy are theorized as being developed through mastery experiences as well as social modeling. The 21st Century classroom, through providing open-ended challenges and scaffolding collaborative work needs to serve as a test-laboratory for students in developing their self-efficacy and developing initiative and entrepreneurship competence.

Young people will “…have to cultivate multiple competencies to meet the ever-changing occupational demands and roles” (Bandura, 2001, p. 11). To turn other competences into initiative and entrepreneurship action, students need to be armed with self-efficacy.

Cultural awareness and expression

New techniques, such as collaborative digital storytelling on mobile devices have been applied also to cultural and creative education. As discussed previously in the social competences section, in a project that involved guiding visits to cultural heritage sites (Lombardo & Damiano, 2012), project researchers used a location-based character-enacted storytelling technique. Through this use of a character-based movie, a memory of the learning experience emerged. Such approaches integrate technology with cultural and creative education. Collaborative projects designed for sharing, such as digital storytelling, also open the possibility of creating educational venues for international learning, as stories are shared between and created across cultures.

2.2. Transversal skills

Critical thinking, creativity and collaboration

Transversal skills like critical thinking and creativity need to be situated within the environment of the 21st Century. As Hennessy et al. (2005, p. 179) note, critical thinking can be lost in the deluge of information available on the Internet. Lewis et al. (2010, p. 7) argue that in order to be prepared as critical consumers and users of modern media and technology, youth also need to understand how to be producers and creators of it:

By together questioning texts and situations, conceptualizing problems, designing solutions, building artefacts, redesigning, re-conceptualizing and reinterpreting, people generate forms of public knowledge that in turn provide conceptual and relational support for further interacting and learning.

To be creative and critical in the digital media environment, however, depends on a high level of technological competency, and self-efficacy with learning new media and mastering new tools. The argument is that in order to be competent, productive and critical in this century, one should endeavour
to have a basic understanding of the languages and processes that underlie our daily lives today. This implies a basic understanding of computer coding and algorithmic thinking (Goode and Margolis, 2010).

One example of designing technology environments for education that enable the development of transversal skills in the MoViE platform from Finland, which provides the capability of sharing and remixing of videos easily online for digital storytelling, designed to facilitate collaborative learning (Multisilta, 2012), and used successfully for digital storytelling by students at both the elementary and middle school ages (Tuomi & Multisilta, 2012). The ability of these new tools to make use of the collaborative potential of Web 2.0, and allow for active participation and critical thinking through remixing of media (Jenkins et al., 2006), increases the potential of digital storytelling to promote learning for the 21st century. In addition, critical thinking (Figg, McCartney, & Gonsoulin, 2009) and increased collaboration (Sadik, 2008) have been outcomes of early studies of digital storytelling in the classroom.

**Problem solving**

The development of an ability to solve problems and make decisions is very important learning outcome of education. Problem solving could be developed in problem-based learning. This learning theory is a student-centred learning approach helping learners to acquire and develop the knowledge, skills and capabilities needed to solve problems effectively (Engel, 1997). The problem based learning aims to prepare students to encounter ill-structured problems normally encountered in real life. Such problems are usually complex and can have multiple solutions. The main principles of problem based learning – contextuality, collaboration and experientialism (Boud & Feletti, 1991) are fruitful to utilize in elementary, primary and higher education.

**Self-management**

Self-regulation is important to problem solving, directing attention, and managing emotion (Malmivuori, 2006, pp. 158–160). As such, it underlies other key competences, particularly learning to learn. The goal of fostering a sense of initiative and entrepreneurship is really a goal about providing students with the skills and self-regulation to become independent, creative and critical contributors. There are many different ways of discussing and evaluating self-regulation, or, for example self-control and executive function, but the evidence suggests that the existence of a unified underlying concept (Duckworth & Kern, 2011).

Strategies for self-regulation can be learned. There are examples of students using ICT to develop self-awareness of their self-regulation with regards to their work, and support in changing existing patterns of behaviour (i.e., Niemi et al. 2003). Such skills are increasingly necessary in complex, individualised learning environments.

**2.3. School-level spaces for teaching key competences and transversal skills: real-world examples**

Self-learning is an important key competence and it can be structured as in Burnfoot Community School in Hawick (Scotland) that has been working with personal learning plans since 1999. Often the students are encouraged and advised to undertake efforts to learn by themselves. When they gather some experience, the next step is to give them the possibility to practise self-assessment and peer assessment. This kind of experience is very important for the preparation for lifelong learning. It also contributes directly to the development of the learning to learn competence (Gordon et al., 2009). Very popular and effective method to teach key competence is project-based education (Ravitz, Hixson, English, & Mergendoller, 2012). This method is strongly encouraged, for example, by the Austrian Ministry of Education.
There have been many studies carried out, investigating the effectiveness of project-based learning. For example, Boaler (2002b) compared student mathematics achievement in two similar British secondary schools, one using traditional instruction and the other using project-based instruction. After three years, students in the project-based-learning school significantly outperformed the traditional-school students in mathematics skills as well as conceptual and applied knowledge. Furthermore, Thomas (2000) found some evidence that project-based learning is effective for teaching problem solving and decision making.

Sherman Oaks Elementary, a school in San Jose, California is an example school that teaches by project-based learning. It features a dual immersion English/Spanish language program and project-based learning culminating in widely attended student exhibitions. According to the school Web site, the Sherman Oaks program focuses on "strong academics built around real-life learning" and has "significantly raised student achievement levels." Also Applied Learning Academy, Fort Worth, Texas (a year-round campus and a school of choice) gives students an opportunity to learn through real-world experience in an environment that "fosters critical thinking, creativity, and collaboration with Fort Worth's arts, business, and scientific communities." Students create portfolios, design high tech projects, collaborate with a local theatre company, and produce and field test documents for the school district. The school Web site reports TAAS (Texas state test) scores that are considerably above average - as well as positive attendance rates.

In Sweden, the advent of friskolar or independent, non-fee paying schools coincided with an increase in schools built around innovative and specialist curricula. While this has not been uniformly positive (especially with regards to equity, discussed further below), it has also created notable successes. One such school is the private Marina Laroverket in Danderyd, Sweden, which was ranked the best school in the Stockholm region by Sveriges Kommuner och Landsting (the Swedish Local Authority administration, SKL) most recently in 2011 due to academic performance and retention of students. The school, which does not charge tuition, combines vocational with academic programs and sends students to study aboard a sailing ship four weeks at a time, during which they focus on learning subjects such as astronomy and marine biology, but also ways of working and self-management. While this example is not scalable, and its finances are dependent on the local economy, it is one example of a local success in creating an interdisciplinary learning environment that engages students in the learning of Key Competences.

Many examples of using innovative pedagogy to develop key competences without the use of ICT can be found in the area of vocational education. In Germany, efforts are being undertaken to increase in-company training, thereby promoting the acquisition of key competences such as the capacity to work in a team, responsibility, self-organisation and linking content-related knowledge with the ability to apply it (Gordon et al., 2009).

2.4. Examples of nation-wide curricular reform for teaching key-competences

While many of the examples in this section stress interdisciplinary examples, an established example of success within mathematics is the Realistic Mathematics Education (RME) developed in the Netherlands by Hans Frueudenthal and colleagues to address the problem of transfer in mathematics education (Frueudenthal, 1968). The curriculum fosters co-operative learning (e.g. Terwel, Herfs, Mertens and Perrenet, 1994), as well as engagement with problem solving grounded in realistic examples. This nation-wide reform now has an established record (Vos, 2010) that speaks directly to the building of mathematics competence, but also addresses issues of ways of working, cooperation, problem solving and metacognition. Most importantly, it is designed to promote the transfer of learning.

Transfer of learning, as discussed previously in this report (section 1.6, p. 12), entails the application of knowledge, skills and meta-cognitive abilities to real-life situations and, therefore, by no means
constitutes a straightforward process. Nevertheless, these good practices indicate that interdisciplinary tasks implemented within a cross-curricular framework can be the vehicle for competence and transversal skills development. According to the Analysis of the Mapping of Key Competency Frameworks (Pirrie, 2004), competence-oriented cross-curricular reform has been an educational goal for nations across Europe aiming, among others, to upgrade the status of competence at all curricular levels (e.g. in Romania, Hungary and Ireland), to use related benchmarks and indicators (in Germany and Malta) and to pilot new standards for reading, languages, mathematics and sciences (e.g., in Austria and Cyprus). Beyond the complexity inherent at the pedagogical level, as the same Analysis (Pirrie, 2004, p. 9) stresses, large-scale curricular innovations should consider implications arising from contextual factors as well. These can include established European states’ practices of subject-dependent teacher training programmes; lack of flexibility in school timetables; the degree of autonomy at school level and the lack of a universal definition of ‘cross-curricular’ competences.

Another pedagogically related theme in the development of curricula for key competences is the innovation in learning environments that must take place. However, it should also be noted that innovative contexts are not enough. The examples above also emphasize the importance of explicitly teaching ways of working and self-management skills, that is, of modelling for students how to learn and inquire independently. In the following section, there is a more in-depth exploration of innovative learning environments for teaching and learning key competences and transversal skills and this theme of intertwining innovative environments with explicit teaching and scaffolding remains.

3. Formal and non-formal learning spaces and applications for key competences

As de Corte (2010) cites the US attempts to define ‘21st century skills’: ‘today’s students to be prepared for tomorrow’s workplace (. . .) need learning environments that allow them to explore real-life situations’. Therefore, new learning environments are needed that support development of problem solving, critical thinking, creativity, initiative, problem solving, risk assessment and decision taking.

3.1. Learning theories behind interactive learning environments for formal and non-formal learning

There are several learning theories that can be used to explain how participants learn in interactive learning environments which could be used for developing Key Competences such us problem solving, critical thinking, creativity, initiative, problem solving, risk assessment, decision taking and constructive management of emotions. By interactive learning environments we mean learning environments that supports active learning i.e. learning with simulation and games, learning with mobile devices and with mobile social media.

First, in interactive learning environments that aim to develop Key Competences, learning is no longer a process of knowledge transfer from the expert to the novice but learners need to construct the knowledge themselves by interacting with the environment. Constructivist learning theories posit that knowledge is built by the learner, not supplied by the teacher, thus constructivism is one of theories that provide a strong rationale for using interactive learning environments to support learning (Kriz, 2010). Constructivism focuses on the process of knowledge construction and the development of reflexive awareness of that process (Bednar, Cunningham, Duffy, & Perry, 1992). Learners must individually discover and transform complex information, check new information against old rules and revise them when they no longer work. Learning also must be situated in a rich context, reflective of real-world
contexts for this constructive process to occur and skills are developed through working on the problem, i.e., through authentic activity. This approach represents the concepts of “active” or “autonomous” learning (Johnson, Johnson, & Smith, 1999). It is also argued that interactive learning environments, through linking knowledge and doing, support the idea of learning-by-doing (Barab, Hay, Barnett, & Squire, 2001). Schank (2005) argues that learning-by-doing is always more effective than learning-by-telling and that the former is best accomplished through complex, high fidelity simulations that engage learners at the highest possible level.

The “active” instructional approaches propose supporting or complementing traditional teaching methods with active learning experiences such as role-playing, simulations, self-paced or team-based exercises, and other types of open-ended problems requiring critical or creative thinking. In addition, students are more highly motivated by interactive learning environments such as games than by more traditional instructional presentations (Lepper & Henderlong, 2000; Garris, Ahlers, & Driskell, 2002).

Further, interactive learning environments provide a meaningful environment for problem-based learning (McFarlane, Sparrowhawk, & Heald, 2002) therefore educators have developed learning environments that support complex problem solving (Suomala, 1999). Problem solving can be associated with discovery learning because interactive learning environments allow students to discover new rules and ideas rather than memorizing the material that have been presented to them. Discovery learning is one of the instruction models based on constructivism; it is an approach to instruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments (Rieber, 2000). The idea behind discovery learning is that students are more likely to remember concepts that they discover on their own (de Jong & van Joolingen, 1998). In many forms of interactive learning environments, students learn by doing, by trying new strategies and by making mistakes. They construct the knowledge internally by immersing themselves into the learning environments. Furthermore, in these environments, participants collaborate with each other and group work helps them to share and develop alternative viewpoints. In interactive learning environments, collaborative learning is often implemented, which supports the use of effective discursive learning methods (make explicit, discuss, reason, and reflect, convince) while allowing for the acquisition of essential social and communication skills (Dillenbourg, Baker, Blaye, & O’Malley, 1995). The main idea of collaborative learning is that collaborative knowledge construction, co-ordination of different perspectives, and shared evaluation of group activities enable a group to create something that goes beyond what any one individual could achieve alone (Bereiter, 2002; Stahl, 2003).

Therefore, learning in these environments is not the lonely act of an individual but a matter of being initiated into the practices of a community (Lave & Wenger, 1991). The learning process is seen as mediated in a social context in situated learning (Winn, 2002) and the socio-cultural approach. In a social context physical artefacts (or tools) are a good facilitator for learning new concepts, as they give a shared starting point and potentially show the student new ways to proceed (Wenger, 1999; Wertsch, 1991, 1998).

Developing Key Competences through interactive learning environments could be also associated with other learning theories for instance activity theory (Kuutti, 1996). These environments have been characterized also as a form of experiential learning (Kolb, 1984) because the process of knowledge creation relies on the transformation of self-experience (Haapasalo & Hyvönen, 2001). For example, according to Gredler (1996) educational games are experiential exercises. They offer here-and-now concrete experiences to validate and test abstract concepts presented in the gaming environment. Such concrete experiences are the heart of this approach in which knowledge is constructed, not transmitted, as a result of experiencing and interacting with the environment (Kebritchi & Hirumi, 2008). This is a key
theme in the idea of meaningful transfer (Bansford & Schwartz, 2001), that formal learning be grounded in experience—particularly in experimentation.

3.2. Examples of formal and non-formal learning environments

Games have been widely implemented in teaching children math. For example, Moreno & Durán (2004) conducted a study about discovery-based learning through computer game and verbal guidance for teaching addition and subtraction of integers. Clements & Sarama (2007) described training of early childhood mathematic skills through different drill-and-practice type mini-games. Further, Barendregt, Emanuelsson & Lindström (2009) study showed evidence for improving early arithmetic skills for preschool children through drill and practice game that uses a specifically designed tactile interface. There has been also an interest for investigating how commercial games can enhance learning (Keskitalo, Pyykkö, & Ruokamo; 2011). In addition, research on social networking tools such as Facebook is booming, for example on educational usage of Facebook (Mazman & Usuel; 2010) or on using the Facebook group as a learning management system (Wang et al.; 2012).

3.3. Barriers for using interactive learning environments at schools

In spite of many positive benefits of technology enhanced learning environments, these environments have been also criticized (Buckingham & Scanlon, 2002). In short, the barriers for using these learning environments in an educational setting include: time scheduling, physical setting, class expectations, teacher background, genre knowledge, technical problems, experience with group work, teacher preparation, class size and prioritizing (Egenfeldt-Nielsen, 2004). Two major negative sides of using technology-enhanced learning environments are:

1. costs involved, because of the costs poorer schools and students can end up being disadvantaged;
2. students, and sometimes teachers, can get too immersed in the technology aspect, rather than the subject content.

There have been a lot of studies carried out, investigating if use of computers improve learning but the results are mixed. First, little evidence has accumulated of the positive impact of ICT on student learning outcomes in schools (Dillenbourg, 2000). Some of the negative factors that have been mentioned in the literature (Deryakulu, Buyukozturk, Karadeniz, & Olkun, 2009) which influence the use of technology enhanced environments are lack of appreciation from colleagues, the difficulty of classroom management in computer labs, inappropriate teaching materials (e.g. textbooks, software), large class sizes and the rapidly changing nature of ICT. Due to the rapidly changing nature of ICT teachers need to continuously update their knowledge. All of these issues affect negatively the ICT teachers’ effectiveness and efficiency in their classes. However, the positive side of the ICT in education has to be mentioned, for example one advantage is the unprecedented possibilities computers present for active or research-oriented learning (Jakkola, 2012; Veermans, de Jong, & van Joolingen, 2006).

3.4. Mobile technology for interactive learning environments

With the increasing popularity of mobile devices, non-formal learning (learning through games or mobile devices) has attracted the interest of educators and researchers. The most important benefit offered by mobile technologies is that they can provide anytime and anywhere functionality. Therefore, mobile devices can support the great amount of learning that occurs during the many activities of everyday life
and learning that occurs spontaneously outside of school. These devices enable learning that occurs across time and place as learners apply what they learn in one environment to developments in another (Sharples, Taylor & Vavoula, 2005; 2007).

3.5. Developing science and mathematics competences with social and civic engagement

There is also the potential for schools, particularly with the advent of technology, to connect learners to authentic experiences of scientific discovery. Citizen science has successfully engaged the public, including youth in mapping invasive species (Jordan et al., 2012), identifying new planets, (Fischer et al., 2012), and perhaps most surprisingly, discovering a new algorithm for folding protein structures through engaging players in an online game (Khatib et al., 2011). Such opportunities present additional ways for learner engagement in real, original science and discovery. Table 1 below illustrates some ‘Real Science’ examples for competence development.

<table>
<thead>
<tr>
<th>Table 1: REAL SCIENCE FOR DEVELOPING COMPETENCE and CIVIC ENGAGEMENT: Examples of new environments for involving students in real science research</th>
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<tbody>
<tr>
<td><strong>Zooniverse</strong></td>
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<td><strong>FoldIt</strong></td>
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<td><strong>CamClicker</strong></td>
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<tr>
<td><strong>Evolution MegaLab</strong></td>
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<td><strong>BeeID</strong></td>
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<td><strong>Planet Hunters</strong></td>
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Biology and ecology are particularly fertile areas for this sort of participatory science. Researchers in the United Kingdom, for example, used online social networks such as Facebook and Flikr to successfully improve the monitoring of the bee population in the British Isles (Stafford et al., 2010). In fields such as ornithology, participatory data gathering has a long history, and is becoming only more important with the advent of web-enabled communities of citizen scientists (Sullivan et al., 2009). The use of citizens for data collection is expanding and changing the way scientists think of data collection (Silvertown, 2009). Many of these programs welcome youth and provide outreach and support for teachers to engage with their students in these real scientific endeavours.

The growing capabilities of technology also increase the ability for schools to make use of such community activities. ‘Currently, mobile devices include GPS, compass and accelerometers that can produce contextual data for applications. This kind of contextual data can also enrich future mobile learning applications.’ (Multisilta, 2012, p. 284). Such technology will increasingly enable learners to take advantage of out of class, in the field, science. It can also be used to link students up with real-world science problems and to become participants in meaningful research.

In mathematics learning, online communities implicitly teach collaborative and social skills while members engage in a task of common interest. For example, the NRich mathematics website hosted by the University of Cambridge provides basic to complex mathematical problems, as well as moderation by mathematics students that supports peer-learning by scaffolding, encouraging students to persevere in problem solving rather than simply ask for an answer (Jared, 2010), thus fostering transversal skills such as problem solving, initiative and self-efficacy in addition to mathematics learning. Curated by faculty and students of the University of Cambridge, the NRich program is also an example of a new kind of university partnership with educators and learners.

These are collaborative, interactive, technology enabled activities present a new significant change in the ways that young people can engage with science and learning that reaches outside the classroom. Not only do such approaches increase engagement by linking inquiry learning with real world problems, but they are interdisciplinary by nature, having the potential to combine elements of digital, math and science competences with problem solving, critical thinking, and initiative.

3.6. Innovative technology learning for participatory literacy and civic competence

Digital competence is one of the seven key competences, but it is also a vehicle for 21st century literacy skills and developing civic competence. Many students are already adept consumers of technology. Some youth have also taken hobbies, such as game design to advanced levels. Kafai and Peppler (2011, p. 89) write regarding participant driven learning communities that ‘Educators should be especially interested in DIY [do it yourself] communities given the amount of time youth voluntarily spend in intense learning as they tackle highly technical practices, including film editing, robotics, and writing novels among a host of other activities across various DIY networks’. Such informal networks, such as those surrounding the program language Scratch used, among other things, for game development, are driven by student initiative, and fertile ground for the development of key competences and transversal skills like creativity and problem solving.

These activities are important because they give students more than a set of digital skills. They are opportunities for students to create, foster dispositions towards innovation and entrepreneurship as well as developing technology literacy. This is an important issue for critical citizenship. The argument is being made that traditional conceptions of computer competence are not longer enough Kafai and Peppler argue that, ‘we should be as equally concerned with “opening the black box” of digital technologies as we are about media ownership and controls issues... Such understandings are crucial for
today’s citizenship, as more aspects of life have moved into the digital domain’ (Kafai & Peppler, 2011, p. 112). The challenge for schools systems is to facilitate access for all students.

Thus, the online environments listed in Table 2 should not be conceptualised as vehicles for students to develop technical skills only. Rather, they are free, openly available resources for promoting in young people the ability to create media, and also understand how media is created so that they can both contribute actively, and be critical consumers and citizens.

<table>
<thead>
<tr>
<th>Table 2.: CREATIVE and CRITICAL TECHNOLOGY COMPETENCE: Examples of tools and communities for learning programming and creating media online</th>
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<tbody>
<tr>
<td>Hackasaurus.org</td>
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<tr>
<td>School of Webcraft</td>
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<tr>
<td>Scratch.mit.edu</td>
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<tr>
<td>Gamestarmechanic.com</td>
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<tr>
<td>Processing.org</td>
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This participatory involvement in technology (Jenkins et al., 2006) has not been realized widely, yet it will increasingly become a part of participatory civic competence. Schools need to foster the capabilities of students to take part in creative, entrepreneurial work with technology, and doing so may necessitate the development of rigorous computer science curricula for all students (i.e., Goode and Margolis, 2010).

3.7. Hands on learning environments

Experiential learning is used to motivate and engage students. However, such environments are also important in developing interdisciplinary key-competences, such as innovative capacity and civic competence, as well as transversal skills like collaboration, problem solving, and self-management.

Example of one hands on program the explicitly aims to teach those transversal skills is the FIRST Lego league, popular throughout Europe and beginning with programs for students as young as six. Simple robotics clubs and competitions provide opportunities for students to collaborate, create, and use technology to solve problems. Some programs aimed at increasing student engagement have targeted even younger students (Cejka et al., 2006). In Belgium, Denis and Hubert (2001) analysed the collaboration of small groups of learners, 10 years of age, working on Lego robotics projects. They find students developing collaborative skills, as well as ‘strategic competencies’, which they relate specifically to metacognition (Denis & Hubert, 2001, p. 467) along with skills such as computer programming.

At the secondary level, programs such as robotics clubs, offer the opportunity to manage team finances, engage in high level engineering, and access mentorship from community professionals, opportunities rarely available in a typical school. Furthermore, by engaging students in real problem solving within a social environment, students develop strong bonds and have the opportunity to develop key
competences such as initiative, as well as transversal skills like cooperation, leadership and self-management (Saari, 2012). Participants also seem to be showing increased understanding and interest in technology and science related fields (Welch and Huffman, 2011, Mellchior et al., 2005). The competitions are characterised by the depth of their difficulty and their open-ended nature. Such programs are also example of frameworks in which schools and local industry can create mutually enriching partnerships to foster key competences. However, they are not available to all students.

3.8. When and where should learning take place?

Jenkins et al., noting the promise of these afterschool clubs recommend that ‘Afterschool programs should be a site of experimentation and innovation, a place where educators catch up with the changing culture and teach new subjects that expand children’s understanding of the world’ (Jenkins et al., 2006, p. 59).

Livingstone (2012, p. 21) describes the changes that occurring as our conceptions of where learning takes place expand: ‘...we are witnessing some genuinely new learning opportunities, centring on possibilities of child-oriented digital creativity and on collaborative communication with those who share similarly specialist or rich forms of interest and expertise.’ (Livingstone, 2012, p. 21). These environments not only teach specific skills, perhaps most importantly they are sites for learning transversal skills, developing creativity and the potential of offering complex and productive environments for learners. Their value might in part be that they are not connected to a particular time or place. This makes administering and ensuring equal access to such environments a challenge for policy makers and school leaders.

3.9. The difficulties of equitable implementation revisited: Administration, resources and the problem of equal access to innovative environments

The alternative environments discussed in this section are largely freely available programs and resources. Elsewhere we have mentioned the availability of open-source materials. However, accessing these implies not only the availability of computers or mobile devices, but of knowledgeable teachers who have the time in their curriculum to make use of these resources. Affluent schools are already doing so; the challenge to policy makers is whether or not to support less affluent schools in doing so.

The problem with these innovative environments is that it would be easy to leave students to access them, or not, according to their own interest, or lack of interest. But this also implies leaving student exposure dependent on a student’s own resources—or lack of resources. Such an approach promises to widen the divide between students.

A curriculum-integrated approach, however, could enhance equal access, as, compared to after-school programs, integration has a higher potential for systemic impact (Repenning, 2012, p. 39). The United States National Science Foundation Innovative Technology Experiences for Students and Teachers (ITEST) program enabled the application of a game-design computational thinking (CT) strategy to middle school curricula in school sites in Alaska, California, Georgia, Ohio, S. Dakota, Texas and Wyoming. During implementation, over 10,000 games and simulations were created by students, which linked with the initial study aim for increased exposure and maximised participation. From a pedagogical point of view, scaffolding was found to be the main common factor supporting motivational levels and skills across different school contexts, gender and ethnicity (Repenning, 2012, p. 40).

Implementation of such an approach is likely to be local. Within Europe, the difference between schools varies greatly from country to country (Green, 2011). Thus an equitable implementation is more possible in some locations versus others. Even in comparatively equal societies such as Sweden, however, a proliferation of innovation, such as occurred with the advent of publically funded free-schools primarily at
the upper-secondary level, also coincided with a rise in equality (Skolverket, 2003), perhaps as navigating the educational choices, and the quality of new programs became more taxing for families with less resources. Since then, Swedish policy makers have instigated tighter regulation.

For the sake of both innovation and equal access, schools should offer students the skills needed to take advantage of the exponential growth in participatory possibilities online and in their communities.

4. Key competences for teachers

4.1. Teachers, school culture and leadership are central

The research above highlights some of the methods research has revealed to be promising in promoting learners’ development of key competences for the 21st century. The emphasis is on complex, open-ended learning environments, enabled by evolving technology and taking place in and outside schools. Rather than replacing teachers, this new ecology suggested here places new demands on teachers. In turn, the implication is that teachers will need meaningful support and training. Just as youth are asked to increase their skills in collaborative learning, networking and digital literacy, so their teachers must do the same.

4.2. Teacher Networks and Collaborative Learning

Collaborative learning is also important for the success of teachers. Programs such as the Helsinki Media Centre (Niemi et al., 2012) provide opportunities for teachers to share resources. This is particularly important because ‘teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes’ (Ertmer & Ottenbreit-Leftwich, 2010, p. 260).

This learning is an on-going process; learning about technology is equivalent to asking teachers to hit a moving target. Teachers will never have “complete” knowledge about the tools available, as they are always in a state of flux’ (Ertmer & Ottenbreit-Leftwich, 2010, pp. 260–261). Some schools, such as the KoulunMestarin Koulu in Espoo, Finland, have embraced the idea of learning from students as well using students’ expertise to facilitate technological integration.

4.3. Challenges for teachers

Over the past decades, research has repeatedly shown that individual teachers exercise important influence over the meaningful adoption of new policies and technologies. Prescriptive policies advocating, for example, the use of specific technological tools will not produce change in the classroom. Due to top-down measures, in some countries teachers can feel pressured to adopt technology, the use of which can seem forced, rather than coming out of a true pedagogical need (Hennessy et al., 2005, p. 170). Teachers may be more likely to adopt and integrate ICT if they see it as adding value rather than ‘bells and whistles’ (Hennessy et al., 2005, p. 172), that is, rather than being used primarily for appearance, or to be able to check a regulatory box.

In order to realize the transformation of the classroom suggested by key competences, then, particular attention must be played to supporting teachers as they work towards fostering a new complex ecosystem in their classrooms. Smith et al. (2012) considered the impact of technology on teachers’ pedagogies to range from traditional+ (adding a new element to an existing classroom structure) to transformational. It is a transformational pedagogy that would include the sorts of activities indicated by the key competencies, learning activities that would use the new opportunities provided by technology to
reach across the traditions bounds of the school and take advantage of open-ended learning in the community and the wider world. However, keeping the adoption of new technology and programs motivated by pedagogically is a key factor in the success of the model: ‘...the unavoidable challenges and disappointments with classroom technology have not been felt as keenly here: keeping the tools subservient to the teaching mission has kept “the horse before the cart” (Smith et al., 2012, p. 491).

Another challenge for teachers is the evaluation in these complex, individualised environments. There may be a mismatch between the instructional method, and outcomes as defined by local governments (Livingstone, 2012, p. 17). There is also the difficulty of monitoring students in ICT environments that have not been designed to do so (Hennessy et al., 2005, p. 171). New forms of evaluation may be more time consuming as well.

4.4. Key competences for Teachers

Investigations into the adoption of technology into education has been shown to be highly teacher dependent. It is likely that the successful adoption of technologically enabled key competences will follow similar patterns. While online communities may provide students space for independent and individualised learning, not all students will access these resources without the intervention of teachers as mentors. Some of the activities mentioned above that are most likely to promote the interdisciplinary and transversal skills are highly teacher dependent.

Just as students are encouraged to develop key competences, so must teachers be supported in developing competences and transversal skills. Somekh (2008) suggests giving teachers time to play with technology as a way of encouraging exploration and growth. Programs such as the European Project Teacher Education on Robotics-Enhanced Constructivist Pedagogical Methods (TERECoP), engage students in the same open-ended learning opportunities recommended for students (See e.g., Alimisis 2009). In Taiwan, courses in Lego robotics were shown to increase pre-service teachers’ self-efficacy, (Liu et al., 2010) and important factor in adopting new practices into the classroom.

It is important to note that what researchers find is not the skill of the teacher that is particularly important, but the relevance of the tool to the teacher pedagogically: ‘This highlights the requirement for teachers to understand fully the affordances of a technology, not necessarily aiming for higher but for more purposeful technology uptake.’ (Mama & Hennessy, 2010, p. 274). Simply demanding use does not result in transformation. It takes a supportive school culture.

4.5. Cultural and organizational support in schools

Successful transformations, such as those described by (Smith et al., 2012, p. 491) are dependent on a culture of support and resources. ‘We have argued that any facility supporting such collaborations is by its very nature as much a social system as any kind of technical system. Intentionally engaging in the support and furthering of the social dynamic is productive, sustaining participation and continuation of participants over time, and sustaining a welcoming and supportive environment for individuals or working groups to explore new ways of teaching and working.’

Indeed, in an extensive research project in Finnish schools, Niemi et al. (2012) found that the success was dependent on the school culture, particularly one that valued sharing, teamwork and risk-taking. That is, the environment of the teachers reflected the environment sought for students, one that combines collaboration and the initiative of entrepreneurship. Thus it is important to focus on the support and environment in which the integration of new classroom structures occurs: ‘The wider implications entail a shift away from a technologically-driven model of ICT integration towards one based on teacher involvement. This means an emphasis on developing and sharing pedagogic expertise concerning ICT use
in subject teaching and learning...’ (Hennessy et al., 2005, p. 187). Ultimately, for students to access, though school, the complex and open-ended learning environments that seem poised to best promote the transversal skills outlined above, teachers need support in continuous, iterative learning and the time and space to engage in peer-to-peer networking in order to take advantage of emerging programs and learning opportunities for their students. Part of the support for the development of school and teacher level competences can be furthered through innovations in the relationship of universities and education research with teachers and schools, discussed in the next section.

5. Using resources effectively

5.1. Taking a long view of technology investment: mobile technology, open source and freely available programs

While currently facing barriers to implementation, in the long run, mobile technology may be a more affordable solution for educational innovations as smartphones decrease in cost. Already, developing countries are looking towards mobile technologies as an efficient way of fostering access to learning (Haßler, Hennessy, Lord, Cross, Jackson, & Simpson, 2011).

While technology without context will not foster Key Competences, increasingly students without access to the interactive online world will be at increasing disadvantage. Mobile devices, cheap and more replaceable elements like interactive whiteboards and desktop computers, are a rapidly evolving alternative.

Technology innovation need not be expensive. If teachers are given the support and time, open source alternatives (Haßler & Jackson, 2010) exist for nearly all commercially available programs and operating systems. Tools like GeoGebra (Hohenwarter, 2006), an open-source program for mathematics that surpasses commercially available tools, also provide gateways into students developing technology competences, as they have the opportunity to contribute to their development.

Finally, and again depending on the availability of hardware, free tools for video conferencing, video editing, chatting and so on provide opportunities for students to develop language competences, but also civic competence and gain intercultural experiences. Curating such activities, however, is not an easy task, and teachers need the time and resources, and perhaps most importantly the space created by alternative assessments, to engage their students in these environments.

5.2. Fostering complex learning environments means funding educational projects with multidisciplinary goals

In the previous sections, examples of learning environments that have been shown to address key competences and transversal skills have been given. One of the overarching themes emerging from education science gathered here is that these learning environments reach several key educational goals simultaneously. For example, the French language learning program researched by Fisher, Evans and Esch (2004) referred to previously did not only give students access to peer learning with native speakers, it also was a site for learning autonomous working skills (independence and self-management) as well as developing civic competences like intercultural understanding. Such programs suggest that funding should not be given for each competence. Rather it suggests the need to support schools and teachers in developing integrated approaches. While many of the examples given here are made possible with technology, the use of technology does not simplify the teacher’s role in designing these learning
environments, scaffolding student progress, and evaluating complex outcomes. Rather, these suggestions imply that the role of the teacher is more demanding, and resources must be allocated accordingly.

5.3. Ensuring equal access to new educational environments

Some of the learning environments that look most promising for the development of key competences are either expensive, or based in spaces outside of school. As such, funding structures must work to extend these opportunities to less advantaged students. As Livingstone (2011, p. 20) argues, ‘...new opportunities, especially if they rely on out of school resources, generate new inequalities. Only publicly funded institutions, schools especially, but also youth and community centres, can work to make this fairer.’

Secondly, teachers at all schools, not only well-resourced schools, must be supported in accessing resources such as networks and grants that will enable them to grow their curriculum in innovative ways. However, this is also problematic, as discussed above. More active teachers at better-resourced schools are more likely to have the time and skills to be successful in grant applications. Less active teachers may be in need of the most help, and yet they are the least likely to access resources. Thus, there is the potential of funding to exacerbate existing inequalities (Green, 2011). As the Swedish case of free-schools demonstrates, the proliferation of innovation can coincide with increasing inequality (Skolverket, 2003) even in a comparatively equal society such as Sweden.

An example of coordinated efforts of local and educational authorities to encourage active participation in innovative learning environments are the cases of Kirkkonummi schools in Helsinki, Finland, and the 2nd and 6th Primary schools in Artemis, Attica, Greece. In these areas, fund allocation aims to increase access and thus benefit less technologically savvy schools, a shared vision and goal for local authorities, school administration and teachers. The integration plan is still in progress and, therefore, it is left to implementation and project evaluation to show in what ways and to what extent technology-enhanced tasks and activities promote key-competence development.

Seemingly, shared vision and technology are significant aspects in mobilizing change processes inherent in a competence-based pedagogical framework. School change, however, requires the synergy of multiple resources to be a tangible goal. The findings of a study on the integration of Key Competences in six Normal Schools in New Zealand (Boyd and Watson, 2006) suggest that only a realistic, multi-dimensional competence-based plan can facilitate change, i.e., one that links new with established school practices; that combines real-world with virtual environments aiming for authentic learning experiences; that allows for teacher integrated planning, experimentation and reflection; and that enables students to connect their in-school with out-of-school lives. Embedded within change management, then, is the management of both human (i.e., teachers and students) and non-human resources (e.g., funds, time, materials, space) between and across schools at the local, regional and national level.

6. Implementation of learning programmes for key competences

The teaching methods outlined for the production of key-competences can be described as being oriented towards interdisciplinary, cross-subject teaching, team oriented learning, individualised approaches (e.g., individual study plans) and project-based work. (Gordon, Halasz, Krawczyk et al., 2009, p. 162). These approaches are already used by many educators, but widespread implementation will mean a change in culture for many schools, particularly schools in challenging environments. Such
approaches demand flexibility at the national, local, and classroom levels. Furthermore, to realise the potential of local partnerships, implementation plans must recognize the complexity of the school context. That is, top down, one-size fits all approaches are unlikely to work, and furthermore they would limit the potential of schools to take advantage of their local contexts. Rather, a leadership environment must be created at the national, local, and school level where diversity and innovation can be supported. What is needed is not a one-time reform followed by stasis. Rather, it is to develop the habit of perpetual revolution: a system structure that encourages constant innovation.

6.1. National, regional, and institution level dimensions

Such an approach implies a flexible national curriculum (Gordon, Halasz, Krawczyk et al. 2009, p. 221), as is the case in Finland, and systems of evaluation that take complex, project-based learning into account. At the regional and local level, successful implementations have demanded collaborations between administration, universities, and schools. Innovative environments require collaboration and support in order to flourish, as studies in Finland regarding the pedagogical integration of technology have shown (Niemi et al., 2012).

International examples of successful, collaborative projects for promoting key competences include the River City project, based at Harvard University in the United States. An interdisciplinary, inquiry based project in an online, collaborative environment, the project implementation required researchers to modify the program for different school environments, and develop on-going relationships with educators and administrators (Clarke & Dede, 2009). Detailing the development of a new, rigorous and inquiry based learning curriculum in Los Angeles, California, Goode and Margolis (2011) describe an iterative process, dependent on strong relationships between researchers, administrators and teachers that was highly dependent on individual school environments.

In another example of networked researcher and educator collaborations, in Finland, Mylläri, Åhlberg and Dillon (2010) researched a network developed through the Environment and School Initiatives programme and as part of a United Nations Educational, Scientific and Cultural Organization (UNESCO) initiative to promote education for sustainable development. Using online collaboration tools to support educators and best practices, the research concluded that a centralized, “expert centralisation” (p. 384) of a collaborative network was beneficial. Community building was also seen as critical for long-term benefits of the programme (p. 386).

Indicative of the need for policies of educational and research environment integration in cooperation with the surrounding community is the case of Linnaeus University in Sweden (Tågerud, 2010). Linnaeus, being the offspring of the Kalmar and Växjö University merge, as Tågerud (2010, p. 57) discusses, would need to maintain the holistic view and strategic goals by combining positive experiences from ‘parent’ institutions. Of these, Kalmar University had adopted a connective approach at an inter-institutional level in the process of redefining pedagogical competence and providing a description of the expected documentation. To achieve this end, discussions held at Kalmar were used; also the model for Lund University’s Faculty of Engineering; the formulations from Uppsala University; and the definition developed in the Mälardalen University project along with the inspiration day held in November 2008 at Kalmar University within the framework of the project “Strategic Development of Pedagogical competence”. Building upon foundational work toward the establishment of its own policies and principles, then, Sweden’s youngest University bears the culture developed within and across some of the country’s institutions with regard to the development of its teachers’ competences.

Competence, however, changes over time and generates the need for encompassing adaptation and development strategies that supersede the formal education level and combine joint local, regional and
trans-sectorial initiatives. In the Netherlands (ECBO, 2008), for example, learning and working ‘infoshops’ are implemented at local/regional level aiming to provide ‘life-long learning’ incentives to the employed, unemployed and those receiving social security benefits. The programme is the outcome of collaboration between the Ministries of Education and Social Affairs and involves the Employment Service, benefits agencies and municipal councils. The ‘infoshops’ are intended for anyone with questions relating to study, career advice, competence testing, etc. Initiatives at sector level known as ‘career projects’ (e.g., for construction workers, the painting and decorating trade etc.) serve similar purposes.

Evidently, the multi-level interaction of implementation strategies for competence development, as discussed in Gordon et al. (2009), is a complex process that involves not only horizontal exchange of actors at the macro-, meso-, and micro-level. Of equal significance, is also a vertical collaboration, between and among policy makers, curricula planners, administrators, university and schoolteachers, and life-long learning organizations.

6.2. Scalability

The studies mentioned here are examples of implementations of new, complex curricula that meet some of the criteria of educating for key competences. They involve long-term, iterative collaborations between administrators, educators, and researchers. Such designs do not lend themselves to traditional methods of education research, nor are they easily spread from a top down approach. Rather, they demand a shift in the relationship between universities, administrations, and schools. One framework for such partnerships can be found in the literature surround design-based research in education, which Sandoval and Bell (2004, p. 201) describe as an ideal method for studying new technologies and complex learning environments within the ecologies of authentic, real-life classrooms. Furthermore, it is a “methodology designed by and for educators that seeks to increase the impact, transfer, and translation of education research into improved practice.” (Anderson & Shattuck, 2012, p. 167). However, it requires an on-going relationship between the researchers and the researched.

The River City project mentioned above, for example, firmly situates the program with design-based research, noting a design that shifted ownership of the project from researchers and developers to users, and established strong bonds between researchers and schools (Clarke & Dede, 2009). However, the researchers and developers are positioned here as key agents and disseminators of curricular innovation. As the work by Mylläri, Åhlberg and Dillon (2010), also suggests, universities and education researchers, then, are also important as agents for scalability of innovative curricula and pedagogical practices.

Just as key-competences requires school systems and teachers to re-think the evaluation of students, so does it require researchers to reconsider school-university partnerships as well as the aims and requirements of education science within the academy. Developments of key competences also imply an increased tolerance for innovative learning environments, including schools learning to take advantage of informal and non-traditional learning spaces.
References


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Section 2: Key competences in policy

Author: Gordon, J. and Arjomand, G. (European Institute of Education and Social Policy - EIESP), Kearney, C. (European Schoolnet).

1. Approaches to implementation at system(ic) level
   1.1. Curriculum design and implementation (frameworks, etc.)
   1.2. Contributions from outside the formal education system

2. Socio-economic issues
   2.1. Schools as learning communities to combat disadvantage
   2.4. Individual student background

3. International policy research findings on specific key competences
   3.1. Communication in the mother tongue
   3.2. Communication in foreign languages
   3.3. Mathematical competence and basic competence in science and technology
   3.4. Digital competence
   3.5. Social and civic competence

References
1. Approaches to implementation at system(ic) level:

1.1 Curriculum design and implementation (frameworks, etc.)

1.1.1 The different country approaches

This section draws essentially on the work of the Gordon et al. (2009) report on key competences and provides a background about the approaches used by EU member states with some examples of the content they put behind the terms in use and also makes use of data collected for Leney et al. 2008 on the Shift to Learning Outcomes. The data comes from the country fiches prepared for the study. The document in Annex 1 is a "mapping" of major categories of terminology about competences and skills used in the EU 27.

Although it is not easy to establish a typology of the policy formulations regarding key competences, it is possible to propose a rough classification by taking the dominant approach in each country as a criterion. It is illustrated in the table below and then more detailed explanations are given.

<table>
<thead>
<tr>
<th>Functional approaches:</th>
<th>Cyprus, Germany, Ireland, Lithuania, Poland, Slovenia, and United Kingdom.</th>
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</thead>
<tbody>
<tr>
<td>Mostly skills or competence-based</td>
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<tr>
<td>Mostly subject-based</td>
<td>Bulgaria, Italy, Malta and Portugal</td>
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<tr>
<td>Thematic approaches</td>
<td></td>
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<tr>
<td>Mostly through major issues of society</td>
<td>Denmark and Slovakia</td>
</tr>
<tr>
<td>Mostly through developing personal qualities</td>
<td>Austria (primary school), the Czech Republic, Greece, Hungary and Luxembourg</td>
</tr>
<tr>
<td>Goals and principles based</td>
<td>Finland, Latvia, the Netherlands and Sweden (see Annex 3)</td>
</tr>
<tr>
<td>Mixed approach (functional and thematic)</td>
<td>Belgium, Estonia and France.</td>
</tr>
</tbody>
</table>

Source: G. Halasz & A. Michel (2011)

The acquisition of key competences by every young person is one of the long term objectives of the Updated strategic framework for European cooperation. The focus is on acquiring learning outcomes for professional and private life in a perspective of lifelong and life-wide learning. Emphasis is placed on the

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quality of teachers and on the autonomy of schools which should be open to civil society and enterprises and put in place appropriate approaches to quality assurance.

For the countries that specifically used the term “competences”, there is, firstly, general agreement that it is about the application of knowledge and skills and secondly that it includes knowledge, skills and attitudes. In Portugal competence relates to the integrated development of skills and attitudes conducive to the use of knowledge in different situations (familiar or not). That is the third aspect included in definitions. Furthermore in Portugal the notion of Competências essenciais (essential competencies) refers to the body of general and subject specific knowledge that is considered indispensable for all citizens in today’s society. In particular, it is essential to identify the knowledge which enables pupils to develop their understanding of the nature of each subject and its processes, as well as a positive attitude towards intellectual activity and the practical work it entails. In the Maltese system, “Competence” is the proven ability to use knowledge, skills and other abilities to perform a function against a given standard in work or study situations and in professional and/or personal development. This definition introduces a fourth notion, that of a standard to be reached. In Italy, knowledge and abilities are defined that each pupil will turn into personal competencies with the help of the school. They are indicated for each subject and cycles of primary education. This is perhaps a fifth notion that competence is individual.

The notion of key competences (AT, BG, CY, CZ, DK, LT, MT, NL, RO, SK, SI) generally refers to subject-independent competences which are seen as providing a “core” or basic set (as in Spain) or a “foundation” (as in Belgium-Fr, France and Luxembourg with the “socle” of competences). In France the “socle” includes both the discipline based and cross-curricular aspects. The French “socle” emphasises that it is the basis on which lifelong learning can be constructed which is an important element in terms of the purpose of the reforms and in line with the EU policy thrust. The Danish example of the definition of key competences is interesting as it makes explicit their role “acting as axes of rotation, activating professional competences and serving as a pre-requisite for the acquisition of professional competences”. In Slovenia key competences include: Learning to learn, Social skills, ICT, Planning and developing career, Entrepreneurship, Environmental responsibility, Safety at work.

Cross-curricular key competences are explicitly defined in the German system as general (subject-independent) competencies essential in order to operate effectively at personal and professional level. They are not limited to cognitive abilities and represent complex operational competencies. They:

- are required for and supported by different subjects and subject areas,
- help solve complex, holistic tasks in real-life contexts,
- can be transferred to new situations not covered by the curriculum,
- can be characterised as general abilities.

In Austria, the term, dynamic skills (Dynamische Fertigkeiten) refer to subject-independent transversal competencies which introduces a nice sense of interaction and development. In the Netherlands they are referred to as core objectives (which relate to subjects) and general objectives (which are cross-curricular). We come back to the reference to objectives later in the section.

Taking one country as an illustration, Estonia clearly differentiates between general and the domain-specific competence and cross-curricular themes. General competence (üldpädevus) is used in the national curriculum and consists of four competences (learning, activity, value and self-definition
competence) while domain-specific competence (valdkonnapõdevus) consists of seven that should cover each aspect that a person has with the world surrounding him/her as well as her/himself. Finally the compulsory cross-curricular themes (kohustuslikud läbivad teemad) are not taught as a separate subject but have to be covered while learning other subjects.

Reform in Hungary with the inclusion of key competences in the primary school curriculum demonstrates in an interesting manner one possible expression of cross-curricular key competences. Most of them are expressed as capabilities and the notion of values is included.

<table>
<thead>
<tr>
<th><strong>Hungary:</strong> the strategy of the ministry contained a list of specific key competence to be developed in primary school:</th>
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<tbody>
<tr>
<td>• the capability of using various learning techniques⁸</td>
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<td>• the capability of intelligent learning</td>
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<tr>
<td>• the capability to apply knowledge</td>
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<tr>
<td>• instrumental competences (like communication, mathematics or ICT-related competences)</td>
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<tr>
<td>• social competences</td>
</tr>
<tr>
<td>• value orientation (the capability to understand and use norms and values) “</td>
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It is interesting to compare that list to the notion of essential used in Portugal: “It is essential to identify the knowledge which enables pupils to develop their understanding of the nature of each subject and its processes, as well as a positive attitude towards intellectual activity and the practical work it entails” in so far as the two approaches appear to differ on the importance placed on content or process competence.

In Finland (similarly to Estonia) the cross-curricular aspect is through themes that are educational challenges with social significance. At the same time, they are current statements on values. In practical terms, cross-curricular themes are policies that structure the upper secondary school’s operational culture and priority areas that cross subject boundaries and integrate education. They deal with issues concerning the way of life as a whole. For the upper grades of basic education, the cross-curricular themes are:

- Growth of the person
- Cultural identity and internationalism
- Media skills and communication
- Participatory citizenship and entrepreneurship
- Responsibility for the environment, well-being and a sustainable future
- Safety and traffic competences
- Technology and the individual

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⁸ This notion is considered to be close to “learning to learn”.
The above examples all refer either to the idea of a foundation which underpins the curriculum, or are intended as threads running transversally across it.

The Lithuanian example is interestingly different as recent reforms, while stressing the need to develop citizenship, entrepreneurship, digital competences, learning to learn and cultural awareness competences, also state that to ensure the quality of education development the content of education need to be related to new competencies of an individual. The orientation is towards the development of general abilities, values, the provision of the necessary competencies based not so much on the transfer of knowledge, as on their analysis, critical assessment and practical application; such competencies shall relate the contents of education to actual life, actual problems and their solutions.

The question is whether those countries using the term “skill” are close to the above notions or to the definition of Chisholm (2005): a skill is “an ability, usually learned, and acquired through training to perform actions which achieve a desired outcome”. In Hungary the term “kompetencia” is a frequent synonym of “képesség” which might be translated as aptitude or skill. In Austria, the term ‘basic skills’ (Grundfertigkeiten) is used to convey the notion in its broadest sense. The terms skills, core skills and key skills are the common ones in use in the four countries of the UK and in Ireland all of which are very similar in the choice of skills to highlight in the schools' curriculum. While Ireland has developed a separate (though similar) framework for each age group (primary, junior secondary and senior secondary), Wales has one framework from age 3 years to 19. The skills embedded into the curriculum contain many elements present in the cross-curricular key competences in the EU framework including the aim that young people should become “full, active and responsible” members of society (see below Scotland). The ideas contained in learning to learn, entrepreneurship and interpersonal and civic competences in the EU framework are present in these different formulations of core/key skills. The emphasis is quite strong on personal “capabilities”, a term used specifically in the Northern Ireland curriculum which has echoes of the Chisholm definition.

Like the French “socle”, the Northern Irish curriculum puts explicit emphasis on the development of skills and capabilities for lifelong learning as well as for contributing effectively to society. These whole curriculum skills and capabilities consist of the Cross-Curricular Skills (Communication, Using Maths and Using ICT) and Thinking Skills and Personal Capabilities – TSPCs - (including Managing Information, Thinking, Problem Solving and Decision-Making, Being Creative, Working with Others, and Self-Management). These skills are embedded and infused throughout the revised Northern Ireland Curriculum at each key stage and it is intended that pupils have opportunities to acquire, develop and demonstrate them in all areas of the curriculum. The notion of capabilities is linked here to a set of skills with quite a functional orientation while it is linked to a set of competences in the case of Hungary (see above) with a more transversal focus.

<table>
<thead>
<tr>
<th>The Irish Key Skills Frameworks:</th>
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<tbody>
<tr>
<td><strong>Primary</strong> - the ability to: Question, Analyse, Investigate, Think critically, Solve problems</td>
<td></td>
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<tr>
<td><strong>Junior secondary</strong>: Interact effectively with others: Communication and literacy, Numeracy, Manipulative skills, Information technology, Thinking and learning, Problem solving, Personal and interpersonal, Social</td>
<td></td>
</tr>
</tbody>
</table>
Key Skills Framework senior cycle: Information processing, Critical and creative thinking, Working with others, Communicating, Being personally effective.

Scotland – Core Skills:
Core Skills describe the broad, transferable skills that people need to be full, active and responsible members of society. The core skills include:

- Communication
- Numeracy
- Problem solving
- Using information technology
- Working with others.

One country that explicitly mentions cross-curricular, transversal skills is Poland for primary education. They reflect the cross-curricular elements of the EU framework and include:

1. planning, organising and assessing pupil’s learning, taking responsibility for one’s learning process,
2. effective communication in various circumstances, presenting one’s viewpoint and acknowledging the views of others, proper use of language, preparation for public presentations,
3. effective cooperation within a group, building interpersonal relations, taking individual and collective decisions,
4. solving problems in a creative way,
5. searching for, ranging and using information from various sources, effective usage of ICT,
6. using the acquired knowledge in practice an creating of necessary experiences and patterns of behaviour,
7. developing personal interest, acquiring methods of negotiating and solving conflicts and social problems.

A third group of countries define goals and objectives. Flanders defines development (Ontwikkelingsdoelen) and final (Eindtermen) objectives. Whereas developmental objectives are minimum objectives which the education authorities consider desirable for a specific pupil population, the final objectives are objectives with regard to knowledge, insight, skills and attitudes, which the educational authorities consider necessary and attainable for a specific pupil population. Similarly the Swedish system is geared towards the idea of ‘steering through goals’ which are decided at the central level though it is the responsibility of the decentralised authorities (such as the municipalities) to fulfil these goals. There are goals to strive for (quality of education process) and the goals to be attained (learning outcomes). Amongst the goals, the knowledge, skills and attitudes corresponding to particular key competences are found. The goals are not ranked in terms of importance and hierarchy and present a range of capabilities or qualities or skills or competences that is broad and developmental. These goals cover all aspects of education from pre-school through to the end of secondary education. (See Annex 1 for the list.)
Another system in which the competences are implicit in the goals is Latvia which has goals common for all general secondary education and which, among others, aim to encourage the development of the student’s personality and of their physical and mental capacities, and to develop their understanding of health as a condition for the quality of life; They also aim to encourage the development of positive, critical and socially active attitudes, and to develop understanding of rights and obligations of Latvian citizens; to develop the ability to study independently and improve knowledge as well as create motivation for lifelong learning and a purposeful career. The latter group are very similar to cross-curricular key competences mentioned earlier in the section.

In Hungary the National Core Curriculum also refers to basic goals which include the development of key competencies as well as a number of other areas. It also contains the principles which underpin and structure the NCC. The NCC published in 2003 also contained a thesaurus which defined the notion of “competence-based” and the relation between “competence” and “knowledge”. According to this, “The ‘competence based approach means a commitment that determines the taxonomy of the curriculum. In the background of this approach there is a theory of personality which considers the competences (personal, cognitive, social and special competences) as the main components of the personality... [This approach] links the competences to specific activities and tasks that are achieved by the human being: someone is competent in relation with an activity if he/she is capable to achieve the tasks related with this activity.” This was the basis for restructuring the NCC so that instead of the element of national culture (“knowledge”) it was focusing on specific developmental tasks that are supposed to develop specific competences.

Two illustrations of a values base are included here while bearing in mind that these are policy statements; the mechanisms and tools of implementation may produce outcomes other than those expressed.

In Finland, for example the values base is very strong and clearly stated.

Students will be educated in tolerance and international co-operation. Upper secondary school instruction is based on respect for life and human rights. The educational ideal of the upper secondary school comprises the pursuit of truth, humaneness and justice. General upper secondary education must promote open democracy, equality and well-being. Students are seen to be the constructors of their own learning, competence and views of the world. Instruction must take into account the fact that human beings observe and analyse reality using all their senses. Educational work will place emphasis on co-operation, encouraging interaction and honesty. The aim is for students to know their rights and responsibilities and to grow to assume adult responsibility for their own choices and actions. During their upper secondary school years, students must be provided with experiences of how to shape the future through joint decisions and efforts. Upper secondary school instruction must encourage students to recognise conflicts between stated values and reality and to ponder critically the disadvantages and opportunities of Finnish society and international development. During their upper secondary school years, students must become able to form a structured understanding of basic civil rights in Finland, the Nordic countries and the European Union, their meaning in practical terms and ways to uphold and promote them. Upper secondary school must highlight the principles of sustainable development and provide capabilities to face the challenges posed by the changing world. The basic values of upper secondary school are consolidated by the cross-curricular themes set out in Section 5.2, which are value-based positions on current challenges in education and schooling.

England: values underpinning the curriculum:
Education should reflect the enduring values that contribute to personal development and equality of opportunity for all, a healthy and just democracy, a productive economy, and sustainable development. These include values relating to:

- **the self**, recognising that we are unique human beings capable of spiritual, moral, intellectual and physical growth and development

- **relationships** as fundamental to the development and fulfilment of ourselves and others, and to the good of the community. We value others for themselves, not only for what they have or what they can do for us

- **the diversity in our society**, where truth, freedom, justice, human rights, the rule of law and collective effort are valued for the common good. We value families, including families of different kinds, as sources of love and support for all their members, and as the basis of a society in which people care for others. We also value the contributions made to our society by a diverse range of people, cultures and heritages

- **the environment**, both natural and shaped by humanity, as the basis of life and a source of wonder and inspiration which needs to be protected.

At the same time, education must enable us to respond positively to the opportunities and challenges of the rapidly changing world in which we live and work. In particular, we need to be prepared to engage as individuals, parents, workers and citizens with economic, social and cultural change, including the continued globalisation of the economy and society, with new work and leisure patterns and with the rapid expansion of communications technologies.

Some issues arising:

The different approaches in the EU countries cover a broad variety of skills, competences, values, themes, etc. but the following aspects are less or not at all present:

- The need for students to understand about how one learns best, that is one’s individual learning patterns and preferences, is not well developed.

- There is little reference to the need to develop a sense of self and of understanding of self. The main references are the interpersonal skills/competences with a strong emphasis on interactions with others, social aspects, etc. This is well-covered in the psychological literature but not well adapted into learning frameworks.

- Few of the definitions and usages refer to values, to the values with which children and young people will relate to each other and to the world around them.

- The relationship to the environment in both senses: the wider world around and issues of the survival of the planet are dealt with in a limited manner.

**Country Example: Scotland**

This example is presented since the curriculum is built out of the overarching framework of aims and principles of the Curriculum for Excellence which aims to achieve a transformation in education in Scotland by providing a coherent, more flexible and enriched curriculum from aged 3 to 18 and includes the totality of experiences which are planned for children and young people through their education,
wherever they are being educated. The purpose is encapsulated in the four capacities - to enable each child or young person to be a successful learner, a confident individual, a responsible citizen and an effective contributor. To reach these outcomes it is recognised that children need to be safe, healthy, achieving, nurtured, active, included and respected and responsible which is illustrated in the following wheel. This is an example of taking a holistic perspective of children as foundational to the learning activities and content. It links formal education with health and well-being outcomes and to this end support has been developed practitioners in all sectors and services and in local authorities.

http://www.educationscotland.gov.uk/thecurriculum/whatiscurriculumforexcellence/index.asp
1.1.2 How have approaches been designed?

This section presents 3 examples of how key competences have been introduced into national systems: Spain, Poland and France. The Spanish and Polish examples refer to articles published in the *European Journal of Education*, vol. 46, No. 3, September 2011 on *Key Competences in Europe*. They present different contexts and approaches. The article on Spain illustrates a government led approach through a core curriculum while the Polish example illustrates the influence of international bodies on the school curriculum in transition countries. The French example refers to articles published in the *Administration et Education*, the journal of the French Association Française des Acteurs de l'Education, No. 2 2012 that focused on *l'Ecole du Socle* (the foundation of competences). It is an example of an iterative process over quite a long period between expert groups and government steering.

**SPAIN**

In "Implementing key competences in basic education: reflections on curriculum design and development in Spain" (Tiana, Moya and Luengo, 2011), the authors observe that in Spain the reference to competences, understood as a way of defining educational intentions, was introduced almost simultaneously in the curricula of basic, compulsory and higher education (Bolívar & Moya, 2007). In the case of school education the Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning was very important whilst for higher education the key influence was the Bologna Process. Tiana *et al* point out that in both cases, "the incorporation of competences seeks to underline that the knowledge acquired at school or university cannot be easily transferred outside the educational context and that there is a lack of systematic work to develop basic skills that permit reaction to the changing situations of life and work which require complex responses". The Organic Education Act (LOE, 2006) was being drafted, debated and passed at the same time as the preparation of the European Recommendation, hence the reason that Spain was one of the first EU member states to include a reference to key competences in their legislation.
Prior to this, the notion of competence had been used in vocational training in Spain in the 1990s and was given a legal basis through the Organic Qualifications and Vocational Training Act of 2002 (LOCFP, 2002) in which professional competence was defined as ‘the set of knowledge and skills that a professional activity to be exercised in accordance with production and employment demands’, whereas a professional qualification was defined as ‘the set of professional competences with significance for employment that can be acquired through modular or other kinds of training and through working experience’.

Consequently key competences were also included in the law in reference to student assessment, diagnostic evaluation and qualification at the end of Compulsory Secondary Education so that competences served both as a reference to assess educational results and included in grade promotion and certification on completion of compulsory education. However the legislation did not specify what these key competences should be. This was carried out subsequently and gave rise to the establishment of the enseñanzas mínimas (core curriculum).

\textit{enseñanzas mínimas}

"the Spanish education system is highly de-centralised and curricula are drawn up on a shared basis. Initially, the central government sets out the basic aspects of the curriculum, in other words, it determines the objectives, key competences, contents and evaluation criteria for each level, cycle or year and subject. These elements, thus defined, are known as enseñanzas mínimas, a misleading expression, which many interpret as ‘minimum education’ that all students must acquire, although this is not its meaning. In reality, they represent a core curriculum which must be respected throughout the State. Subsequently, the Autonomous Communities established the curricula for each level, cycle, year, area and subject, which must necessarily include the enseñanzas mínimas defined by the Government nationwide (this is the true meaning of minimum). These curricula then serve as a reference for schools in every Autonomous Community. On the basis of these curricula, schools and teachers draft their respective projects for each grade, area or subject. This curricular development process, carried out in several successive phases, ensures that both Government and Autonomous Community responsibilities are respected, giving schools their margin of autonomy and teachers their academic freedom. With this cascaded decision system, where each decision is derived from a previous one and included in it, the initial curricular design is given shape and permitted to grow in depth and breadth, whilst avoiding the many obstacles that may arise in its path and allowing adaptation to the specific environment through which it flows.

Once the law had been approved, the government defined the key competences that all students must develop by the end of compulsory education for primary and compulsory secondary education in Royal Decrees. Given that this approach was very new, it was decided to proceed "cautiously and gradually". The Royal Decrees provided a general framework with the description, purpose and distinctive aspects of each key competence, as well as the development level which should be reached by all students on completion of their basic education. They include how each knowledge areas in primary education and subject in compulsory secondary education contributes. This was a break with standard practice in which curricula established objectives, contents, methodology and evaluation criteria for each area and subject.

At the school level the authors point out that the curriculum developed by the school will be the set of experiences offered to its students which is qualitatively different from curricular design and cannot be "reduced to the decisions adopted by public authorities when selecting learning (key competences, objectives and evaluation criteria) and the related cultural elements (curricular areas and contents). Curricular design conditions but does not determine the school curriculum, as there is considerable scope for freedom and responsibility to transform curricular design into real curricula." Hence in this context the
importance of school autonomy and education practices if the construction of an integrated curriculum is to be adapted to the specific conditions and characteristics of each school which become organisations run on a project basis. Thus the authors also insist that this is fundamentally about how they manage their own resources and activities on the basis of their own projects. The importance of schools becoming learning associations is underlined and the authors emphasise that "The integrated development of the curriculum to whatever level a school can attain has a single purpose: to increase learning opportunities and improve the results of each and every student."

POLAND

In their article on "Translating key competences into the school curriculum: lessons from the Polish experience" (M. Dabrowski & J. Wisniewski 2011), the authors focus on general education in primary and secondary schools in the context of the transition process in Poland in which the challenges to education and learning have been compounded by major economic and social changes and the democratisation of structures and processes. Both authors played a significant role in this period. The article underlines the complexity of the reform process and how the introduction of outcomes based approaches and key competences have affected mindsets and attitudes of all the functions and actors in the education system (governance, the role of principals and teachers, teacher training, parents, etc.). "Polish schools in the second half of the 20th century were institutions where encyclopaedism, teacher-oriented classrooms, and lack of autonomy and democratic procedures prevailed."

Though the process of education reform was at the outset limited it had a great symbolic value for Polish society as it was assumed that "values such as democracy, freedom of the individual, respect for the law, and tolerance should form the basis of the education system. Promotion of these values could be achieved by including them in the curricula and in the way schools operated, including organisational and teaching culture. These aspects of school operations also created the conditions for developing key competences." Lack of funds and the economic situation created a major obstacle which included reducing the number of teachers and the class hours, etc. while maintaining all subjects and this led to the need to establish minimum curriculum requirements which turned out to be the first step in developing a core curriculum.

The debate on key competences started in Poland due to the results of the International Adult Literacy Survey (IALS) in 1994 which caused dismay and led to an initial list of competences being developed for Polish schools in 1996. They were: preparing for teamwork, preparing for oral and written communication, preparing for using the latest information media, problem-solving skills, and preparing for continuous learning, retraining and re-skilling. This debate about using competences at work and in social interactions also led to reflection on how to measure competences and evaluate their acquisition. Thus the IALS results and the debate were the "beginning of a new paradigm to define goals for the education system" and was made concrete in the Kreator project launched in 1995 with EU Phare funding. It aimed at developing a method for including specific key competences in the teaching of individual subjects and applying adequate methods. The competences defined were: planning, organising and assessing one's learning; successful communication in various situations; successful teamwork; constructive problem solving; and proficient use of computer and Internet technology. This project, which unfortunately only lasted as long as the EU funding, also looked at the organisation of lessons in order to better support pupils' acquisition of knowledge and development of competences. See box below:

1. **Commitment**: During the first stage of the lesson, its topic is clearly presented, which motivates students. It is important to accurately formulate the goals and instructions and create an atmosphere that
is conducive to commit students to problem solving. The organisational framework of the class is established at this stage (e.g. students are divided into groups).

2. **Researching**: Students individually analyse the tasks. This stage is devoted to discussion, analysis, negotiations, and relating to previous experience and acquired knowledge. Hypotheses are made and doubts are voiced. Teachers become observers and listeners; they verify how much knowledge and experience students contribute.

3. **Processing**: At this stage of the lesson, knowledge gained at the previous stage is organised and used in a creative manner. Students present their proposals as to how to solve the problem they have faced. The success of this stage is subject to cooperation by students, their inventiveness and commitment. They deepen their understanding of the problem, assimilate knowledge and learn how to use it.

4. **Presentation**: At this stage, representatives of individual groups report on the results of their work to a wider audience, be it a class or group. When presenting the results of group work, students can compare the solutions that have been applied to a given problem and results achieved by other teams.

5. **Reflection**: The closing stage of the lesson is indispensable and very demanding on the teacher and students. Students conduct self-assessment, define what and how they have learnt, the purpose of the working methods adopted and how they could continue the work and use the acquired experience. Students and the teacher attempt to answer the following questions: What have we done? What have we achieved? What could we have achieved? What were the principles for our learning? How can we use the experience?

The Council of Europe also had an influence in Poland through the results of its symposium on Key Competences for Europe in 1996 which defined five sets of key competencies with which schools should "equip" young Europeans (Council of Europe, 1996). See box below:

1. Political and social competencies such as the capacity to accept responsibilities, to participate in group decisions, to resolve conflicts in a non-violent manner, and to play a part in running and improving democratic institutions.

2. Competencies relating to life in a multicultural society, such as accepting differences, respecting others and the capacity to live with people of other cultures, languages and religions.

3. Competencies relating to the mastery of oral and written communication, which are essential for work and social life to the point that those who lack them are henceforward threatened with social exclusion. In this same register of communication, the mastery of more than one language is taking on growing importance.

4. Competencies associated with the emergence of the information society. The mastery of these technologies, the understanding of their applications, strengths and weaknesses, and the capacity for critical judgement with regard to information disseminated by the mass media and advertisers.

5. The capacity to learn throughout life as the basis of lifelong learning in both occupational contexts and individual and social life.

This informed the work of a group of experts set up in Poland by the Ministry of Education and which led to Regulation no. 8 on Core Curricula for Obligatory General Education Subjects (1997), which was the first of its kind in Polish legislation on education.

"Its philosophy and structure differed greatly from previous solutions. The education process was divided into two- or three-year stages which replaced the traditional division of curriculum into one-year cycles.
The curriculum was divided into 21 subject areas, including those which were totally new for Polish schools, such as media education, health education, reading education and information education. It is clear that some of these subject areas were closely related to cross-curricular key competences." One important aspect was that the document addressed schools and not individual teachers. However a change of government led to its implantation being delayed till 1999 and then modified going back to instructions for individual teachers.

FRANCE

In his article on, "La difficile (et chaotique) histoire de la mise en place du socle" (Lelièvre 2012), the author traces the history of the reflection in France about a common foundation (socle commun) or a minimal knowledge (savoir minimal) or a shared basic culture (culture commune de base) that should be acquired by all pupils back to the legislation in 1959 making 16 years the end of compulsory schooling for children who had reached the age of 6 years old in 1959. This measure led throughout the following period to a discussion not only about the structure and organisation of secondary schools to respond to the longer compulsory schooling but also to its content and whether different streams should address the needs of what were considered to be the most competent pupils, the average pupils and those in difficulty. This led during the presidency of Giscard d’Estaing in the second half of the 1970s to a fierce debate about the meaning of a minimum common knowledge for all pupils with the word "minimum" creating the heat of the debate.

Lelièvre traces the iterative reflections from that period on between a succession of expert groups and ministers of education. He draws attention to the fact that for a long period, 30 years, the debate about the common or minimal knowledge that pupils should have acquired by the end of compulsory education was regularly buried due to its sensitivity. Under the presidency of François Mitterand, Pierre Bourdieu was commissioned to draft a report on the "fundamental principles for the future of the education system" in 1984 that recommended a "fundamental and obligatory core of knowledge and skills that all citizens should possess. Ten years later in 1994 the philosopher, Luc Ferry in his role as chair of the National Council of Programmes submitted a report recommending a "common foundation of knowledge and competences, including practical and reflexive competences" that should be for all pupils regardless of their level and capacity. In 1999 the sociologists Marie Duru-Bellat and François Dubet undertook a consultation in secondary schools concluding on the need for serious reflection on the competences and knowledge that should form the common foundation for a generation. But it was not until the commission on the national debate, led by Claude Thélot in 2005 that led to legislation establishing a "socle commun de connaissances et de compétences". A further advance in this period was the confirmation that competences are all equally important for young people and cannot be compensated for, i.e. acquiring one but not another is not acceptable. The final stage was in 2005 under the newly formed High Council on Education which added to the 5 competences already defined (mastery of French; a foreign language; basic competence in mathematics and a scientific and technological culture; mastery of information and communication technology; and a humanistic culture) two others based on the EU framework of competences: civic and social competence; and autonomy and initiative.

This article demonstrates interestingly the importance of the history and culture of an education system and the importance of debates being embedded in the culture of the system. It is also an interesting example of role played by French experts nominated by successive ministers to examine what were seen as critical issues but plagued by sensitive debates.
1.2. Contributions from outside the formal education system:

This section looks both at non formal environments and the contribution of NGOs to the implementation of key competences (that are implemented in formal environments). The first example is ISSA, an international NGO that has had considerable influence in early childhood education and care policy and the professional development of teachers and educators over the last decade in a number of central and eastern EU member states as well as candidate and partner countries.

International Step by Step Association [http://www.issa.nl/]

The International Step by Step Association (ISSA) is a spin-off from the Open Society Institute (OSI) from which it receives support. They connect professionals and organisations working in the field of early childhood development and education, promoting equal access to quality education and care for all children, especially in the early years of their lives. ISSA was established in the Netherlands in 1999 and are now present in about 30 countries, including in Central and Eastern Europe where they implement the Step by Step Programme initiated by the OSI in 1994 and other programmes. Members of the ISSA network work closely with local and national educational authorities and other key stakeholders in the countries. Their services include professional development programmes for staff in preschool and primary-school.

*Competent educators of the 21st Century* (Step by Step, 2010), defines what they consider to be quality pedagogy for early years education and care. It was developed with the support of a group of international experts in this field, to further the ISSA vision: "With support from family and community, every child reaches his or her full potential and develops the skills necessary for being a successful and active member of a democratic knowledge society". ISSA promotes:

- Equal access to quality education and care opportunities;
- Child-centred, individualised teaching and learning, combining high-level instruction with support for the needs of each child;
- **Development of skills and dispositions for lifelong learning and participation in a democracy;** *(Our bold)*
  - Recognition of educators’ many roles as facilitators, guides, and role models in the learning process and as active members of their communities;
  - Family involvement in children’s development and education;
  - Community engagement in public education;
  - Respect for diversity, inclusive practices, and culturally appropriate learning environments and methods; and
  - Self-improvement and on-going professional development

ISSA’s quality approach takes as its foundations the United Nations Convention of the Rights of the Child as well as other major international documents and inspiration such as the Council of Europe programme, Building a Europe for and with Children and the OECD Starting Strong reports. They consider that what constitutes high quality in education is a "complex and multi-faceted matter, including structural conditions (e.g. group size, adult/child ratio, etc.), as well as process factors (e.g. sensitivity of the adult, quality of interactions and curricula, etc.)" that should support professional autonomy. They first adopted standards to help practitioners their everyday performance through the principles of learner-centred, interactive pedagogy, the development of life-long learning skills, and cooperation with families and communities. They are widely used in their programmes and in working with authorities and stakeholders. A practice of mentoring to assist educators in improving their performance based on the
standards has been adopted. Continuous improvement and integration of new findings, such as neuroscience, has led to the development of Competent educators of the 21st Century which consists of seven focus areas that reflect ISSA’s main beliefs about quality pedagogy and identify ways to aspire to excellence:

1. Interactions
2. Family and Community
3. Inclusion, Diversity and Values of Democracy
4. Assessment and Planning
5. Teaching Strategies
6. Learning Environment
7. Professional Development

The seven areas promote “practices guided by humanistic and socio-constructivist principles, emphasizing developmentally appropriate practices, an individualised approach, and the idea that learning occurs in interaction, and is a dialogue between children and adults, as well as between children, which is marked by respecting each other, stimulating and giving autonomy to the learner, and assuming that children are competent and full citizens even while they need support from adults”. This supports the development of lifelong learning competences, including:

- interpersonal and civic competences,
- awareness about environmental issues and sustainable development,
- intercultural understanding,
- entrepreneurship, and
- ICT skills.

An important aspect is that teachers and educators are seen as having an important role in helping children to develop self-esteem, self-confidence, learning skills, the disposition for living and working with others and respect for diversity. ISSA considers that they therefore need space for their own development on both a personal and pedagogical level to be able to model and share with children. The second example moves from early childhood to schools.

Bertelsmann Stiftung: Selbsevaluation in Schulen

The second example in this section is taken from a self-evaluation tool built by the Bertelsmann Foundation for use by schools in Germany. SEIS (Selbsevaluation in Schulen) is a self-evaluation instrument that can be administered through a computer or in a pen and paper format, originally developed in the mid-1990s in the context of the Bertelsmann Award for Innovative Systems when they began to identify through the process what good school quality implied. This led in 2003 to developing the software for delivering the self-evaluation. Several thousand schools use SEIS in different Länder of Germany. (Gordon et al, 2009-2010) The data obtained is for the school in a perspective of school development and improvement. There are specific questionnaires for students of different ages (e.g. up to grades 6 and grade 7 and above), teachers, support staff and parents. The data belongs to the school and is confidential but comparisons can be made with aggregated data from other schools. Bertelsmann Foundation also manages a programme called ‘Good and Healthy Schools’ (Anschub.de) and for these
schools there are extra questions pertaining to that project. Though the tool contains questions on a number of aspects of the school, it is the outcomes expressed as skills contained in the student survey that are of interest for this literature review. This example (with the items re-organised into categories selected by the author) is taken from the questionnaire for grade 7 and above students.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal well-being</strong></td>
<td>Setting personal goals for improvement; explain ideas well in writing and orally</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>Relationship with teachers: support from teachers, encouragement, promoting, pay attention</td>
</tr>
<tr>
<td></td>
<td>Feeling that the class has taught to work well with others, respecting &amp; paying attention; participating in group work; solving tasks, confidence, do group-work; get along with others</td>
</tr>
<tr>
<td><strong>Impact of environment:</strong> School, community or home</td>
<td>Feeling that the class has taught to recognise strengths &amp; weaknesses; learn from mistakes; solve a task; recognise what I am good at &amp; what needs improving</td>
</tr>
<tr>
<td></td>
<td>Perception that school has helped to learn new things; organise time; be healthy; protect the environment; think about what I see in media; solve problems in different ways; explain thought process when solving a problem; make decisions</td>
</tr>
<tr>
<td></td>
<td>Satisfaction with going to school: overall satisfaction; feeling that school promotes talent; feeling that school treats students fairly; satisfaction with teaching &amp; learning methods; satisfaction with what needs to be done to achieve academically; pupils assess lessons; school recognised good effort &amp; achievement; school provides healthy and nutritious meal plans; active promotion of health is important at school</td>
</tr>
<tr>
<td><strong>Activities and agency</strong></td>
<td>School has helped: act as leaders in a group; solve disagreements</td>
</tr>
<tr>
<td></td>
<td>Participation with extra-curricular activities at school: use of school campus beyond class time</td>
</tr>
<tr>
<td></td>
<td>Student opinion is considered on decision that affect students: feeling safe in school; school is welcoming and friendly; existence of counsellors &amp; support services for parents; student council can influence decisions regarding school life &amp; work; students are involved in planning of school life</td>
</tr>
<tr>
<td></td>
<td>Support: teachers effectively deal with bullying and bad treatment by other students; with inappropriate behaviour; students with personal problems receive help &amp; support; there is someone to turn to in school for assistance</td>
</tr>
</tbody>
</table>

Source: Gordon et al, 2009-2010
The categories combine skills that are contained in the EU key competences (e.g. such as solving problems) with outcomes for students that entail a focus on broad competences for both staff and students (e.g. the quality of relationships) and other learning outcomes that pertain, for example, to health literacy, not included in the EU framework. The next example from the Learning for Well-being Consortium is focusing on core capacities that underpin human development.

**Learning for Well-being**

In 2009, convened by the Universal Education Foundation, a group of foundations established the ‘Learning for Well-being’ Consortium of Foundations in Europe. Learning for Well-being proposes a vision of inclusive societies where children and young people are respected as competent partners. It describes the journey of learning to realise one’s unique potential through physical, emotional, mental and spiritual development in relation to self, others and the environment. It focuses on cultivating capacities and environments that:

- nurture the expression of one’s unique potential;
- respect the uniqueness and diversity of each individual;
- emphasise the nature and quality of relationships;
- support participation and engagement in one’s community and society.

These are illustrated in the framework below:


From 2010 to early 2012 the Consortium developed and then launched, *Learning for Well-being; a Policy Priority for Children and Youth in Europe: A Process for Change*. This policy glossary represents a cross-sector perspective developed through a consultative process involving a broad range of stakeholders. (http://www.eiesp.org/hosting/a/admin/files/L4WB%20A%20Policy%20Priority%20for%20Children%20%26%20Youth%20in%20Europe.pdf) Through working with research partners, foundations, European NGOs and practitioners, Learning for Well-being has developed the conceptual framework above and a first set of core capacities. In comparison with key competences and the transversal skills of the EU framework focused on the learner in the context of lifelong and lifewide learning, core capacities are defined by Learning for Well-being as fundamental skills and behaviours that are implicitly required for learning to
learn and other complex competences such as creativity, problem-solving, emotional self-regulation, and critical thinking. Learning for Well-being emphasises that too often differences in ways of communicating and learning are causes of exclusion and are viewed as problems to be resolved rather than as natural patterns of expression to be supported. When children and adults are allowed to function in their own natural ways of being, participation in all activities becomes more engaging, meaningful and inclusive. A current interest of the work of the consortium (now enlarged to a broader range of partners) is deepening the understanding of the articulation between core capacities and key competences. The following are an illustrative list of core capacities for supporting physical, emotional, mental and spiritual development that can be nurtured from early childhood onwards:

- Relaxation (physical, emotional, mental, spiritual)
- Sensory awareness
- Paying attention
- Caring for one’s physicality
- Emotional self-regulation – including resilience, coping with stress, difficulties, trauma
- Subtle sensing – including intuition and imagination
- Reflection
- Critical Thinking
- Listening
- Inquiring
- Empathy
- Conscious action – including planning, decision-making and self-discipline
- Discerning patterns and systemic processes

These three examples illustrate the contribution from outside of the formal education sector that focus strongly on nurturing in children and young people the capacities, skills and competences that will strengthen their capacity to live meaningful, joyful and healthy lives.

2. Socio-economic issues:

2.1. Schools as learning communities to combat disadvantage

The arguments in the literature on education and disadvantage tend to focus on:

- Education as a route out of poverty whether for adult learners of young people in terms of supporting future employment
- The role of schools in creating a learning community embedded in the local community, welcoming, supportive and accepting diversity.
- Some literature, either related to neurosciences or to social and emotional learning, indirectly addresses the issues related to disadvantage by emphasising the conditions under which children can or cannot learn - for example, if you are hungry, afraid, in pain, etc. learning will be less effective.

On the whole research does not address directly the socio-economic issues of competence development, but there is a strong emphasis on creating the environments and processes that will support and empower learners. Thus the European FP6 funded research project INCLUDE-ED (2006-2011), focused strongly on the participation and engagement of pupils and their families/communities in developing the
educational project of the school and learning communities using "Successful Education Actions" in schools where there are a high percentage of children living in poverty, with a migrant or minority status and/or other forms of disadvantage (http://creaub.info/included/results/). The project team observed that successful actions do not require additional resources but rather a reorganisation of the existing ones in the classroom and in the school with a focus on nurturing learning communities. The interest for the key competences network is in the partnerships created between schools, authorities and families to better support children's learning.

Emphasis is placed for example on transforming power-based relations between the education professionals and Roma parents into dialogic ones, by which they are referring to dynamic relations between stakeholders where dialogue and exchange become the foundation of cooperation. The aim was to undertake a collective approach to understanding what will improve the quality of education. Recognising Roma culture and contributions was very important and ensuring that their voices, experiences, skills and knowledge participate in the decision-making spaces. In parallel to co-creating strategies for Roma children to succeed in developing their capacities in school, the project also supported family education classes, such as literacy or courses so that Roma mothers could work as canteens supervisors and observed the importance of the presence of Roma mothers in schools for the continuing presence of girls. In this research the emphasis is not so much on specific key competences, but on the importance of creating a learning community within schools that involves families in ways that are empowering and change the way that schools "look at" children living in poverty and vice versa, the experience of the school by the pupil and their families (Melgar et al 2011).

Furthermore, there is an increasing agreement among policy-makers that it is crucial to include the voices of those who are living in poverty in order to fight exclusion most effectively. For education to be an effective tool in fighting poverty, policy must include all voices, especially those of people who are more socially vulnerable, stressing the impact of collaboration within the whole community and between schools and their contexts, valuing the potential of all students and families to support and collaborate with teachers (Valls et al 2011). On the other hand, schools alone cannot reverse the high rates of school failure in the poorest communities in Europe; they need the contributions of the entire community. Coordination between families, the larger community, and the school has proven crucial to enhance student learning and achievement, especially for minority and disadvantaged families (Diez et al 2011).

2.2. Individual student background

This section looks at three aspects of students' individual background:

a) The socio-economic aspects
b) Supporting students to become learners
c) Whole child approaches

a) The socio-economic aspects:

The evidence for developed countries is that education and training are major determinants of an individual's life chances, not only in employment, but also in terms of the broader social outcomes. More educated people tend to be healthier, to live longer, to commit fewer violent crimes to experience a greater sense of well-being, and are more likely to be tolerant of others and other cultures, to trust other people and institutions, and to be active citizens, participating in their communities and engaged in politics (Green, 2011). Though these associations can be found in most developed countries in individual
level analysis they do not necessarily hold in cross-country analysis because other contextual factors come into play (Green, Preston, & Janmaat, 2006). Evidence from the 2009 PISA survey on the distribution of skills amongst 15-year-olds in different regions and country groups has been analysed to investigate how education systems in these regions contribute to different levels of inequality (Green 2011). Education and training systems shape social outcomes both in the way they socialise children and in the way they distribute skills (Green 2011). The principal message from this research is about the importance of educational equality in particular in social cohesion. Green concludes that "Countries which achieve more equal education and which, on our evidence, benefit thereof in terms of social cohesion, are countries which believe in the virtues of equality and design their education systems to enhance it". A strong correlation has been shown to exist between the poverty risk of households and the level of education of the head of the family in so far as families with a low-educated head face a poverty risk which is twice that of those where the head has completed secondary education (24% versus 13% on average for the EU27) (Nicaise 2012). Young people born and growing up in poverty have far fewer opportunities to benefit from education and have less access to good quality services in early childhood, participate less in kindergarten (2012), start primary school with some disadvantage in relationship to better-off peers, accumulate larger deficits throughout their education careers, are more often referred to special education, frequently orientated into lower-quality vocational tracks, and drop out more easily without any qualification. Empirical research for the EU has shown that children living in low income households, whose parents have low qualifications, are unemployed or are at risk of ‘in work poverty’, who live in inadequate housing and disadvantaged neighbourhoods, and/or who come from a migrant or ethnic minority background are much less likely to obtain good qualifications at school (Nicaise 2012).

Nicaise refers to the theoretical literature on equality in education that distinguishes between three sources of inequality at the individual level: unequal ‘talents’ (mostly interpreted as genetic endowments); unequal effort or preferences, which are the responsibility of the individual; unequal opportunities relate to causes that are exogenous to the education system, such as the living conditions of disadvantaged groups. And adds a fourth which he suggests is probably the most important source of inequality: unequal treatment or discrimination. This includes the more frequent referral of children from immigrant or poor backgrounds to vocational tracks or in some countries the fact that Roma children may attend totally different and lower level school. Nicaise argues that "By the end of basic education, children from socially disadvantaged or minority backgrounds may have accumulated such deficits in verbal ability that it is almost impossible for them to enter general secondary education. If the curriculum in primary school had better valued instrumental forms of knowledge, it would have generated more equal success scores of lower-class pupils and led to more positive motivation and orientation." He concludes on the need for massive investment in education, especially in basic skills and echoes existing research that suggests that both the fairness and the efficiency of education systems can be significantly improved by pulling down barriers and calls for a consensus "on the human rights perspective that the ‘right to learn’ is intimately linked with human dignity (and therefore rather absolute), irrespective of social background, ethnicity or indeed (perceived) talents."

b) Supporting students to become learners:

While it is recognised that non-cognitive factors are important in learning, a critical review of the evidence base was less readily available and hence addressing this need constituted the basis of the literature review produced by the University of Chicago Consortium on Chicago School Research in partnership with Lumina Foundation and Raikes Foundation. The aim was to develop a coherent and evidence-based framework for considering the role of non-cognitive factors in academic performance and to identify
critical gaps in the knowledge base and in the link between research and practice. The review sees this as a prerequisite for policymakers, practitioners, and education funders who would wish to assess the potential of non-cognitive factors as levers for increasing student educational attainment. The review found evidence to suggest that the best leverage points for improving student performance are in helping teachers understand the relationship between classroom context and student behaviours, providing teachers with clear strategies for creating classrooms that promote positive academic mindsets in students, and building teacher capacity to help students develop strategies that will enhance their learning and understanding of course material (Farrington et al. 2012) The study acknowledges that while a growing body of knowledge suggests that non-cognitive factors play a key role in student success, it is unclear how all the different types of non-cognitive factors interact to shape academic performance or what their implications are for educational practice. The report reviews the research on non-cognitive factors with a focus on students in the middle grades in high school in the USA and in the transition to college. They focus on identifying which non-cognitive factors matter for students’ long-term success, clarifying why and how these factors matter, determining if these factors are malleable and responsive to context, determining if they play a role in persistent racial/ethnic or gender gaps in academic achievement, and illuminating how educators might best support the development of important non-cognitive factors within their schools and classrooms. They identify five general categories of non-cognitive factors related to academic performance:

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC BEHAVIORS</td>
<td>Going to Class, Doing Homework, Organizing Materials, Participating, Studying</td>
</tr>
<tr>
<td>ACADEMIC PERSEVERANCE</td>
<td>Grit, Tenacity, Delayed Gratification, Self-Discipline, Self-Control</td>
</tr>
<tr>
<td>ACADEMIC MINDSETS</td>
<td>I belong in this academic community. My ability and competence grow with my effort. I can succeed at this. This work has value for me.</td>
</tr>
<tr>
<td>LEARNING STRATEGIES</td>
<td>Study Skills, Metacognitive Strategies, Self-Regulated Learning, Goal-Setting</td>
</tr>
<tr>
<td>SOCIAL SKILLS</td>
<td>Interpersonal Skills, Empathy, Cooperation, Assertion, and Responsibility</td>
</tr>
</tbody>
</table>

c) Whole child approaches:

This third example is taken from *My transition Guide*, which was developed by the children’s services with the Scottish Highland Children’s Forum in order to help young people plan their transition from school into further study or work, to see the skills and achievements they already have and how to use them to make plans. [http://www.highland.gov.uk/NR/rdonlyres/C4A1C8E0-577A-431E-8C63-500DFDC4BF32/0/transitionguideppp.pdf](http://www.highland.gov.uk/NR/rdonlyres/C4A1C8E0-577A-431E-8C63-500DFDC4BF32/0/transitionguideppp.pdf)

What is interesting in this example is the use of the transversal aims for children and young people that are within the Scottish Curriculum of Excellence in the specific situation of transition from school to work or further study, which means broadening the items from classroom learning to their lives in general around three pillars: How I grow; What I need; and My wider world (see diagram below).

<table>
<thead>
<tr>
<th>Am I Safe, Healthy and Nurtured? Do I</th>
</tr>
</thead>
<tbody>
<tr>
<td>• have a place to live where I feel supported, happy and cared for?</td>
</tr>
<tr>
<td>• feel secure in my home and community and safe from people who could harm me?</td>
</tr>
<tr>
<td>• have confidence to be able to plan for myself and to take informed risks?</td>
</tr>
<tr>
<td>• maintain a healthy body and mind?</td>
</tr>
</tbody>
</table>

61
• know how I feel and have someone to talk to?
• feel confident to be able to get support to make informed and healthy choices?

**Am I Included and Active? Do I**
• have the support to be accepted and understood as an equal at home, work and play?
• like and respect myself and am I willing to ‘have a go’?

**Am I Respected and Responsible. Am I a Responsible Citizen? Do I**
• feel heard and involved in decisions that affect me and others?
• have opportunities and encouragement to be confident?
• understand the values and beliefs of others and look at the wider world?

**Am I a Confident Individual? Am I an Effective Contributor? Do I**
• feel comfortable with myself and others?
• set achievable goals for myself?
• understand the skills and needs of others and myself?
• understand the importance of being a team player?

**Am I a Successful Learner? Do I**
• have curiosity; do I want to learn?
• have enthusiasm; am I keen to learn?
• have determination; do I keep trying?

**Am I achieving my wishes? Do I**
• feel supported to achieve my goals?

The aims of the Transition Map are to help young people to think about their own wishes, the support they might need and to give them a tool to help to plan and be heard.
3. International policy research findings on specific key competences

This section presents information about what we learn from international research and policy findings on specific key competences. The following key competences from the EU framework are included:

- Communication in the mother tongue
- Communication in foreign languages
- Mathematical competence and basic competences in science and technology
- Digital competence
- Social and civic competences

Of the remaining three, "Learning to Learn" is examined in detail above and no relevant international policy research has been found for "Sense of initiative and entrepreneurship" and "Cultural awareness and expression".

Before moving to specific competences, one of the characteristics of competences, referred to above in the introduction to this literature review, is that competence relates to the integrated development of skills and attitudes conducive to the use of knowledge in different situations, whether familiar or unexpected. Researchers focusing on neuroscience and learning have explored how the connections between emotion, social functioning and decision-making have the potential to revolutionise our understanding of the role of affect in education. The authors emphasise that recent findings underscore "the critical role of emotion in bringing previously acquired knowledge to inform real-world decision-making in social contexts, they suggest the intriguing possibility that emotional processes are required for the skills and knowledge acquired in school to transfer to novel situations and real life". They conclude by saying that when "we educators fail to appreciate the importance of students’ emotions, we fail to appreciate a critical force in students’ learning (Immordino-Yang & Damasio 2007). This suggests it is
important not to separate the different key competences when developing suitable strategies for their acquisition, but to emphasise, through curriculum and pedagogy, the integrated nature of competence development. Still in the field of neuroscience, two important notions developed are that people acquire knowledge with their entire “bodymind” and that learning is an emotional event impacted by how one feels (Pert & Marriott in Goleman 2008). This research approach suggests that recall is stored throughout the body in a psychosomatic network extending through all the systems of the organism and that much of memory is emotion-driven with two possible effects. Emotions can bring a recollection to the surface or bury a memory below awareness where it can affect perceptions, behaviours, health, etc.

Given this on-going work based on neurosciences, it is useful to look at what international policy research highlights as important for schools - school culture and organisation - in order to support students in a holistic way with their learning and also the specific contribution that can be made by school leadership.

In PISA’s 2009 ‘What makes a successful school’, school resources, policies, practices and environment are assessed across OECD countries to determine to what extent school plays a role in a student’s overall learning outcomes, and its contribution to equity, defined in the survey as "students from different backgrounds having equal chances of performing well". It also looks at the role of school as a learning environment in the development of competences. Results show that learning requires an orderly and cooperative environment, both in and outside the classroom, that effective schools are characterised by amiable and supportive teacher-student relations that extend beyond the walls of the classroom and where academic activities and high student performance are valued by both students and teachers. Positive teacher-student relations are also seen as crucial in establishing an environment conducive to learning. The authors refer to research showing that students, particularly disadvantaged students, learn more and have fewer disciplinary problems when they feel that their teachers are devoted to their academic success (Gamoran, 1993) and when they have good working relations with their teachers (Crosnoe, Johnson and Elder, 2004).

In this same volume on PISA, reference is made to OECD’s Teacher and Learning International Survey (TALIS) which examines aspects of lower secondary school teachers’ professional development, their beliefs, attitudes and practices, teacher appraisal and feedback and school leadership. Having surveyed over 90 000 teachers and principals in 23 OECD and partner countries, certain conclusions were published that highlight the need to reinforce teacher competences:

- more targeted and enhanced professional development helps improve teacher effectiveness. Many teachers believe that certification programmes and individual and collaborative research can help improve their work, yet they don’t often engage in these forms of professional development
- policies and individualised professional development programmes should target teachers, not just schools or school systems since much of the variation in teaching effectiveness is attributed to individual teachers
- school leadership is key in the development of teacher competences, as schools with strong instructional leadership have teachers that engage in professional development to address the weaknesses identified in appraisals, and have better student-teacher relations and stronger collaboration among teachers

School leadership is specifically considered as pivotal in ensuring organisational and educational conditions for the quality of schooling and hence for positive student learning outcomes (OECD 2008). As OECD points out this is a complex role that takes place largely outside of the classroom creating the right conditions for good teaching and learning through factors such as good working conditions, capacities of
staff and the learning environments. Policy levers include redefining school leadership responsibilities, distributing school leadership and making it an attractive profession but also focus on the types of specific advanced competences that need to be developed through initial preparation, induction and in-service training.

PISA’s conclusions regarding student performance and successful school practices include the following:

- where more students repeat grades, overall results tend to be worse.
- where 15-year-olds are sorted into tracks based on their abilities, overall performance is not enhanced, and the younger the age at which selection for such tracks first occurs, the greater the impact of socio-economic background on student performance by age 15, without improved overall performance.
- where it is more common to transfer weak or disruptive students out of a school, performance and equity both tend to be lower.
- where schools have greater autonomy over what is taught and how students are assessed, students tend to perform better.
- where schools compete more for students, they tend to have higher performance levels, but this is often accounted for by the higher socio-economic status of students in these schools
- where the learning environment is shaped by parents and school principals, student outcomes are better. Parents interested in their children’s education are more likely to support their school’s efforts and participate in school activities
- where world-class academic standards are incorporated into a system of external examinations, there is positive association with overall performance of school systems. These examinations are often linked to national qualifications systems.

3.1 Communication in the mother tongue

There is considerable interest and concern about literacy competence in European children, adolescents and adults. On 6 September 2012 a report on literacy in the EU "Act Now!" was launched at a conference in Nicosia hosted by the Cyprus Presidency, written by the members of a High Level Group of Experts on Literacy. The report provides an analysis of the state of literacy across the EU for children, young people and adults as well as examples of successful literacy projects in European countries. According to the report: “one in five of our 15-year-olds in the EU still has insufficient reading skills and that more than 73 million adults in the EU currently have low qualifications, and many of them do not have sufficient literacy levels to cope with the daily requirements of personal, social, and economic life”. (Commissioner Vassiliou’s Foreword). Moreover, the report highlights a significant gender gap, with 13.3% of low achievers among girls compared with 26.6% for boys. In view of this highly problematic situation, the EU Education Ministers have set a joint target to reduce the ratio of 15 year olds with poor reading skills from 20% at present to 15% by 2020 (http://ec.europa.eu/education/news/20120906_en.htm). The report emphasises that in the high-tech 21st-century society in which we live, literacy has become more essential than ever before. This raises the importance and urgency of ensuring that Europeans acquire effective reading and writing skills from an early age. Despite the EU’s high standards of education, some young people fall through the literacy net for a diversity of complex reasons. The effects of this loophole can be profound and will impact the rest of a young person’s life and have implications for his or her family and society as a whole. Furthermore, literacy is not just a crucial skill for the individual, but is a vital component of economic prosperity and social well-being (EU HLGL on Literacy 2012).
Literacy can be examined from a wealth of dimensions: reading and writing ability, media literacy, active citizenship empowerment, economic and innovative impacts, technology related skills, values and ethical literacy, intercultural dialogue, health care, to mention the least. There is a general agreement that reading is the cornerstone of literacy but also, in Commissioner Vassiliou words, “we need to rethink what kind of literacy tomorrow’s Europe needs”.

As is summarised above, it can be difficult to distinguish those aspects that pertain to communication in the mother-tongue and to learning to learn, which explains why we have chosen to include some of the key points from the 2009 PISA Volume ‘Learning to Learn’ in this section. It looks at the reading motivations and engagement of 15-year olds and their use of effective methods in learning to learn. Students were asked to self-report on the extent to which they are aware of strategies to understand and summarise materials which shows that awareness of effective learning strategies is closely associated with student proficiency in reading (OECD 2012). There can be over 100 points difference in reading proficiency between those that are aware of such strategies, and hence have the skills to carry them out, and those who do not.

Across OECD countries, the majority (57%) of 15-year-old students are proficient at Level 3 (the level which involves comprehension and interpretation of moderately complex text), or higher. In the European countries Finland is the only one where three-quarters of the students reach at least Level 3. On the other hand, this degree of proficiency is demonstrated by fewer than half of the students in Austria, the Czech Republic, Luxembourg, and Turkey. Given the foundational importance of literacy for all the other key competences, this suggests a major challenge for Europe. Among the highest mean reading scores in the EU were Finland at 536 points (which placed them second overall) in addition to the Netherlands, Belgium, Norway, Estonia, Switzerland, Poland and Iceland, who all ranked above 500. When assessing the relationship between enjoyment of reading and reading performance, Finland held the highest percentage of 27%, compared to an OECD average of 18%. Ireland’s was at 24% and Switzerland, Iceland and Sweden followed at 22%.

The reading competences assessed in this volume are:
- Enjoyment of reading activities, derived from students’ level of agreement with a range of statements offered to them about engagement in reading
- Diversity of reading materials, derived from the frequency with which students read the following materials because they want to: magazines, comic books, fiction, non-fiction books and newspapers.
- On-line reading activities, derived from the frequency with which students involved in the following reading activities: reading emails, ‘chatting on line’, reading online news, using an online dictionary or encyclopaedia, searching online information to learn about a particular topic, taking part in online group discussions or forums and searching for practical information online.
- Approaches to learning, based on student responses and measured through the following three indices: memorisation, elaboration and control strategies.
- Metacognition strategies: understanding and remembering, derived from students’ reports on the usefulness of certain strategies for understanding and memorising the text.
- Metacognition strategies: summarising, derived from students’ reports on the usefulness of certain strategies for writing a summary of a long and rather difficult two-page text about a scientific subject.
- Students’ engagement in reading for school, measured through the following four indices: index of interpretation of literary texts, index of use of texts containing non-continuous materials, index of reading activities for traditional literature courses, index of use of functional texts.

The survey shows that it is those students who read a wide variety of material who have the strongest outcomes in reading. Reading fiction for enjoyment also appears to be positively associated with higher scores in the reading assessment. Students who are have a strong engagement in online-reading activities, i.e. with e-mails, chatting on line, reading news, on-line dictionary, group discussions or searching online, are generally better readers than students who do not do much online reading.

PISA underlines that while enjoying reading is a necessary step towards becoming a better reader, it must go hand-in-hand with a good understanding of how to use reading to learn. This reinforces the need for parents, teachers and schools to provide students with the tools to become effective readers and learners. In all but a few countries, students who use appropriate strategies to understand and remember what they read, such as underlining important parts of the texts or discussing what they read with other people, perform at least one full proficiency level or nearly two full school years – than students who use these strategies the least. In Belgium, Switzerland and Austria, for example, the quarter of students who use these methods the most scored an average of 110 points higher than the quarter of students who use them the least, which is difference of nearly three years of formal schooling.

The survey outcomes also show that the gender gaps in reading engagement and performance has widened in recent years. The authors suggest that in the short-term, this may require catering to boys’ reading preferences, such as their strong interest in newspapers and reading online, as opposed to a single model of engagement in reading. Over the longer term, they argue that shrinking the gender gap in reading performance will require that parents, teachers and society at large work to change the stereotyped notions of what boys and girls excel in and enjoy doing.

At the launch conference of Act Now!, the consequences of low reading competence and the challenges to policy were neatly summarised by H.R.H. Princess Laurentien of the Netherlands, Chair of the HLGL: "Literacy is about people’s ability to function in society as private individuals, active citizens, employees or parents. Children need skills to learn, adolescents need them to get a job and shape their futures positively. Citizens won’t be able to pay their taxes online or vote if they’re not literate. Employees need to be able to read safety instructions. And how can patients use their medication properly if they cannot read the instructions or lack the confidence to ask others? Literacy is about people’s self-esteem, their interaction with others, their health and employability. Ultimately, literacy is about whether a society is fit for the future”.

3.2 Communication in foreign languages

The framework increasingly used in the EU for foreign language learning is the Common European Framework of Reference for Languages, which is available in over 30 language versions, has become a key reference document and tool for educational purposes (learning, teaching and assessment), as well as for professional mobility. Building on the ‘Threshold level’ concept of the 1970s, it was developed by the Council of Europe through a process of scientific research and consultation in order to provide a practical tool for setting clear standards to be attained at successive stages of learning and for evaluating outcomes in an internationally comparable manner. A European Union Council Resolution (November 2001)
recommended the use of this instrument in setting up systems of validation of language competences. The document describes

- the competences necessary for communication;
- the related knowledge and skills;
- the situations and domains of communication, as well as levels of attainment for understanding (listening and reading), speaking (spoken interaction and spoken production) and writing.

The summary table has been included below as it illustrates the relationship of this framework to other competence and learning outcomes-based frameworks (“can do”) and the cumulative process of level descriptors adding increasing categories of difficulty and unfamiliarity (e.g. more varying situations) and knowledge and its application of increasing sophistication of language. In these aspects it has much in common with the European Qualifications Framework and current national qualifications frameworks approaches.

<table>
<thead>
<tr>
<th>Proficient User</th>
<th>C2</th>
<th>Can understand with ease virtually everything heard or read. Can summarise information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. Can express him/herself spontaneously, very fluently and precisely, differentiating finer shades of meaning even in more complex situations.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C1</td>
<td>Can understand a wide range of demanding, longer texts, and recognise implicit meaning. Can express him/herself fluently and spontaneously without much obvious searching for expressions. Can use language flexibly and effectively for social, academic and professional purposes. Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organisational patterns, connectors and cohesive devices.</td>
</tr>
<tr>
<td>Independent User</td>
<td>B2</td>
<td>Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes &amp; ambitions and briefly give reasons and explanations for opinions and plans.</td>
</tr>
</tbody>
</table>

Basic User

| A2 | Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need. |
| A1 | Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce him/herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has. Can interact in a simple way provided the other person talks slowly and clearly and is prepared to help. |

But what do we know from international research about foreign language competence development in the EU member states?

The First European Survey on Language Competences was carried out in 2011 and in 13 member states (Belgium [Flemish, French and German Communities], Bulgaria, Croatia, Estonia, France, Greece, Malta, Netherlands, Poland, Portugal, Slovenia, Spain and Sweden, UK [England]) and Croatia. It was designed to collect information about the foreign language proficiency of students in the last year of lower secondary education (ISCED2) or the second year of upper secondary education (ISCED3). The intention was to undertake a survey of language competences that would also provide information about language learning, teaching methods and curricula. The survey measured the language proficiency of approximately 54,000 students across Europe, that is, their ability to use (foreign) language(s) purposefully, in order to understand spoken or written texts, or to express themselves in writing using the levels of the above framework. (http://ec.europa.eu/languages/eslc/index.html) On the basis of these results a Staff Working Document was published by the Commission in 2012.

The survey concludes that considerable differences are found across educational systems concerning when foreign language learning begins, the teaching time and the number of languages offered and learned but that an earlier start is related to higher proficiency, as is learning a larger number of foreign languages and ancient languages. There are clear differences between educational systems in the informal language learning opportunities available to students (such as students’ perception of their parents’ knowledge of the foreign language tested, individual trips abroad, the use of dubbing or subtitles in the media, and the students’ exposure to the language through traditional and new media). However, the contribution made by the characteristics of the school environment display a less clear picture in terms of, for example, ICT facilities, the number of guest teachers from abroad and provisions for students with an immigrant background. Furthermore, students who find learning the language useful tend to achieve higher levels of foreign language proficiency. Improving the quality of initial teacher education and ensuring that all practicing teachers take part in continuous professional development was identified as a key factor.
The key findings summarised in the SWD are:

1. The outcome of foreign language learning in Europe is poor: only four in ten pupils reach the ‘independent user’ level in the first foreign language, indicating an ability to have a simple conversation. Only one quarter attains this level in the second foreign language. Too many pupils — 14% for the first language and 20% for the second — do not reach the ‘basic user’ level which means that they are not able to use very simple language, even with support. At the same time, almost half of Europeans report that they are unable to hold a conversation in any language other than their mother tongue.

2. There are considerable differences in Member States’ performance: the new data show that the share of pupils reaching the level of ‘independent user’ in the first foreign language varies from 9% (England) and 14% (France) to 82% (Malta and Sweden).

3. English is becoming de facto the first foreign language. It is the most taught foreign language, both in Europe and globally, and it plays a key role in daily life - but: it is proficiency in more than one foreign language that will make a decisive difference in the future. This calls for language policies and strategies inspired by a clear vision of the value of language skills for mobility and employability.

4. Member States should make teaching and learning foreign languages significantly more effective by action along the following lines:
   a. Quantity: more hours need to be invested into the teaching and learning of languages (both in general and vocational education and training). Pupils should start earlier in life to learn foreign languages and at least two foreign languages should be taught to all pupils during compulsory education.
   b. Quality: teaching should be improved with the help of innovative methods, including Content and Language Integrated Learning (CLIL) where non-language subjects are taught through the medium of a foreign language, initial and in-service training of language teachers, increased opportunities for using language skills and the development of ICT-based language learning resources.
   c. Focus: language learning outcomes must be geared to support employability, mobility and growth. Education systems have to respond better to pupils’ learning and professional needs and work more closely with employers, chambers of commerce and other stakeholders, linking language teaching to the creation of EU-level career paths.
   d. Guidance: in line with this focus, Member States should provide adequate guidance to pupils and their families.
   e. Monitoring: developments in learning outcomes should be monitored to identify strengths and weaknesses and, ultimately, to improve the effectiveness of the system.

3.3 Mathematical competence and basic competences in science and technology

According to PISA’s 2006 survey “Science Competencies for Tomorrow's World”- which primarily assessed 15-year old students’ basic math and science competences- although most students reported being concerned about scientific issues such as preserving the environment and agreed that it was important to take measures to address these problems, they expressed pessimism that things could improve in these domains. Indeed, the more scientific knowledge students acquired, the more negative they reported being about improvement.
Finland, with an average of 563 score points, was the highest-performing country on the PISA 2006 science-scale. Among the six other high-scoring countries with mean scores of 530 - 542 points, only Estonia was an EU-member. The Netherlands, Germany, the United Kingdom, the Czech Republic, Switzerland, Austria, Belgium and Ireland, and the partner countries/economies Liechtenstein and Slovenia also scored above the OECD average of 500 score points.

The scientific and mathematical competences examined in this volume are the following:

- General interest in science
- Enjoyment of science
- Instrumental motivation in science
- Future-oriented motivation to learn science
- Self-efficacy in science, derived from students’ beliefs in their ability to perform certain tasks on their own
- Self-concept in science
- Personal value of science
- Science activities
- Awareness of environmental issues, from students’ beliefs regarding their own level of information on certain environmental issues
- Level of concern for environmental issues, derived from students’ level of concern about certain environmental issues
- Optimism regarding environmental issues, derived from students’ optimism concerning the development over the next 20 years of the problems associated with certain environmental issues
- Responsibility for sustainable development
- School preparation for science-related careers
- Student information on science-related careers
- Interaction in science teaching and learning, derived from students’ responses about the frequency with which certain activities occur when learning ‘school science’ topics at school
- Student investigations in science teaching and learning, derived from students’ responses about the frequency with which certain activities occur when learning ‘school science’ topics at school
- ICT familiarity, derived from students’ responses about the frequency with which they use computers
- ICT programme/software use, derived from students’ responses about the frequency with which they use computers
- Self-confidence in ICT internet tasks, derived from students’ beliefs about their ability to perform certain tasks on a computer
- Self-confidence in ICT high-level tasks, derived from students’ beliefs about their ability to perform certain tasks on a computer

Students also reported awareness about high profile environmental issues but only half as many were conscious of other critical environmental areas such as deforestation or genetically modified crops. Therefore the report underlines the important of schools providing a more rounded knowledge of scientific issues, rather than only those regularly highlighted in the media. Interestingly, students tended to report a stronger belief in the technological potential of science than in its capacity to make social improvements. The authors suggest more could therefore be done to highlight within the school curriculum the wider potential and benefits of scientific advances.
3.4 Digital competence

3.4.1 PISA’s 2009 survey “Students On Line: Digital Competencies and Performance”

PISA’s 2009 survey “Students On Line: Digital Competencies and Performance” explores the use of students’ use of information technologies to develop digital competence in reading and overall learning outcomes. It underlines the importance for policy makers to prevent a digital divide between those who can and cannot access new technology, by understanding the nature of digital reading; examining students’ performance in digital reading and address significant disparities that exist; and identifying the influences on digital reading performances and designing effective policy responses, for example, through better access to ICT and training for both students and teachers. The authors argue that identifying effective strategies to teach digital reading skills is an important objective for education policies because these skills include the ability to critically evaluate the quality and credibility of texts, integrate information from several texts, and to navigate effectively.

The competences examined in this volume, in addition to the ones listed in Learning to Learn, include in addition:

- Computer use at home for schoolwork, derived from students’ reports on how often they use a computer for the following activities at home: i) browse the Internet for schoolwork; ii) use e-mail to communicate with other students about schoolwork; iii) use e-mail to communicate with teachers and submit of homework or other schoolwork; iv) download, upload or browse material from the school’s website; and v) check the school’s website for announcements.

- Computer use at school, derived from students’ reports on how often they use a computer for the following activities at school: i) chat on line at school; ii) use e-mail at school; iii) browse the Internet for schoolwork; iv) download, upload or browse material from the school’s website; v) post their work on the school’s website; vi) play simulations at school; vii) practice and drilling, such as for foreign language learning or mathematics; viii) do individual homework on a school computer; and ix) use school computers for group work and to communicate with other students.

- Self-confidence in ICT high-level tasks, derived from students’ reports on the extent to which they are able to do the following tasks: i) edit digital photographs or other graphic images; ii) create a database; iii) use a spreadsheet to plot a graph; iv) create a presentation; and v) create a multimedia presentation.

- Attitude towards computers, derived from students’ reports on the extent to which they agree with the following statements: i) it is very important to me to work with a computer; ii) I think playing or working with a computer is really fun; iii) I use a computer because I am very interested; and iv) I lose track of time when I am working with the computer.

PISA suggestions include strategies that promote greater access to ICT at school, to help minimise the extent to which socio-economic differences between students become digital competency gaps. Moreover, the survey highlights the value of project-based activities using ICT – particularly those that let students explore various approaches to problem-solving using ICT, as they do when they use it at home. This could help improve their navigation skills. The volume also suggests that teachers could develop reading methodologies that improve students’ ability to distinguish between relevant and irrelevant text, and to structure, prioritise and summarise material.

The authors underline the need to look beyond the relationship only between ICT use and reading performance, as ICT can enable students to obtain more regular feedback on their learning progress. It
can also make students more active participants in learning processes in the classroom and tailor those processes to individual students’ needs, and it can provide students with up-to-date access to the world’s current research and thinking. Here we also see a correlation between evolving ICT-use and learning to learn competences.

Finally, and interestingly, although computer use at home for leisure is positively related to navigation skills, parents and educators should be aware that intensive users do not perform better in digital reading – and often perform worse – than moderate users. This negative association between intensive use of computers and performance is even more pronounced in mathematics, science and especially in print reading.

3.4.2 The Survey of Schools: ICT in Education

This section reports on the findings of the Survey of Schools: ICT in Education concerning students’ and teachers’ digital competence. The Survey of Schools: ICT in Education was commissioned in 2011 by the European Commission Directorate General Communications Networks, Content and Technology to benchmark access, use of and attitudes to ICT in schools in the EU27, Croatia, Iceland, Norway and Turkey. It paints a picture of the use of technology for learning in schools: from the provision of infrastructure to teachers’ and students’ use, confidence and attitudes. Based on over 190,000 responses from students at grade 4, 8 and 11 in general and vocational education, their teachers and head teachers, in schools randomly selected in around 30 European countries, the survey questionnaires were administered online and answers analysed during the school year 2011-12. The survey was conducted in partnership between European Schoolnet and the University of Liège (the Service d’Approches Quantitatives des faits éducatifs, Department of Education).

Teachersons’ professional development and digital competence

On average around half of European students are taught by what the survey’s analysis terms ‘digitally positive teachers’, i.e. highly confident teachers with positive attitudes about the pedagogical use of ICT in the classroom. A smaller proportion of those teachers however have high access to ICT in the classroom. Moreover, given that teachers with low confidence but high access to equipment engage relatively less in ICT based activities, it is clear that increasing teacher confidence through investing in teacher professional development to boost their digital competence is key to achieving the optimal utilisation of the available infrastructure. Around 70% of students at all grades at EU level are taught by teachers who have used their personal time to engage in ICT learning, showing a willingness to become better prepared for the 21st century classroom. Policymakers would be wise to build on teachers’ existing positive attitudes, by providing more and more innovative forms of continuous professional development, and to keep in mind the central importance of teachers’ motivation for the successful use of ICT for pedagogical purposes.

A lot of the research in this area illustrates that there is a relationship between the digital competence and use of ICT by teachers. Participation in professional development activities, aimed at developing teachers’ digital competence, can therefore significantly influence teachers’ use of ICT (Fredriksson et al. 2008; Valiente 2010). The survey therefore investigated different types and modes of ICT training pursued by teachers in relation to their ICT use in the classroom. The analysis showed that there is a stronger correlation between the percentage of students at grade 11 (general education) taught by teachers who have recently participated in training on the pedagogical use of ICT and the frequency of teachers’ ICT based activities, than is the case for those taught by teachers who have participated in equipment-specific training.

Interestingly, while it is the case that teachers engaging in equipment-specific, pedagogical, subject-specific and multimedia training tend to use ICT for teaching and learning more than those who do not
participate in any type of training, teachers who have engaged in advanced types of training on applications and on the internet are even more likely to use ICT with the class. A much smaller percentage of students at EU level are actually taught by teachers who participate in advanced training courses on the internet (20%) or specific applications (25%). Yet, it is this currently small group of ICT savvy teachers who use their ICT expertise with the class the most.

On the other hand, the analysis also shows that pursuing introductory courses on the internet and general applications does not seem to make a significant difference to the frequency of teachers’ ICT activities with the class. This therefore suggests that participating in basic training is not enough to bring about an increase in teachers’ use of ICT. Facilitating as many teachers as possible to eventually reach the required level to be able to benefit from more advanced ICT related professional development is more likely to encourage technology-enhanced learning in the classroom.

The survey’s findings clearly reveal that, among the various modes of training, teachers who participate in professional development courses via online communities, are most likely to engage in ICT based activities for teaching and learning purposes. These might be online platforms, blogs, forums or other social networking sites where teachers can exchange professional experience and materials. However, only around 25% of students at grade 11 (general education) are taught by teachers who have actively taken part in an online community for professional development purposes. Seeing as research reveals that teachers prefer informal methods of training (Balanskat, A., & Gertsch, C. 2010), and OECD’s TALIS report highlights the importance of online professional collaboration as a potential driver for change in teachers’ practice, more should be done to encourage teachers to participate in online communities.

While training teachers how to use specific ICT equipment, the internet and general applications is important, we know that without feeling competent in how to integrate ICT into teaching appropriately, both from the pedagogical perspective as well as the specific view point of the subject being taught, teachers are less likely to use ICT in the classroom for teaching and learning. The need therefore for more professional development opportunities on the pedagogical use of ICT and particularly subject-specific training on learning applications, currently pursued by fewer teachers, deserves underlining. The survey’s findings suggest that education stakeholders should be advised that providing and encouraging more teachers to engage in pedagogically focused training on how to effectively reach learning outcomes using ICT, is likely to be more beneficial than investing solely in equipment based training. Moreover, basic training is not sufficient to bring about an increase in the use of ICT in the classroom. What is needed is for more teachers to reach and benefit from a more sophisticated level of ICT training, preferably with a strong pedagogical orientation, if the use of ICT based activities is to become a common reality in classrooms across Europe.

However, using ICT based activities frequently with the class is of course not alone enough to guarantee learning. Indeed, researchers such as Mayer (2010) agree that it is not the technological medium itself, but rather the instructional method used, which causes effective learning. It would seem wise therefore, in the light of this analysis, to harness the clear potential of online communities for professional exchanges between teachers on pedagogical methods, which can lead to positive changes in teachers’ practice.

**Teachers’ confidence in their digital competence**

Teachers and students were asked to rate their level of confidence in their ability to perform a list of ICT related tasks (later categorised as operational skills and social media skills, and additionally for students, the ability to use the internet safely and responsibly, after subjecting the data to factor analysis) according to a Likert scale ranging from ‘none’ to ‘a lot’. At EU level, the mean score of students across
grades taught by teachers who are confident in social media use is substantially lower than those taught by teachers confident in the operational use of ICT. By subjecting the data to factorial analysis two scales emerged from the twenty items which were categorised as operational and social media skills. Operational ICT skills are the fundamental skills needed to use generic ICT tools (e.g. Word, Excel, Outlook, PowerPoint) to function in the information society and in working life. They therefore include key computer and internet skills. The survey considered teachers’ operational ICT skills to comprise the following: production of text using a word processing programme; capturing and editing digital photos, movies or other graphics; editing online text containing internet links and images; creating a database; editing a questionnaire online; emailing a file to someone/another student or teacher; organizing computer files in folders and sub-folders; using a spreadsheet; using a spreadsheet to plot a graph; creating a presentation with simple animation functions; creating a presentation with video or audio clips; and downloading and installing software onto a computer. Social media skills enable users to interact and collaborate with each other as consumers of user-generated content in a virtual community. The survey defined teachers’ social media skills as consisting of the following: the ability to participate in an online discussion forum; the ability to create and maintain blogs or websites; and the ability to participate in social networks.

Although measuring teachers’ confidence in relation to various ICT skills as this survey does, is not the same as measuring their actual competence in these areas, it is nevertheless important as it is a component of their competence and can have some potential influence on the frequency with which teachers use ICT based activities for teaching and learning within the classroom. This is confirmed by the substantially positive correlation found in the survey’s data across all grades, illustrating that the more confident teachers are in their operational use of ICT and their use of social media, the more they tend to use ICT based activities with the target class. Correlation analysis also shows that teachers who participate in ICT-related professional development, and to a lesser extent those who spend more time on this, tend to have more confidence in their operational and social media skills.

Students’ confidence in their digital competence

Students were asked to rate their level of confidence in their ability to perform twenty-four (twenty-eight at grade 11 vocational education) ICT related tasks according to a Likert scale ranging from ‘not at all’ to ‘a lot’. By subjecting the data to factorial analysis four scales emerged from the list of items. These included operational and social media skills (as found in the teachers’ data and defined accordingly, comprising the same groups of items) and two additional scales related to students’ ability to use the internet safely and responsibly. The survey defined the safe use of the internet to include students’ confidence in their ability to protect their privacy and online reputation, as well as respect the privacy and online reputation of others. It also includes their confidence in their ability to use the internet to protect themselves against online bullying, spam and junk mail. Students’ confidence in their ability to use the internet responsibly is defined as the ability to judge the reliability of information found on the internet; to identify online sources of reliable information; and to use information found on the internet without plagiarizing. At EU level, students across all grades have a higher mean score in their confidence to use the internet safely, than in any other ICT skill surveyed. Conversely, students across all grades have a lower mean score in their confidence to use social media, compared to any other ICT skills, particularly at grade 8. Grade 11 (general education) students’ confidence mean score is consistently higher across all ICT skills surveyed, while grade 8 students’ score is consistently lower.
3.5. Social and civic competences

This section addresses firstly social and emotional literacy/learning and briefly civic competences.

In recent years there has been a growth of programmes in schools to develop more personalised approaches to learning and different groups of competences for example social and emotional literacy, competences for citizenship and democracy, health promoting programmes, rights promoting programmes, etc. Researchers, such as Michel Fielding, maintain that: “education must be person-centred, democratic and aim at the flourishing of each individual as a human being”. Other approaches emphasise process, for example the work of the iNet project, which focuses on system redesign as a path to educational transformation, defining the challenge as “getting schools from mass production to mass customisation” with the aim that more of the educational needs of more of the students are met more fully than ever before (Hargreaves 2004). This includes moving from teaching to learning and to the “deep learning” that will equip students for the 21st century world of work (Sims 2006). This approach identifies and develops “nine gateways” clustered into four areas through which a school may successfully explore personalising learning (deep learning (assessment for learning, student voice, learning to learn); deep support (mentoring & coaching; advice & guidance); deep experience (new technologies, curriculum); deep leadership (design and organisation; workforce reform). According to their definition, one of the outcomes for a learner experiencing “deep learning” through personalisation of their learning will be linked to the general well-being: “An articulate, autonomous but collaborative learner, with high meta-cognitive control and the generic skills of learning, gained through engaging educational experiences with enriched opportunities and challenges, and supported by various people, materials and ICT linked to general well-being but crucially focused on learning, in schools whose culture and structures sustain the continuous co-construction of education through shared leadership”.

It is interesting to note that all of these approaches, whether focused on content or process, highlight some of the same capacities for children and young people to develop. They all emphasise albeit in different ways:

- Addressing the ‘whole’ child;
- The need for learning to be person-centred or human-centred;
- Capacities that will support the child’s flourishing;
- The transformative capacity of learning.

They are illustrated here by looking in more detail at social and emotional literacy, sometimes referred to as social and emotional education or learning, other times as a form of literacy (or sometimes termed skills). Whatever the title used, the intention is to stimulate well-rounded growth in young people and to enhance their academic achievement. The fact that students are more motivated to engage in learning when they experience positive emotions towards learning activities and, on the contrary, direct their attention away from learning when they experience negative emotions, has been extensively researched (Boekaerts in Dumont, Istance and Benevides 2010). It has been found that positive and negative emotions become integrated into specific mental representations. While the positive emotions energise students, the negative inhibit performance.

Social and emotional learning also serves as a preventative strategy as well as also contributing to the improvement of their physical and mental health (Clouder 2008, p12). Furthermore proponents of this type of approach, such as the authors contributing to the two international publications on Social and Emotional Education (2008 & 2011) published by the Fundación Marcelino Botín, emphasise the importance of training adults (teachers, parents, professional, etc.) as a prerequisite in working towards
developing the well-being of children and young people. There is an interesting assumption in this report that certain capabilities or competences are human rights to which all children should have access as it is vital for the sake of the health of future societies. They are:

- The ability to relate well to others
- To cooperate
- To manage and resolve conflict
- To act autonomously
- The ability to act within the larger context
- To form and conduct life plans and personal projects
- To defend and assert one’s rights, interests, limits and needs
- To use language, symbols and texts
- The ability to use knowledge and information interactively and the ability to use technology interactively.

The Introduction emphasises that “a child needs to understand her own feelings in order to recognize those in others” (p40) which echoes both the “learning to be” and the “learning to live together” pillars of the UNESCO report.

Depending on the context, approaches to emotional and social learning may involve introducing specific modules into the curriculum or ensuring that children and young people have the opportunities to develop the competences identified across the whole curriculum and through all the different types of classroom and extra-curricular activities proposed in a school.

Very substantial work in this field has been carried out in the USA by CASEL, the Collaborative for Academic, Social and Emotional Learning (http://casel.org/), which addresses five essential areas of social and emotional development:

- Self-awareness (recognising one’s capacities, strengths, emotions and values)
- Self-management (managing emotions, and behaviours, persevering in overcoming obstacles)
- Social awareness (showing understanding and empathy for others)
- Relationship skills (forming positive relationships, teamwork, conflict resolutions)
- Responsible decision-making (making ethical, constructive choices about personal and social behaviour).

A recent survey described SEL as: 

"Social and emotional learning (SEL) involves the processes through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions. SEL programming is based on the understanding that the best learning emerges in the context of supportive relationships that make learning challenging, engaging, and meaningful. Social and emotional skills are critical to being a good student, citizen, and worker; and many different risky behaviours (e.g., drug use, violence, bullying, and dropping out) can be prevented or reduced when multiyear, integrated efforts are used to develop students’ social and emotional skills. This is best done through effective classroom instruction; student engagement in positive activities in and out of the classroom; and broad parent and community involvement in program planning, implementation, and evaluation. Effective SEL programming begins in preschool and continues through high school". (Civic Enterprises 2013)
However, one of the issues for education systems is to identify reliable assessment tools for social and emotional learning. For a review carried out in the USA, researchers used the social and emotional competencies identified by the CASEL as their research framework:

- **Self-Awareness.** Accurately assessing one’s feelings, interests, values, and strengths; maintaining a well-grounded sense of self-confidence.
- **Self-Management.** Regulating one’s emotions to handle stress, controlling impulses, and persevering in addressing challenges; expressing emotions appropriately; and setting and monitoring progress toward personal and academic goals.
- **Social Awareness.** Being able to take the perspective of and empathize with others; recognizing and appreciating individual and group similarities and differences; and recognizing and making the best use of family, school, and community resources.
- **Relationship Skills.** Establishing and maintaining healthy and rewarding relationships based on cooperation; resisting inappropriate social pressure; preventing, managing, and resolving interpersonal conflict, and seeking help when needed.
- **Responsible Decision Making.** Making decisions based on consideration of ethical standards, safety concerns, appropriate social norms, respect for others, and likely consequences of various actions; applying decision-making skills to academic and social situations; and contributing to the well-being of one’s school and community.

The aim was to test which tools have sound psychometric properties, are suited for programme evaluation, are readily available for schools to access and were not developed for use with a specific programme. Of the 73 instruments reviewed, just 10 met their criteria. In addition to improving students’ social-emotional skills, the review reports that SEL programmes improve students’ performance in the classroom (Payton et al., 2008) with an increase of 11% to 17% in test scores (Payton et al., 2008). The researchers conclude that SEL is "absolutely crucial to children's success in school, both academically and socially". Hence reliable and valid assessment tools are necessary to conduct needs assessments and monitor the success of SEL programmes over time (Haggerty et al. 2011).

Turning to civic competence, a recent study on Participatory Citizenship in the European Union study mapped the theory, policy, practices and levels of engagement across Europe into three reports. Though the study was not primarily focused on civic competence, it did make recommendations about successful learning methods if participatory citizenship is to be encouraged. The study found that for young people to develop their civic competence, it is important that learning is situated, i.e. that means that in a school, "learning citizenship is effective when situated in a real life civic context, such as influencing decisions that have real consequences and influence on the lives of students and the how the school is run, making connections with decision making in their local communities and involvement in simulations of real events such as mock elections" (Hoskins and Kerr 2012). Edelstein (2011) argues that major developments in Western industrial societies towards individualism, increasing social complexity and globalisation present serious threats to basic requirements of stable societies and expose democracy to the corrosion of its socio-moral resources such as social trust and civic commitment to the public good. In order to grow and to flourish, the competences and capabilities that constitute these resources require systematic cultivation through educational processes. From this perspective, school is the only institution that can provide the appropriate experience of a democratic life to all members of society and need to adopt strategies for providing the experience of schools as democratic life-worlds from an early age: classroom councils as tools for democratic self-government and sites for socio-moral learning; projects of service
learning in the community which can be successfully organized by these councils; and early experiences of civic engagement in community contexts as part of democratic classroom practice.

In terms of classroom practice, it is no doubt in the early years field that most work has been done (conceptually and in practice) in identifying competences to be developed in teachers/educators and in the children with whom they are working (ISSA 2010). In developing a framework for "quality pedagogy" that is used in teacher training in over 30 countries, the International Step by Step Association (ISSA) identifies, among others, principles and indicators of inclusion, diversity and values of democracy. Educators are expected to develop children's understanding of the values of civil society and the skills needed for their participation through classroom practice, activities proposed as well as the way the educator behaves and works with the children and by encouraging children to treat others with "equity, fairness, respect, and dignity" (http://www.issa.nl/qrp.html).

Summary of key points:

- The ethos of the school including the characteristics of the leadership will have an effect on the acquisition of key competences by the students.
- The role of emotions and feelings and the engagement of the student as a whole person will impact on the quality of the learning that takes place.
- The professional development of teachers and of their competences is a key element in key competence development in students.
- The structure and organisation of the school system (e.g. repeating classes, tracking) can have a major impact on competence development.
- Literacy in the 21st century can be examined from a wealth of dimensions: reading and writing ability, media literacy, active citizenship empowerment, economic and innovative impacts, technology related skills, values and ethical literacy, intercultural dialogue, health care, though there is a general agreement that reading is the cornerstone of literacy and hence of communication in the mother tongue.
- Students who read a wide variety of material who have the strongest outcomes in reading. Reading fiction for enjoyment also appears to be positively associated with higher scores in the reading assessment. Students who have a strong engagement in online-reading activities, i.e. with e-mails, chatting on line, reading news, on-line dictionary, group discussions or searching online, are generally better readers than students who do not do much online reading.
- The outcome of foreign language learning in Europe is poor. There are considerable differences in Member States’ performance. Member States should make teaching and learning foreign languages significantly more effective by developing the quantity, quality and monitoring of learning outcomes.
- It is important for schools to provide a more rounded knowledge of scientific issues, rather than only those regularly highlighted in the media. PISA results suggest that the more scientific knowledge students acquired, the more negative they reported being about using science and technology for possible social improvements.
- PISA highlights the value of project-based activities using ICT – particularly those that let students explore various approaches to problem-solving using ICT, as they do when they use it at home. This could help improve their navigation skills. The report suggests that teachers could develop
reading methodologies that improve students’ ability to distinguish between relevant and irrelevant text, and to structure, prioritise and summarise material.

- Approaches that focus on social and emotional aspects of learning all tend to emphasise the need to address the ‘whole’ child; for learning to be person-centred or human-centred; capacities that will support the child’s flourishing; and the transformative capacity of learning.

- It has been found that positive and negative emotions become integrated into specific mental representations. While the positive emotions energise students, the negative inhibit performance.

- Depending on the context, approaches to emotional and social learning may involve introducing specific modules into the curriculum or ensuring that children and young people have the opportunities to develop the competences identified across the whole curriculum and through all the different types of classroom and extra-curricular activities proposed in a school.

- In terms of citizenship, school is the only institution that can provide all children with the appropriate experience of a democratic life. A considerable contribution has been made in early years education through the development of a framework for "quality pedagogy" the International Step by Step Association (ISSA) used in teacher training. Identifies, among others, principles and indicators of inclusion, diversity and values of democracy. Educators are expected to develop children's understanding of the values of civil society and the skills needed for their participation through classroom practice, activities proposed as well as the way the educator behaves and works with the children and by encouraging children to treat others with "equity, fairness, respect, and dignity".
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Section 3: Key competences in France

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1. The approach to competences in France and the French-speaking world
   1.1. Professional origins of the notion
   1.2. The opening up of the school to the divisive outside world
   1.3. The dominant definitions of competence in the context of education in the French-speaking world

2. The establishment of competences in France
   2.1. The law on compulsory schooling implemented in 2005
   2.2. Subjects and competences
   2.3. Upper secondary school (lycée)
   2.4. Assessing competences

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The framework of exchange and discussion regarding competences has, until recent years, been more of a theme in the French-speaking world as a whole than in each individual French-speaking country. Before the development of the European Reference Framework for Key Competences, Belgium (Missions decree - 1997) and Québec in Canada ("Pedagogical renewal" reform since the beginning of the 2000s) had indeed put the notion of competences at the heart of their reforms, and in doing so provoked scientific writing on the subject which has been widely circulated in the French-speaking community in Europe (Belgium, France, Luxembourg and Switzerland) and in North America (Québec) as well as in the African French-speaking countries.

Debates and experiences regarding competences have thus been included in the development of local educational culture and policy, rather than adhering to the frameworks of key competences, such as those which have been subsequently developed by the European Union.

1. The approach to competences in France and in the French-speaking World

1.1. Professional origins of the notion

The notion of competence developed mainly in the professional world in the 70s, where it progressively replaced the notion of qualifications, to better consider the role of the person and the responsibility of the employee in unforeseeable circumstances (Legendre 2008).

Secondly, the notion was encompassed in the context of adult education and vocational training, in order to identify the underlying "knowledge in action" of efficient activity and, if possible, ensure their application (Ropé and Tanguy, 1994). In the domain of adult education, still today the notion of competences is mentioned the most spontaneously, particularly with regards to life-long education (CAFOC, 2012).

It was only at a later stage in the 90s, that competence was encompassed in the context of school education, to characterise the unique competences of adaptation of an individual to new situations, and their evolutionary competences based on advances in technology and society (Rey, Carette, Defrance and Kahn, 2006).

Parallels were drawn between the separation of micro-objectives of the school curriculum (behavioural theory of pedagogy by objectives) and a Taylorist economy on one hand, and the approach by competences and a modern economy mainly based on people's autonomy and flexibility (Jonnaert, Barette et al. 2004).

One of the leading theorists on competences, Guy Le Boterf, is a consultant in human resources management, and has studied the notion of competences primarily in the context of training within professional organisations. He believes that the defining of competence as an extension of knowledge, skills and attitudes is too weak. His view is that competence is the combination of abilities or aptitudes for resolving a given problem. It consists in "knowing how to act", which is the combination of - and not the addition of - various resources in a working environment:

- Knowing how to mobilize others;
- Knowing how to integrate;
- Knowing how to transfer.
Competence is in mobilisation. For the individual, it is a question of going from knowing how to knowing how to act in a particular unforeseen situations (le Boterf, 2010).

1.2. The opening up of schools to the divisive outside world

The "professional" origins of the notion of competences have provoked opposition, in that the notion stifles educational ambition and leads to a utilitarian perspective (Crahay 2006, Boutin 2004).

For some researchers, education stakeholders or schools of thought, the notion of competence is a Trojan horse for employers - possibly backed up by international organisations and States, in order to adapt their education systems to their own needs - going against the transferral of heritage or critical thinking in education which schools should focus on, in their eyes (see for example Del Rey, 2010; Hirtt, 2010; Laval, Vergne, Clément and Dreux, 2011).

Equally, some intellectuals in France are very keen on the teaching of the "great works" in literature, history or art - subjects which are sometimes classified as Humanities or Humanistic Culture, a notion which was added to the French socle commun (core curriculum) of knowledge and competences in 2005 (Lelièvre, 2009).

This humanistic culture, which is essentially found in the school context, would, according to some, be threatened by the transformation of subjects into competences, in which the study of literature or civilisation would be, for example, diluted as "written or oral expression" or "communication".

These suspicions should be put in the context of the educational institution in France, particularly with regards to its political role in the fabric of the Republic and then national socialisation, something which one famous French sociologist calls the programme institutionnel (institutional programme) of schools (Dubet, 2002).

Conversely, for other researchers, it is precisely this better, desirable link between school and a society which pleads for recourse to competences.

Philippe Perrenoud (2004, 2011) has therefore worked for some years on the best way, for schools to prepare students for their personal, social, economic and civic lives.

His view is that getting through school is not an end in itself: the student should be capable of applying his educational achievements outside of school, in different unforeseen and complex situations. In doing so, this leads to an interest in building competences for the transfer of knowledge to other situations through their integration into wider competences, incorporating further concepts of reflection, decision making, action and adaptation.

He argues for educational content to be significantly more controlled with regards to social, cultural and professional life as "If school prepares for life, changes in the world and to people's lives should logically be the main factor determining evolution of the curriculum, at least as much as the transformation of knowledge is. Ultimately, it should only be the knowledge that affects people's lives and their understanding of the world that should be the force behind changes to educational programmes." (Perrenoud, 2008).

Other experts note that existing disciplines are often a creation of teaching itself, particularly in Secondary Education, however they do not really correspond to the creations of the worlds of science, culture or economics (Gauthier, 2006).

10 Please note that all quotations in this section of the literature review have been translated from the original French into English by a subcontracted translator.
For sociologist Denis Meuret, schooling in France was marked by the heritage of conceptions made by the early 20th century sociologist Emile Durkheim, as a result of which school is seen as a front to protect individuals from unwholesome influences in the world - an idea which creates a negative view of everything external to schools, and furthermore makes structuring of teaching very difficult alongside what pupils learn and experiment with in their lives outside of school (Meuret, 2007).

He believes that this tradition has favoured the changes necessary to integrate advances of a scientific and technical nature that arose in the form of academic knowledge, but it is significantly less suited to "post-modern" strategic changes, in which case the quality and competences of the person should be improved first, giving more meaning to learning.

1.3. The dominant definitions of competence in the context of education in the French-speaking world

In the French language and in daily life, competence can assume very different meanings: legal authority (the legitimacy of an institution to act in a particular domain, for example), overall quality given to an individual, technical ability in a domain, etc.

In education, it can also define an overall competence (close to a key competence), such as the ability to express oneself in public, as well as elementary parts of knowledge or expertise: learning a spelling rule or ability in using a tool, for example.

Some researchers use the term competence without distinction in a number of ways (competence in mathematics, competence in spelling, competence in writing comments on texts) to describe all learning in school, at a level of detail which has little to do with the concept of key competences (Morlaix, 2009).

Other works on the other hand look to define competences with a holistic and integrated view, closer to the definition of key competences.

Competence-based approaches aim principally to break from the traditionally dominant method of teaching by objectives seen in schools during the 20th Century, which separates the transmission of knowledge within disciplines into objectives to be reached at each level of schooling.

Here however, the integration of learning into an overall logic is favoured, with the concern that the final aim of the competence to be acquired is not only at the end of this process, but is included from the outset and conditions the very way in which the different constituent parts of the competence are built by the student. In this sense, it is knowledge in action, built for action in problem-solving situations, series of tasks, etc.

The complex skills in the field of competences rest in putting into use multiple elements of knowledge and expertise to enable an integration of achievements into teaching. (Roegiers, 2000).

The knowledge put into use are transformed and re-contextualized. It is in carrying out actions that competences must be inferred, which is where the importance of evaluation in appropriate situations lies. This also raises the issue of "attitudes", otherwise difficult to evaluate with indirect evidence (Scallon, 2007). Being confronted with a concrete situation is essential, and competence is rarely demonstrated by a figure or a numbered result, but by means of an overall judgement. It is not an abstract ability separate from any context: competence is finalised and contextualised.

In Québec, a number of studies on competence have been made with regards to the Observatory of Educational Reforms, leading to the creation of a UNESCO chair on curricular development at the University of Québec in Montréal.
According to the researchers involved, at least three constant elements appear to make up the concept of competence in contemporary literature:

– Competence is based on the putting to use and coordination of a variety of resources by a person in a particular situation;

– A competence can develop only in that situation;

– A competence can only be attained if fully completed.

However, in their opinion, this is not a sufficient curricular definition for the creation of study programmes. In particular, the question of coordinating resources is often misunderstood, in most cases being reduced to juxtapose existing disciplinary elements. However, more than the sum of resources, competence is the result of the efficient coordination of such resources (Jonnaert, Barette et al., 2004). The "explicit and thought-out competence" seems to be largely absent in thoughts on contemporary teaching and learning when considering competence in education. Nevertheless, the researchers warn that "if situations are important, they are not enough".

When discussing competences as a new educational paradigm, we are therefore referring to the possibility for an individual to apply an integrated set of resources to oneself, to solve a series of problem situations, as defined by X. Roegiers (2004).

The taking into account of competences in the world of training denotes, in a general way, the gradual shift from a focus on knowledge, considered as a preamble to activity and so often decontextualized, to a consideration of activities in which this knowledge embodies itself (Legendre, 2008).

We are no longer in a framework of stable knowledge in its disciplinary configuration, but rather in one of knowledge in a state of dynamic construction, where knowledge is constantly reconstructed by the student. The aim is not so much to convey a science of academic knowledge passed down through heritage, as to be productive in the application of knowledge that is expressed by practical results and the demonstration of expertise. Therefore knowledge is called upon to become competences, through activity-centred teaching (Lemaître & Hatano, 2007).

For Bernard Rey's team at the Université Libre de Bruxelles, the main interest in competence is to make students work on sufficiently wide-ranging activities, which are meaningful and whose function is evident to them, even if it is often difficult to determine which competences are directly relevant to their social and professional lives.

Three degrees of competences are distinguished, of which only the last two can really deserve to be called "competences":

– An elementary competence: knowing how to carry out a task in response to a signal (automated procedure, skill)

– A competence framework: to be able to interpret an unknown situation and choose the elementary competence most suited to it;

– A complex competence: to choose and combine multiple competences to respond to a new and complex situation (Rey, Carette, Defrance & Kahn, 2006).
2. The establishment of competences in France

The teaching of competences did not wait for the 2005 law to establish itself, although sometimes referred to by different names. For example, this is the case in many primary schools where the learning of certain competences coexists with the teaching of traditional school subjects, in particular in schools which experiment with different teaching techniques, such as Freinet’s Pedagogy (Reuter, 2007).

It is also the case in certain secondary schools, which promote interdisciplinary work, contextualize grades, and insist on cooperation or creativity, in the framework of experimental lower secondary Schools (Cédelle, 2009) or regular lower secondary schools, where they use their ability to experiment as permitted by law (Di Martino and Sanchez, 2011; Duffez, 2012).

2.1. The law on compulsory schooling implemented in 2005

In the autumn of 2003, the French government established a commission headed up by an expert, Claude Thélot, to arrange a significant consultation on the future of the French education system. The conclusions from this consultation were submitted in a report published in 2004 entitled Pour la réussite de tous les élèves (For the success of all students) (Thélot, 2004), clearly evoking a base of "essential" knowledge that a school must allow students to acquire.

One result of this consultation would lead to the law on the French socle commun de connaissances et de compétences (core curriculum of knowledge and competences), passed on the 23rd April 2005, dealing with four areas: command of the French language, command of the principal elements of mathematics, a culture of humanities and science giving the ability to freely live as a citizen, and a command of common techniques in information and communication (Raulin, 2006, 2008).

A further decree in 2006 made this base clearer, and was composed of 7 major competences, each one broken down into knowledge, skills and attitude, largely inspired by the European Key Competences:

- command of the French language;
- use of a foreign language;
- basic competence in mathematics, science and technology;
- command of common techniques in ICT;
- humanistic culture;
- social and civic competence;
- Autonomy and initiative.

It can be noted that the "French" version of the competences transforms "sense of initiative and entrepreneurship" into simply "sense of initiative", to prevent ideological clashes, and raises humanistic culture to the rank of the major competences, while the European framework speaks only of "cultural awareness and expression".

In many ways, this law is a milestone in the history of French education. This is one of the few times where legislation has intervened in the field of education, and is almost without precedent since the late 19th Century, when political power dictated the curricula with the introduction of the concepts of “common” and of “competences”. This in an education system which was one of the last in the Western World to develop a common lower secondary teaching system (the "collège unique") in
which disciplines are organised within a structured framework at an academic and institutional level (Gauthier and Le Gouvello, 2010; Rey, 2010).

However, some believe that the way in which the socle commun (core curriculum) is written in such a way that it "refers to the old teaching by objectives method in three fields of classification: knowledge, attitudes and skills" (Clerc, 2012) behind the apparent distribution between knowledge, attitudes and skills. Others are concerned that the description of the main areas, similar to the European Key Competences, do not mention the issue of specific skills which are useful in everyday life, nor, more importantly, do they describe specific situations or series of situations (Perrenoud, 2011). Is there not the risk then that we fall back on the closest possible meaning of what we commonly call subject "competences", which are more familiar and already used?

New concepts and rapid change, mixed with the frequent hesitancy of successive governments led to many reports highlighting that the introduction of measures relating to primary and secondary schooling was half-hearted, slow and incomplete (Gosperrin, 2010, HCEE 2011).

In some areas, the competence approach was more easily adopted due to the existing widespread use of the concept. This is the case in physical education and sport, Modern Foreign Languages (influenced by the European Framework for Languages) or in ICT (Cerisier, Devachelle, Rizza and Nguyen, 2008).

In other areas, competences were often heavily assimilated to related subject teaching (native language teaching, mathematics, history) or the lack of conformity was difficult to police.

This is particularly true in the case of the competences "social and civic competences" and "sense of autonomy and initiative" which raised concerns among teachers as it seemed to lead more to influencing attitudes rather than objective knowledge.

2.2. Subjects and Competences

The implementation of competences through a common framework is hampered by reluctance expressed variably by some teachers, trades unions, and associations who are attached to the subject framework, and fear that the competence-based approach means that subjects in the socle commun (core curriculum) are weakened or watered-down.

This reluctance is mainly found in secondary education, which is mainly structured around subjects, rather than in primary education.

For certain actors in the education field, academic subjects represents a framework of protection for schools against the pressures of society and employers, and in a more general way against a utilitarian view of the school which the competence approach is suspected of causing.

Despite there seemingly being a prevailing consensus in France that there are no all-encompassing competences which can be acquired outside of the learning of subjects, some of those involved in the sector and some researchers are continually concerned that "knowledge" becomes watered-down within transversal "competences".

With regards to research on the subject, these concerns are found in a number of articles.

The most well-known is that of Marcel Crahay (2006), where he discounts the idea that knowledge is secondary in the competence approach, and that the ability to react to a particular situation tends to lead to forgetting the necessary decontextualisation at the heart of all processes of cognitive construction.
Magguy Schneider-Gillot (2006) also believes that by focussing on competences common to multiple disciplines, the myth of transferability leads to the elimination of the specifics of the theories relating to knowledge and thereby creating a phenomenon of "decategorisation" of the issues studied in school.

2.3. Upper Secondary School (Lycée)

Beyond compulsory education, the issue of competences is also raised in an indirect manner, notably in the context of upper secondary education, which corresponds to "Lycée" in France.

In both technological and general education, a recent reform (Moisan and Cook, 2011) notably provides for the creation of a "personalised teaching" system, giving a margin of manoeuvre to the local initiative of teachers and schools. The general aim is to assist Lycée students to build on competences which have otherwise been poorly acquired during traditional lessons. This can be found in certain personalised teaching systems in activities which resemble either the key competence of "learning to learn", or parts of the key competences (such as oral communication) which are not explicitly developed within the framework of standard subjects.

2.4. Assessing Competences

The Theoretical Model

It can be noted that in all countries that have introduced a competence-based approach assessment is a crucial factor and therefore needs to be considered at the same time as curricular reform and not afterwards, as is so often the case (De Ketele, 2009).

Scallon’s view (2007) is that it is fundamentally important to distinguish between the recall of knowledge and its use. In response to the use of standardised tests, performance should be assessed and focussed on, taking into account many features:

- challenging situations, to encourage giving a relatively advanced and more complex response, rather than simply ticking a box
- authenticity - to come as close as possible to a situation where real-life questions are evaluated
- Interactivity
- The multi-dimensional aspect of learning, to take good account of abilities, as well as self-motivation and self-confidence
- Requirements, expectations and standards. A threshold of expected success or levels of competences should be defined, rather than fixing a cut-off point which separates students who fail from those who succeed; as is the case with the measurement model.
- The importance of judgement to carry out a complete evaluation without merely confronting isolated work and one-offs.
- Processes as elements to be assessed, to give importance to path monitoring (process) and the growth of the individual, not only the final result (product)
- Integration and assessment of learning, considering the notion of interactive regulation of teaching
• the participation of the student in assessment as well as self-assessment, intended as a constituent part of competence (i.e. having the ability to think about one’s own progress)

Among the multiple possible definitions, there is common agreement that a competent student is one who is capable of resolving complex and unforeseen tasks that require an element of choice and a combination of learned procedures (Carette, 2009, 2008). The idea of previously unseen and complex tasks is clearly in contrast with current mainstream school assessments. In other words, in order to resolve the problem, the student must choose and combine procedures having identified those which are most relevant to the situation in hand, and this process of “framing” is an essential component of competence.

Nevertheless, there should be no confusion made between a "complex" situation and a "complicated" situation. This is not a matter of having students confront infeasible or overly-complicated tasks for their level; it is more a question of encouraging an alternative application of solutions already known or used (Gérard, 2008).

For most French-speaking researchers, the competence approach requires input based on the situation, not based on knowledge (Ayott-Beaudet & Jonnaert, 2011; Perrenoud, 2011, Beckers and Voss, 2008). Every competence has a situation and a group of situations relating to it, in which the competence develops and grows. This leads to the provision, for public policy, of a bank of situations or a similar pooling device aiding the assessment of competences for teachers.

If the competence is demonstrated during assessment, the "perceived" competence should also be considered, i.e. the feeling of being more or less competent in relation to a proposed task (Van Der Maren & Loye, 2011). The question of being able to reflect and give a meaning to learning is just as, if not more important than what could be considered as a purely behavioural dimension.

Being competent does not mean adding skills and attitudes to knowledge, but knowing what one knows, how one knows it, and with what force to react to confront a new situation (Clerc, 2012).

**Assessment of Competences and Traditional Assessment**

Grade-based assessments usually appear to be poorly compatible with an assessment of competences. This is particularly the case where the result is a certification based on an average grade weighted over multiple disciplines (Dauvisis, 2007). In certain countries, as is the case in France or in some cantons of Switzerland, many experiments are trying and have tried to find alternatives to marking. At primary school level, if assessment notebooks, portfolios or coloured symbols ("traffic lights") are fairly common experiments designed to eliminate marking at the beginning of secondary education still frequently provoke debate and come across opposition, especially from parents. These are parents who fear the loss of a "simple" method of evaluating their child’s performance at school, as well as the fear of falling behind the rest of the school system still measured by competition based on grades. The system also sends discouraging signs concerning this type of experiment, by maintaining marking systems based on traditional programmes alongside competence-based programmes, as is the case in France where the "Brevet" exam at age 14-15 has been maintained alongside the socle commun (core curriculum) (Colsaët and Mevel, 2011).
Some researchers have devised a multi-level assessment to evaluate the ability to classify and mobilise resources when attempting to master a competence, above and beyond mastering procedures (Rey, Carette, Defrance & Kahn, 2006). Their aim is to first evaluate complex competences, in other words, the ability of students to select and combine multiple competences from those already acquired, in order to adequately resolve a previously unseen problem. To do this, they have conceived an assessment method made up of three successive tests from the most complex (the competence) to the most simple (the procedure).

However, as one of the researchers involved points out, this system is not completely infallible: individuals do not demonstrate the same behaviour when faced with situations which nevertheless require the same "mental reasoning" but in different forms (Kahn, 2012).

Various tools are used in the French-speaking world in support of the assessment of competences, among which portfolios, learning files, and concept maps (Tardif, 2006).

In France, the assessment of competences is carried out using a tool called the "livret personnel de compétences" (personal competences book) (Houchot and Robine, 2007; Delatouche 2012), which has been strongly criticised by teaching staff for a number of reasons:

- the numerous items behind each competence (dozens of times each time) which makes it seem as a sort of "tick box factory" and can create an artificial certification of competences by adding micro-tasks;
- a lack of coherence between competences, the book and traditional programmes;
- a binary certification of achieved/not achieved which does not reflect the progressive nature of learning;
- unrealistic or misunderstood levels of expectation;
- Certain traditional tests such as the "Brevet des collèges" (at the end of lower secondary education) coexisting with the certification of competences in the book at the end of Year 10, both having a different logic behind them.

The chaotic implementation of the competence book in the French context is a demonstration of the fragile nature of the changes which began with the 2005 law. As is often the case, assessment methods concentrate and bring out all of the debates and problems which have not previously been solved, among which:

- a major reform, the *scole commun* (core curriculum), which has not been directly challenged but the political leadership of it was only intermittently sustained, leaving many ambiguities pending with regards to issues concerning compulsory education;
- a fundamental and controversial question in teaching, grading and examinations, discussed in a time of confusion and mix-ups, when in fact what is at stake is a symbolic and practical representation for teachers and students, but also as a way of evaluating education for parents and other people involved in the system.
The assessment of competences is a difficult challenge, for which the solution is yet to be found for most of those who are involved, outside of mainland France, while the atmosphere around the education system is somewhat anxious meaning that the lack of certainty, guesswork and improvised teaching methods is difficult to accept (Rey, 2012).
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Key Reading


Section 4: Key competences in Scandinavia, France, Belgium and Finland

Author: Kallunki, V. (University of Helsinki), Erstad O., and Gilje, O. (University of Oslo), Rey, O. (IFE).

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In this section the key competences are discussed from the standpoints of various countries. The section includes reports from Scandinavian countries (Denmark, Sweden and Norway), France, Belgium and Finland. Writers in this section have been Ola Erstad and Øystein Gilje from the Department of Education, University of Oslo, Norway, and Olivier Rey from Institut Français de l’Éducation, École Normale Supérieure de Lyon, France and Veera Kallunki from the Institute of Behavioural Sciences, University of Helsinki, Finland.

In this updated version the recent research literature of the key competences in the above mentioned countries will be analysed. This update continues the work started in the literature review 2012 (http://keyconet.eun.org/literature-review). In selecting research to the analysis it has been followed the principles of significance and topicality of the studies in the research countries, but also the overall situation of key competences in research and in school education in the countries in question have been taken into account.

This country based part of the updated literature review 2013 starts by some general considerations such as educational systems and the history of the key competences in the countries in question. After that the latest updates for the eight key competences in the research countries will be reviewed in detail.

1. General considerations of key competences

Scandinavia

This report on developments within the Scandinavian countries – Denmark, Sweden and Norway – for the overall literature review of the KeyCoNet project will cover some key developments and strategies. Erstad and Gilje will focus more on some of the key competences than others, and Norway will necessarily be more referred to than the other countries due to our better knowledge about developments in this country.

The historic background of the education systems in the Scandinavian countries is important in order to understand the way key competences have been framed within these countries. The education systems in all three countries have a similar background in strong educational policies on equal possibilities for all almost exclusively through public schools. For the last century this has mainly been proclaimed by social democratic governments, emphasising education for all as a common goal with education. Historically, the Scandinavian education systems are parts of what has been termed as the Nordic educational model (Telhaug et al., 2006).

The Scandinavian countries have a longer tradition than most other countries of connecting formal and informal ways of learning (for example project work in schools), and long traditions of life-long learning and distance education using different media. In recent years the penetration of digital technologies in all aspects of Scandinavian societies based on a Nordic welfare state model has been higher than in most other countries (Castells & Himanen, 2002). Also, the distribution of mobile telephones and other digital media among young people (Haddon & Livingstone, 2012), and a public and political awareness of the importance of access and use of new digital media related to education has been strong (Erstad, 2010).
The key competences have been growing in attention in the Scandinavian countries. Both in policy and practice there have been an increasing concern of how to implement and perform key competences in the educational systems. There are marked similarities among the Scandinavian countries, but also some differences. As both Denmark and Sweden are members of the EU, and Norway is not, these two countries have more explicitly been reporting on ways of that they have implemented key competences in school education. Especially in Denmark initiatives were taking as a direct consequence of the DeSeCo-report by the OECD in 2002 in what was called ‘Det Nationale Kompetenceregnskab’ connected to the Ministry of Education (Undervisningsministeriet, 2002). In this report researchers wrote about specific competences that were defined as important in a Danish context at that time, such as; social competence, Literacy competence, Learning competence, Communicative competence, Self-governing competence, Democratic competence, Nature and environmental competence, Cultural competence, Intercultural competence, Creative and innovative competence, Embodied competence, and Health competence. Denmark was the only country at this time that developed such a national ‘competence accountancy’. This has later on been developed further linked to the key competences of the EU. In Sweden, key competences have been explored as part of lifelong learning initiative and future challenges of the education system. For example Skolverket in Sweden has made evaluations of the implications of key competences for Swedish education (Skolverket, 2010). For each of the key competences Skolverket (2010) makes a link to the present situation in Swedish kindergartens, schools and adult education.

The common aspect of developments across the Scandinavian countries during the last fifteen years has been an increased emphasis on basic competences of reading, writing, science and math. This is, for example, reflected in national curricula and reports on science education in all countries. At the same time there has been an ongoing debate about 21st century skills and new challenges in competences.

The PISA and TIMMS studies have had a strong impact in educational policies in Scandinavia, especially in Norway, in the ways some key competences have received a lot of attention during the last decade. This relates especially to ‘Science and Math’ (Ministry of Education, 2010). The implications on educational practices in schools have been that student performances on these competencies have been the main target. Resources and methods within these areas have been strengthened. The meta-review by Hattie (2009) also had an impact on the educational discourse in these countries as a way of focusing on the quality of instruction within school education.

In a parallel way a discourse about key competences has been developing that has been directly linked to the DeSeCo report (OECD, 2002). This has been seen in reports on targeted areas such as ‘digital competence’. One example is the ‘Millennium Learners’ report by Pedro that had an impact in Norway in the forming of digital competence as a key competence (Pedró, 2006). But the DeSeCo report has also had impact on more general discussions about the concept of competence in school education. Such a discussion on the concept of competence was most explicitly made in Denmark. For example Stefan Hermann made important contributions in a public debate about the transitions implicated by the change from emphasising qualifications towards emphasising competences (Hermann, 2003). In recent years ‘Stiftelsen Datorer i Undervisningen’ in Sweden, has organized events on ‘Learning of the Future’ (Framtidens lärande) with an emphasis on digitalization of schools (see: www.diu.se).

An important common trait across the Scandinavian countries is the positioning of national agencies in targeting key competencies and their implementation in school education. In Sweden Skolstyrelsen has been important in following up on different areas. Rektorsakademien has focused
more on school leadership challenges. In Norway specific national centres have been established focusing on targeted competences such as Science centre, Reading centre, ICT centre. The aim is that these centres should combine research and development work with schools within the targeted areas.

**France**

Very few new developments have occurred in the French literature about competences since the last review. Nevertheless, mention may be made of an issue of a journal of philosophy, "Rue Descartes", which devoted an issue to the topic philosophy of education: competences in question (philosophie de l'éducation: les compétences en question). Several articles within this issue are a variation of the same ideas one can find in several polemical and controversial papers: competencies could be the Trojan horse of liberalism to adjust education and students to the needs of economy, against the traditional assignment of schools (culture and critical thinking).

However, other articles explore the possibility to use competences as a means to move from a traditional approach to a more student-centred approach, where the aim is to help students to philosophize rather than to listen to lectures.

At policy level, a new Act, “loi d'orientation sur l'école” (Education Act), was prepared and discussed throughout the past year. The law was finally published on 8 July 2013. The principle of a common core of knowledge and skills was maintained, but supplemented by the word of culture: compulsory schooling have to ensure that every student have means to acquire the common core ok knowledge, skills and culture ”La scolarité obligatoire doit garantir à chaque élève les moyens nécessaires à l'acquisition d'un socle commun de connaissances, de compétences et de culture” (Loi d'orientation, art. 13, section 4).

The addition of "culture" was an agreement to satisfy different points of view and obtain a majority in parliament (left wing). Some members of the majority (Greens and Socialists) wanted to add a reference to European Key Competences, while another part (Communists) would have preferred to remove the idea of competences completely, using arguments against "utilitarianism" or "commodification of knowledge" which they associate Key Competences with.

The contents of the core curriculum will be fixed at a later stage by decree, after the opinion of a new institutional body, the "conseil national des programmes" (national curriculum council). An Inspectorate Report (published in September 2012) stated that the booklet which was intended to assess competences ("livret personnel de compétences") was too complex and poorly used. According to several experts, an important concern with the booklet was the "fragmentation" of competences into too many items.

The authors suggested to set up a more effective and "authentic" booklet of competences: the ministry is working to prepare this new booklet, which will be reviewed by the national curriculum council. In the interim period, while the new booklet is being produced, the current version has been "simplified" for immediate use.

At "ground level", among schools where competence initiatives are developed, the main priority is to improve the assessment of competences and especially to make students work in such a way for it to be possible for them to be assessed in complex tasks. A special issue of "Les Cahiers Pédagogiques", a
well-known magazine targeted at teachers, will be dedicated to this topic (to be published in January 2014).

Belgium

The French-speaking community in Belgium is one of the first European “countries” to have integrated competences at the very centre of a “national” pedagogical reform. A great many general texts on competences in education published in French have therefore been written by Belgian researchers and writers, even if the texts do not focus specifically on the situation in Belgium. Here, however, we have tried to select articles that are more specifically representative of the situation in Belgium, that are a direct part of the discussion of the application of the “Missions” decree of 1997.

In Belgium, education authorities have great pedagogical freedom that is protected by the “School Pact” of 1959 and the Community law of 1989; this leads to a huge diversity in terms of educational approaches. The revised reform in secondary education implemented in Belgium after the 1960s was greatly inspired by ideas of the progressive education movement and was based on the principle of equal opportunities. As it was applied at the same time as secondary education was witnessing a huge increase in the number of students, this reform did not bring about satisfactory results for all.

Some research found that certain methods favoured by the progressive education movement (focus on the individual student and on their autonomy and creativity) are of benefit mainly to children from socially disadvantaged groups, whose families master the implicit codes of this “invisible pedagogy” (to use the expression of the British sociologist Bernstein). Children from working class families are often put in a position of failure as they do not fully understand the educational codes. This has led to teachers and society becoming disillusioned regarding the promise of educational democratization (Beckers, 2011).

Rather than equal opportunities, some have proposed a move towards equality in terms of acquisition, which would involve supplying supplementary means to those who are most alienated from the educational culture. Such a concept requires a definition of the essential acquisitions of human culture and a guarantee that these will be achieved on completion of compulsory education; this was an objective of the Missions decree (1997) that takes competence-based approach. This decree, which reforms compulsory education, introduced the issue of competences through the eight guidelines that form the structure of the key competence frameworks. Each guideline outlines various competences (e.g. questioning, critical thinking, etc.) based around groups of tasks (e.g. communicating historical knowledge).

The development of new guidelines was carried out within subject-based groups that worked in a fairly heterogeneous manner with no shared conceptual foundation. The link between knowledge and competences has remained unclear for some of the guidelines, while “groups of tasks” were successfully defined for a minority of subjects. It is not, therefore, certain that these frameworks are coherent and clear enough to guide the development of subject syllabuses and teaching practices, as we know that on a day-to-day basis it is the syllabus that guides the work of teachers, sometimes through teaching manuals (Beckers & Voos, 2008; Bridoux, 2012; Desagher et al., 2009).
The success of the competence-based approach requires firm backing from teachers in terms of both the management of complex situations and in the construction of quality resources in order to avoid a slide towards invisible pedagogy (Beckers et al., 2012).

The complexity and lack of clarity of the guidelines and the new syllabuses have therefore given rise to anxiety, confusion and anger among a large proportion of teachers, who are already faced with difficult working conditions of the profession. Some consider the competence-based approach to be too complex and too dangerous to implement, favouring instead a learning process through more subject-based educational routines in order to ensure that knowledge is not diluted in the desire to link the syllabuses to competence or transversal methodologies (Beveren et al., 2012; Crahay, 2006).

Other specialists of educational subjects, however, feel that it is possible and useful to use competences in their field, including in the subject of literary education, provided that they establish items of priority focus for teachers in the tasks given to students (Dumortier, 2009). The majority of research agrees that the insufficient adoption of competence reform must be overcome through the training of teachers and that in order to identify the necessary changes and difficulties encountered it is necessary to clarify theories and the application of competences in different disciplines as well as to analyse teaching practices (Sylla, 2013).

A significant danger of the introduction of new methods is that they may be only be applied – and sometimes without having been fully mastered – in schools with a student population from disadvantaged backgrounds, while in more advantaged schools middle-class families maintain the pressure to continue the traditional practices that are more adapted to competition within the social and educational elite. Competences can therefore be covered by pedagogical approaches that give priority to the socialisation and personal fulfilment of students at the bottom of the social and educational hierarchy, while continuing to aim for high performance and excellence at the top of the hierarchy (Mangez, 2008).

It would therefore appear that the reform has not been applied everywhere in the same way, since there is a long tradition of educational freedom in the different networks. Members of educational middle management, for example, have interpreted the legislation in different ways, producing versions that vary quite widely (Mangez, 2004). We can ask whether a real competence-based education is, in fact, provided in Belgium or whether previous practices have tended to endure. Some claim that for an openly competence-based approach, competences should be used as a guide for education and a method of progress in terms of the mobilisation of resources in learning, rather than as a pedagogical doctrine that imposes only one approach (Romainville, 2008).

A competence-based approach is also seen as a support for real freedom in terms of “skills-capabilities” (Verhoeven et al., 2005). A significant, but often forgotten, aspect of the competences reform in Belgium was the fact that it proposed shared standards to teaching networks, something that had previously been lacking. In particular, this entailed the introduction of a shared evaluation culture, which shows that the issue of the evaluation of competences is a major challenge. This led a team from the University of Brussels to work on a three-phase evaluation model, allowing for a distinction of the evaluation of basic knowledge/procedures and low-level competences from the evaluation of the capacity to make choices and to combine procedures during complex tasks (Carette & Kahn, 2010; Carette, 2007, 2008; Rey et al., 2006).
Finland

The national curriculum reform of the basic education is a currently on-going process in Finland. The aim is to put the new national curriculum into operation during autumn 2016 (Halinen, 2013). The group work of the expert groups is a visible process that can be followed through the web page of the Finnish National Board of Education (http://www.oph.fi/english).

According to the draft of the new curriculum (FNBE, 2012), there can be classified various skills necessary in the present day world. In the draft of the curriculum these skills are called as broad-based competences that are needed in the changing world. By these broad-based competences are referred to the total of knowledge, skills, values, attitudes, capacity and will that the pupils acquire during her school years. It is supposed that these competences support the identity formation of pupils. They also have a property to create an ability to lead a more sustainable life. However, it is not simple to teach this kind of broad-based competences at school. According to the draft of the new curriculum, competence development requires cooperation between school subjects and choosing the questions the pupils find meaningful in their life.

The Finnish draft of the curriculum defines seven broad-based competences that should be included to the school’s educational work. These dimensions come close to the eight key competences defined as the European framework for key competences for lifelong learning, released at the end of 2006. In the Finnish draft of the curriculum (FNBE, 2012), the seven broad-based competences will be as follows: Thinking and learning, Cultural competence, interaction and expression, Looking after oneself, managing daily activities, safety, Multiliteracy, ICT competence, Competence required for working life and entrepreneurship, and Participation, empowerment and responsibility. A tentative list of these competences already appear in a report, Basic Education 2020 (2010), where five of above mentioned competences were listed as citizen’s skills. In the following chapters these Finnish broad-based competences will be compared with the European framework for key competences.

2. Reviewing key competences

Communication in the mother tongue

Language policies have been important in the Scandinavian countries for several decades. Maybe more so in Norway than in Sweden and Denmark because of historic reasons. Norway was under Danish rule for more than 400 years and under Swedish rule for about one hundred years. This created a strong language policy about communication in the mother tongue that has existed until today.

Communication in foreign languages

Since all the Scandinavian countries are rather small countries, policies on communication in foreign languages have been strong. Students learn English from early on in their schooling as stated in the national curricula in Denmark, Sweden and Norway. In addition students choose an additional
second foreign language later on in their schooling. German used to be the common language in addition to English, but during the last two decades this has changed towards Spanish and French.

**Mathematical competence and basic competences in science and technology**

In all Scandinavian countries Math and Science has become a priority in educational policies for schools. This is mainly due to international tests, especially PISA and TIMMS, that show that these countries score low compared to the emphasis and investment in school education. One challenge addressed in the literature is about the lack of motivation among students for the subjects of math and science. An aim here is to include the students perspectives in math and science (Alrø & Skovsmose, 2002; Johnsen-Høines, 2009). This is, for example, mentioned in the White Paper No. 22 (2010-2011) in Norway called ‘Motivation-Coping-Possibilities’ (Motivasjon-Mestring-Muligheter).

**Digital competence**

Some international reports show that the Scandinavian countries have come further in implementing this competence area in school education than other countries. This is expressed both on institutional levels and in educational practices (Erstad, 2010).

In the middle of the 1990s, several of the Scandinavian countries started large national programs on the implementation and use of digital technologies in schools. In Norway, this was introduced as part of a five-year program, called the “Program for Digital Competence 2004–2008” (Ministry of Education and Research, 2004a). It signalled an interest from the Ministry of Education and Research to shift the focus more towards the implications of technology for learning and development. This “Program for Digital Competence” (2004–2008) was developed in parallel with a White Paper as a large national curriculum reform for Norwegian schools called “Culture for Learning” (Ministry of Education and Research, 2004b). The rationale for this included macro-level issues about the “knowledge society” and the need for Norway to keep up with international developments, and also a concern with how to use digital technologies as integral to learning activities. This national curriculum of Norway consists of a general part, and a part that specifies aims and content areas for the different subject areas on different levels. The national curriculum of 2006 is of special importance since it defines ‘to be able to use digital tools’ as one of five core skills running through all subjects and levels of schooling, the others being reading, writing, numeracy and oral skills, as a system wide reform. The committee preparing the national curriculum used the term competence, and highlighted ‘digital competence’ as one of the five basic competences running through the whole curriculum, but the Ministry of Education decided to rather use the term skill than competence about this basic areas. This development has created a totally new commitment within the whole education system towards using digital technologies in all subjects and on all levels.

This White paper defines “digital competence” as:

Digital competence is the sum of simple ICT skills, like being able to read, write, and calculate, and more advanced skills that make creative and critical use of digital tools and media possible. ICT skills consist of being able to use software, to search, locate, transform, and control information from different digital sources, while the critical and creative ability also needs ability for evaluation, critical use of sources, and interpretation and analysis of digital genres and media forms. In total, digital
literacy can be seen as a very complex competence. (Ministry of Education and Research, 2004b, 48, Erstad’s translation)

According to the national monitoring of the educational use of ICT in schools in Norway, carried out bi-annually since 2003, the differences between schools, different regions, and different levels of education are large. On the one hand, we note the importance of the differences in access between schools and levels, which make it difficult for some to “use digital tools” and work towards digital literacy. On the other hand, we note differences in conception of digital literacy between teachers and students, and the discursive struggle this creates for teachers in designing learning activities using digital tools. This also illustrates the institutional barriers that are frequently raised when bringing digital literacy from the policy level down to the school level, and the difficulties in how a mandated conception of digital literacy can be related to, and change, educational practice.

Several journals in the Scandinavian countries also raise issues of implementation of digital competence in school education, such as ‘the Nordic Journal of Digital Literacy’, ‘Datorn i skolan’ (Sweden), and ‘Designs for learning’ (Sweden). In Denmark several books have been written about the impact of introducing digital media in school curricula, for example ‘Digital dannelse’ (2010) by Lotte Nyboe.

In recent years the German term Bildung has regained an important position as a reformist agenda for Scandinavian education in a digital culture (Thavenius, 1995). The term goes back to Humbolt and his ideals of academic scholarship, but is now reinterpreted as the challenge of what it means to be. As such it represents another route than the one proclaimed by cultural pessimists like Neil Postman. The Norwegian educational philosopher Lars Lovlie (2003) writes about the Internet as the new interface for a ‘meetings of minds’, and what it means to become literate today. Further, key concerns are raised about the overall challenges of being part of digital culture.

Pupils’ ICT competences, and especially the need to develop them, is a topical issue in Finnish politics and in the new curriculum of basic education. According to the Finland’s Minister of Education, Krista Kiuru, coding and other ICT competences will significantly be highlighted in the new curriculum of the basic education. (HS, 2014)

According to Finland’s new curriculum in basic education 2016 (FNBE, 2012), ICT and working in different digital environments effect on and bring new possibilities to thinking and learning. The new technology makes it possible to support the active role of the pupil and to develop interactive pedagogies for teaching and learning.

To support pupil’s ICT competence requires that ICT and media are used in a diverse way in different school subjects in all age groups. It is important that the technologies are utilised both for interaction, working with knowledge, creating new knowledge and for solving problems. ICT competence includes also skills to recognise ethical problems in digital environment. This means for instance understanding information security and right to privacy in digital environments. In addition, the ability to evaluate the reliability of the information and using different sources belongs to the ICT competence.

Learning to learn

Learning effectively is a skill we need across the life span. However, “learning to learn” is a competence that needs to be acquired in itself.
Learning to learn is the ability to pursue and persist in learning, to organise one’s own learning, including through effective management of time and information, both individually and in groups. This competence includes awareness of one’s learning process and needs, identifying available opportunities, and the ability to overcome obstacles in order to learn successfully. This competence means gaining, processing and assimilating new knowledge and skill as well as seeking and making use of guidance. Learning to learn engages learners to build on prior learning and life experiences in order to use and apply knowledge and skills in a variety of contexts: at home, at work, in education and training. Motivation and confidence are crucial to an individual’s competence (paragraph 5, annex, Education Council, 2006).

Fredriksson and Hoskins (2007) define learning to learn as a quintessential tool for lifelong learning and state that this is why education and training needs to provide the learning environment for the development of this competence for all citizens, including persons with fewer opportunities (those with special needs and school dropouts), throughout the whole lifespan (including pre-school and adult learners) and through different learning environments (formal, non-formal and informal).

In 2002, the European Commission expert group nominated learning to learn as one of the eight key competences seen to be indispensable for the European citizen for the attainment of personal fulfilment and development, inclusion, and employability. In 2006, the Council and the European Parliament adopted the recommendation on key competences for lifelong learning. (Kupiainen et al., 2008b).

As a competence area, learning to learn has often been linked to issues of lifelong learning. The idea is that school education should provide learners with the necessary competences in searching for and using information when needed to solve problems. As equipment provided by school education that is further elaborated through working life. This perspective is emphasised in an OECD report called ‘What works in Innovation in Education – Motivating students for lifelong learning’ (2000).

The key competence, learning to learn was studied in the EU pre-pilot study in Finland (Kupiainen et al. 2008a) where the following eight countries participated: Austria, Cyprus, Finland, France, Italy, Portugal, Slovenia and Spain. Forty-nine schools, 155 classes, 2325 students in all participated in the study. The agreed target population of the pre-pilot was the grade level where the majority of the country’s 14-year-olds are enrolled. In some countries this meant the equivalent of grade nine and in some, grade eight.

According to Hoskins & Fredriksson (2008), learning to learn covers the three dimensions of cognitive, affective and metacognitive competence. In Kupiainen et al.’s study (2008b) the different dimensions of learning to learn were analysed. The pre-piloted test, built from components from four original tests more or less closely related to the concept learning to learn, comprises three domains: the cognitive, the affective, and the metacognitive, reflecting the three key dimensions of an individual’s readiness – willingness and ability – for lifelong learning.

These three dimensions have been further operationalized into subdimensions (Hoskins & Fredriksson, 2008, 28-29). The cognitive dimension consists of four subdimensions: Identifying a proposition, Using rules, Testing rules and propositions and Using mental tools. In the affective dimension belong three subdimensions of Learning motivation, learning strategies and orientation toward change, Academic self-concept and self-esteem, and Learning environment. The metacognitive dimension includes three subdimensions as follows: A metacognitive monitoring task, Metacognitive accuracy, and Metacognitive confidence.
According to the results the model supports the view of the affective and the cognitive component as having an independent impact on learning to learn (GPA) while the metacognitive component, at least as it is measured in the current pre-pilot test, does not. Despite this lacking independent impact of the metacognitive component, the model can be seen to support the validity of the framework and the pre-piloted test as measuring learning to learn. (Kupiainen et al., 2008b) However, the authors of the pilot-test highlight that there is need to revise the test and do wider tests in order to achieve a common European indicator of learning to learn (Kupiainen et al., 2008a).

The different dimensions – cognitive, affective and metacognitive – were modelled by using the following sub constructs. The cognitive dimension consisted of “identifying a proposition”, “using rules”, “testing rules and propositions”, “using mental tools”, and “applying reasoning in everyday problems”. The affective dimension was divided into dimensions of “learning motivation: supportive attitudes”, “learning motivation: detrimental attitudes”, “academic self-concept”, “self-esteem”, “learning environment: school”, “learning environment: family” and “learning environment: friends”. The metacognitive dimension consisted of dimensions such as “metacognitive accuracy” and “metacognitive confidence”.

In the test cognitive component of learning to learn competence was operationalized by four constructs (identifying a proposition, using rules, testing rules and propositions, and using mental tools). However, in the cognitive domain, the fit between the four-dimension framework (identifying a proposition, using rules, testing rules and propositions, and using mental tools) and the tasks used for measuring them was shown to be problematic. To solve this problem, Kupiainen et al. (2008a) recommend a new dimension to be included (reasoning in everyday situations) in the next step of the learning to learn indicator project. In spite of the problems, students’ performance in the cognitive tasks is the best predictor for their school attainment, thus the cognitive component is an important dimension in measuring the key competence of learning to learn. This result is understandable, because cognitive component is the most direct way of measuring what has actually been learnt and on what level. If one has not learnt he/she has not learnt to learn either. In this sense the two other components to be studied, affective and metacognitive aspects will offer important background information about the reasons for learning or lack of it.

In the case of the affective domain that deals with sensitive factors like motivation and self-esteem, problems were revealed related to the fit between the three sub constructs of the framework (learning motivation and strategies, academic self-concept, and learning environment). Regarding the framework, a discussion should be opened concerning the exact nature of our expectations for the three constructs. According to Kupiainen et al. (2008b), some of the affective dimensions measured seem to be better in predicting students’ comportment in the learning challenges relevant to their lives at the moment. However, because the objective is to the comportment of a young people later in life it is difficult to say to what extent decisions concerning the factors to be measured should be taken into account. So, although the affective component of learning to learn would offer important information about factors behind present and future learning ability, it is in its present form difficult to measure. In their research Kupiainen et al. (2008b) conclude that the three constructs – learning motivation, self-concept and learning environment – form an acceptable basis on which to continue the revising and foreshortening of the affective component of the instrument.

The third aspect of the learning to learn, metacognition that in its core is supposed to measure learners belief in his/her skills to learn, was operationalized as students’ ability to reflect on and evaluate their own performance. In the test, metacognition was measured with four different elements, most importantly with two questions posited immediately after four of the cognitive tasks,
forming two separate scales. The first question, I believe I did well in this task, was set to measure students’ ability to accurately evaluate their own performance (metacognitive accuracy). The other, I am confident of my answers, was set to measure their confidence in the accuracy of that evaluation. According to Kupiainen et al.’s (2008b) study the results might be seen to support the interpretation of the measured phenomenon as ‘accuracy of metacognitive evaluation’. However, because there is no other outside reference, the conclusion has to be regarded as only contingent. Still, it is obvious that metacognition should be seen as an essential component of learning to learn and hence has its place in the instrument for its measuring. There instrument of measuring the aspect of metacognition still needs to be reinforced towards the direction of clearer differentiation between students’ ability of general and context-bound evaluations of their performance to form an independent third dimension on side of the cognitive and the affective ones.

On the grounds of the discussion above it can be concluded that learning to learn competence really deserves its place as one of the eight key competences explaining the different dimensions that affect individual’s capability to learn. Being so fundamental competence, it can almost be thought to be the mother and background of all the other key competences. However, there is still research work to be done to be more reliably separate especially the metacognitive component of learning to learn from the two other components.

Increasingly learning to learn has become an important competence area for school education in the Scandinavian countries. Again this is partly due to international tests and the emphasis on lifelong learning in Sweden, Denmark and Norway. For example, in Norway, students are shown to be weak in reading strategies (Braten & Stromso, 2006) (Elstad & Sivesind, 2010). In this report several case studies are presented, among them several Norwegian upper secondary schools that succeed in increasing the level of motivation for learning among students as part of learning to learn.

In Norway the White Paper No. 22 (2010-2011) called ‘Motivation-Coping-Possibilities’ (Motivasjon-Mestring-Muligheter) focus especially on students’ lack of motivation as the major challenge for succeeding at school. It has been suggested that many students at this level experience schooling as disconnected from other domains in their lives, lacking in relevance and in variation and being too theoretical. Teachers are facing the dual demand of fulfilling curriculum requirements of knowledge provision while, at the same time, creating motivation. Several researchers have pointed out that bringing young people’s experiences from outside of school into the classroom may strengthen motivation (Nordahl et al., 2009). It is not obvious, however, how teachers can do this and whether it will enhance learning in school. The key concepts running through this document are relevance and authenticity in order to increase motivation for learning. In this sense the White Paper highlight key values in the Norwegian education system of engaging all students for increasing their potential.

The last 40 years of international debates and developments around Lifelong Learning (LLL) have strong roots in the Scandinavian countries (Bengtsson, 2013). Given these countries’ century-old traditions of strong democratic movements, including innovative initiatives in favour of adult education, it should not come as a surprise that the early concepts of LLL and Recurrent Education originated here. If a particular person should be mentioned, it would be the late Olof Palme from Sweden. Before becoming Prime Minister, he was Minister of Education and took part in the European Education Ministers’ meeting in Versailles 1969. He then presented the first proposal for LLL to be implemented through a strategy of Recurrent Education (RE).
Learning to learn appears in the draft of the Finnish curriculum of basic education with the emphasis of thinking; the broad-based competence, thinking and learning comes close to the ideas of learning to learn. According to the draft, thinking and learning is a competence that in its best includes the aspects of curiosity, creativity, courage and innovativeness. The development of these properties is based on an interaction between pupil’s own thinking and knowledge. Different teaching approaches such as game-based approach are understood to support the joy of learning and creativity. On the other hand, this kind of competence includes independent initiative, but also sees the worth of cooperation. In this way, the aim is to support pupil’s active thinking and learning lifelong processes. (FNBE, 2012)

**Social and civic competences**

Compared to international tests like PISA and TIMMS, this is an area where Scandinavian students in schools score higher than students in other countries (Torney-Purta et al., 2001). The International Civic and Citizenship Education Study has documented that students in these countries have a relatively good understanding of civic processes in our societies. This has been highlighted across the curriculum, especially in the subject of social sciences. There is now a growing concern in the Scandinavian countries towards the notion of citizenship in citizenship education (Biseth, 2011; Rom et al., 2012). In Norway this is a relatively new subject in school, and there are only a few researchers, currently paying attention to these issues (Berge & Stray, 2012; Solhaug & Børhaug, 2012). Similar issues have been raised in Sweden (see the Journal Utbildning & Demokrati for more on this).

As mentioned above, democratic knowledge and citizenship have for a long time been implemented in national curricula in the Scandinavian countries. At the same time, during the last decade all the Scandinavian countries have faced huge social challenges due to immigration making the multicultural impact stronger.

**Sense of initiative and entrepreneurship**

Entrepreneurship is seen as a driving force for the new economy and creative business (O'Connor & Lunati, 1999; Rosa et al., 1997). Thus, entrepreneurship education has been an area of solid commitment and investment in many European countries, and has throughout Europe and the US become a very popular teaching method throughout the educational system. Besides the UK, which has a long tradition for Entrepreneurship Education, the Scandinavian countries are among the countries in the EU where the method is well integrated into the curriculum.

Junior Achievement Young Enterprise (JA-YE) initiatives are linked to school education in all Scandinavian countries. In Norway it is implemented in the curriculum of several subjects, worked with as a cross-curricular method from lower-secondary education to Graduate programme in colleges and universities. Recent surveys in Norway show that the latter approach of a cross-curricular method is the most relevant, which refers to the dominant approach to entrepreneurship education in Norwegian school (Johansen et al., 2008; Rotefoss et al., 2008). In this approach, students in upper secondary work with mini-companies over a year, and the trajectory of the project-based work ends with a regional and a national competition in late spring. These contests scaffold and structure the work in more concrete ways than traditional project-based education.
Based upon a bipartisan agreement regarding the focus on entrepreneurship in schools, JA-YE Norway was established in 1997. Two White Papers define the policy of Entrepreneurship in Norway. In 2004 the national government launched the project “See the Opportunities: strategy for entrepreneurship in education”. In 2009 this White Paper was replaced with the action plan “Entrepreneurship in education - from compulsory school to higher education. 2009-2014”. JA-YE Norway is supported by four government ministries, several industry organisations and a series of large companies. The motivation for introducing the initiative/reform is threefold:

- **Political:** Creating viable communities, increasing people's desire to live in their local community and encouraging "lights in all the houses" (as they say in the Norway’s northern county of Finnmark). When young people want to move back to their home communities but cannot find the jobs they want, they will have the skills to create jobs for themselves.

- **Economic Development:** The workplace of the future has not yet been created. Norway needs more “ready, willing and able” individuals to start new businesses. Innovation and creativity will be equally important in both the public and private sectors in the future. **General Education:** Connecting theory and practice so that education is more meaningful for students. "Learning by doing" – more is learnt by doing than by watching and listening, as J. Dewey claimed nearly a century ago. This is particularly important in relation to the current White Paper for lower secondary schools in Norway (Ungdomsskolen, grade 8-10).

The target for the initiative is to integrate aspects of entrepreneurship in the school curriculum across all school levels, from primary school to higher education.

New regulations for teacher training for primary and lower secondary schools were completed in 2010. Entrepreneurship has become a mandatory element in the subjects of pedagogy, student knowledge and social sciences. Teacher training is an important factor for developing future skills in entrepreneurship. More and more educational institutions are now collaborating with JA-YE Norway to provide student teachers with the knowledge required to facilitate this.

The overall approach in JA-YE is to develop a culture for entrepreneurship across the Norwegian school system, from primary schools to master programme. The activity is divided into three different programmes:

1. **Grundercamp** - Innovation Camp (Workshops).
2. Business oriented programmes. People from small business supervise and make contact with students.
3. Mini-companies; pupils’ enterprise (lower secondary), company programme (upper secondary) and graduate programme (colleges). The latter two of these include regional and national competitions.

A key component is also social entrepreneurship, which involves starting an organisation or a company whose main goal is to solve a social problem in areas such as the environment, education, health, human rights and economic development. Social entrepreneurs use methods and tools from business to make the world a bit better.
The overall aim of creating a culture of entrepreneurship puts an emphasis on the ability and willingness to take the initiative, including willingness to take risks.

As a programme between private and public sector entrepreneurship in Norway, innovation and creativity are high on the agenda. This is done in three different ways:

1. The overall approach is to create a culture of entrepreneurship. This approach is cross-curricular, and is aimed at all levels in the educational system.
2. Entrepreneurship is understood to be a teaching and learning method. This method is applied to diverse subjects, such as maths, social studies and language studies.
3. There is an emphasis on the value of the processes of innovation and creativity in society. This knowledge is usually taught in the specific Entrepreneurship subject in lower and upper secondary schools.

Entrepreneurship in Norway is now well established. The figures below (as of August 2012) give an idea of how different programmes are run across the country:

- 383 municipalities in Norway are connected in some way to the different JA-YE programmes.
- Approximately 120 schools participate in the programme in some way.
- Nearly 8000 teachers are engaged in Entrepreneurship in schools.
- Approximately 170,000 student activities carried out throughout the year.

In addition to supervision of students by teachers, mentors from local business and organisations offer supervision for students in lower and upper secondary schools. A number of events like Venture café take place during the semester.

The teachers have varied backgrounds. In vocational programmes in upper secondary schools, many teachers have previously worked with business and business development. In the teacher training programme, teachers are trained in entrepreneurship as a method. All the teachers participate in short-term courses in their county, and most organisations in the counties arrange seminars. All teachers in the programme are invited to participate in events outside of school, such as competitions and seminars run on an annual basis.

For a long time Norway has worked on creativity and creative methods in entrepreneurship education. Many other countries in Europe have been inspired by the programme, and ideas have travelled across borders as they are exported to other countries. For instance, many programmes are based on the skills of creativity and innovation. These ideas are exported to YA Europe. These issues were put on the agenda for a number of years.
In Finland’s draft curriculum of basic education (FNBE, 2012) the competence of entrepreneurship is connected with working life. To develop pupil’s Competence required for working life and entrepreneurship the basic requirement is that pupil is trained to work alone and also with others. He or she is encouraged to systematically and perseveringly and to pick up the baton what he or she is doing. Also in this process it is important learn to interact with other pupils and to solve conflicts and to learn about mistakes. To get to know the world of entrepreneurship pupil is guided to know societal and economic structures and courses of action. For instance project work and networking is trained at school work. It is important that pupil gets experiences with actors outside the school. To support the competence required for working life and entrepreneurship it is significant that creativity is underpinned in different phases of studying.

Work practice training is a part of developing this competence. In Finland school work includes phases of work practice training and volunteer work where the pupil gets to know different professions and entrepreneurship. Also guiding the pupil with his or her choice of a profession belongs to supporting of this competence.

Cultural awareness and expression

The Scandinavian model of education is dominated by a ‘culture-in-school-discourse’, a discourse characterised by intentional arts and cultural education and expectations about positive consequences for individual and society (Trondman, 1998). The roots are to be found in the progress of the public school system and the development of the ‘Nordic model of education’. In the Norwegian Report on Core Curriculum (R-1993), arts and culture are described as an indispensable component of a quality general education. Norwegian pupils are expected to identify themselves individually as cultural participants through education. Similar points are made in several Danish reports on creativity in the Folkeskole.

Professor Anne Bamford from the UK wrote a report on arts education in Norway, on request by The Norwegian Centre for Arts and Cultural Education (KKS), also with relevance to developments in the other Scandinavian countries. The work on the report started in October 2010 and finished in April 2012. In this report she stated that: “According to the survey results, the amount of time actually used for arts and cultural education in the grunnskole is quite high, and above the international average of just over two hours for primary schools and one hour and forty minutes for secondary schools.” (2012, 29) Also in Norway, the national Cultural Rucksack program has been important during the last decade (Christophersen & Breivik, 2013; Spord Borgen, 2011). The Cultural Rucksack was developed step by step from 2001 onwards, and in 2003 it became a national scale experimental scheme. After a research evaluation the Rucksack became a permanent feature concurrent with the Norwegian school reform in 2006, the Knowledge Promotion Curriculum Reform (K06), though it was not part of the reform itself. The guidelines and funding for the Cultural Rucksack are provided by the Ministry of Culture, while the Ministry of Education is responsible for the school, the arena where the programme is delivered. A coordinating state-level secretariat for the Cultural Rucksack is organised under the Ministry of Culture.

In Finland the broad-based competence – Cultural competence, interaction and expression – best answers the key competence cultural awareness and expression. To support this competence pupil is guided to know and value his or her own environment, own social, cultural, religious or other
worldviews, and linguistic roots. At school pupils get to know to other kinds of backgrounds, environments, cultures, views and matters. A Pupil understands that the different interaction situations develop ones personality in a balanced way. Pupils are encouraged to express themselves in different ways such as using at least two foreign languages, mathematical symbols or pictures. (FNBE, 2012)

In a Finnish study, Jääskeläinen & Repo (2011), Schools reaching out to a global world (2011), the nowadays key competences are reviewed from the aspect of being a global citizen. According to them, present day requires among others the following key competences: intercultural competence, sustainable lifestyle, global citizen’s economic competence, global citizen’s civic competence, and the competence of global responsibility and development partnership.

By intercultural competence are meant a bridge building dialogue and intercultural interaction where people learn from each other. Intercultural competence makes is possible to establish individual diversity as part of everyday life and the starting point for interaction. Through intercultural interaction (dialogue), pupils’ identities are also consolidated as they experience that they are genuinely able to participate in developing and changing the school’s atmosphere, culture and operations. (Hartikainen & Mattila, 2011)

The key competences related to sustainable lifestyle can be classified to the environmental awareness, environmental sensitivity, ecological thinking, sustainable competences, and the will to act in a sustainable manner. To underpin these competences experimental learning has proven to be the best way. The aim in this kind of learning is to deepen pupils’ relationship with the environment. Besides knowledge, it is also important to educate pupils to change their consumption habits and to increase their feeling of responsibility of sustainability. (Houtsonen & Jääskeläinen, 2011)

The need for global citizen’s economic competence has been highlighted during the last economic crises. That is why it is important that pupils learn to build bridge between their own world and a global world. In addition to knowledge of the basic concepts of economics and for example understanding the significance of economic thinking in solving international problems, it is also important that pupils also have skills and ability to act with their own finances. In this, taking into consideration the effects of globalization to their own life and for example the ability to think economically to solve everyday problems are essential competences. (Arola, 2011)

Traditionally it has been thought that people belong to local communities and to their own state, but nowadays this sphere of belonging has been widened to the whole internationalized and globalized world. In this kind of new world an individual is required both to appreciate his/her own cultural and spiritual heritage, but also to understand and respect other cultural backgrounds. Civic competence can also be referred by terms of democratic competence or civic literacy that means knowledge about society and political processes, citizenship skills, and ability to reflect on values and interest in common affairs. On the whole a citizen’s and a global citizen’s civic competence encompass skills of participation and influencing, as well as social skills, communication and media competence, economic and consumer skills, judicial competence, cultural competence and global ethics, and the ability to assume responsibility. (Kaihari & Virta, 2011)

The competence of global responsibility and development partnership means awareness of one’s own community’s identity, but also the significance of the rest of the world. Global partnership means getting along with different people that is also a skill which is called as an intercultural
competence. It is the task of the school also to educate pupils to keep up with global news and the state of the world. The competence of global responsibility and development partnership includes developing skills of dialogue and critical assessment of information. Among other skills of critical and creative thinking, as well as skills to participate in and influence global issues in their own local lives are important. In addition, understanding world requires also points of reference, value systems and ability to draw conclusions. Key global education skills are considered to constitute the ability to adapt to change, the ability to understand complex phenomena and the ability to tolerate uncertainty in different respects. Pupils should also be guided to understand how their own behaviour affects in global terms and also to understand how globalisation affects their own lives. (Heino & Houtsonen, 2011)

Other competences

In the draft of the Finnish new curriculum of basic education one essential competence is *Looking after oneself, managing daily activities, safety*. In the background of highlighting this broad-based competence is the concern over pupils’ ability to look after themselves. It is important that pupils are guided to look after themselves, and to learn skills that are needed in everyday life. For instance controlling ones use of time and consuming are important skills needed across the life span. In addition things like health and safety belong to this competence. (FNBE, 2012)

The second broad-based competence presented in the draft of the Finnish curriculum of basic education, but what cannot be placed to any of the above mentioned key competences, is the competence of Multiliteracy. By that competence are meant the skill that is needed when interpreting and producing different kinds of messages. This competence is very closely related to thinking skills and to ability to produce, evaluate, acquire and edit information in different learning environments. Multiliteracy includes different literacies such as ability to read, writing skills, mathematical literacy, media literacy and digital literacy. (FNBE, 2012)

Participation, empowerment and responsibility are also one of the broad-based competences included to the new curriculum of basic education in Finland (FNBE, 2012). According to the draft, it is a task of the basic education to strengthen the interest of a pupil towards common and societal things, and to act as a part of a democratic society. To support this it is important that the pupil gets to participate in planning work in the everyday school work and gets experiences of influencing for example in school’s fraternity. This supports the feeling of belonging to a community. One aim of the basic education is also to construct pupils’ impression about the importance of studying and know-how. This means a competence to be responsible for one’s own life, neighbourhood, society and nature.

3. Concluding remarks

The aim of this literature review was to analyse how the eight key competences defined as the European framework for key competences (2006) appear in different European education policies and practices. The key competences in question are: Communication in the mother tongue, Communication in foreign languages, mathematical competence and basic competences in science and technology, Digital competence, Learning to learn, Social and civic competences, Sense of
initiative and entrepreneurship, and Cultural awareness and expression. The countries reviewed were Scandinavian countries (Denmark, Sweden and Norway), France, Belgium and Finland.

In general, there seems to be a vivid ongoing discussion about the key competences in the analysed European countries. Although the competences are understood to be important and useful skills for our children, there appears also concern about implementing and performing key competences in the educational systems. On the other hand, the development work of basic competences has been a natural part of curriculum work, for instance in Scandinavian countries skills of reading, writing, science and math have been on the focus of discussions. One reason for this is the results from PISA and TIMMS studies.

Also in France the key competences have welcomed with contradictory feelings. In several public articles the key competences have feared to be such as Trojan horse of liberalism to adjust education and students to the needs of economy. At the same time, other debaters have highlighted the possibility to use the key competences in order to renew traditional teaching approaches towards more student-centred teaching. The situation in France is a good example of the present state of key competences in Europe. After long discussions, a new law about key competences was published. The law says that “compulsory schooling have to ensure that every student has means to acquire the common core ok knowledge, skills and culture”.

Of the countries reviewed Belgium, and especially its French-speaking community, represents an area where key competences have been integrated at the very centre of the pedagogical reform. Although there are applied many different pedagogical approaches in Belgium, the new competence-based approach has not yet received a general acceptance, but some educators consider it too complex and too difficult to implement. On the other hand, other educators see the use of competences to be useful.

In Finland the process of putting key competences into operation is in the beginning. The national curriculum reform of the basic education is a currently on-going process in Finland amd the aim is to put the new national curriculum into operation during autumn 2016. The main ideas of the eight key competences have clearly been integrated into the new Finnish curriculum; the seven broad-based competences of the draft have a close connection with the European framework for key competences.

In the second part of this review, the manifestation of the eight key competences in the reviewed countries was analysed. The analysis uncovered that all competences are utilized, but with different emphases. In addition to these eight competences, the analysis also revealed competences that can be partially overlapping with those eight.

All in all, the review showed that utilising key competences in national level curriculums is an ongoing process that has generated lots of discussions, and which in spite of difficulties and prejudice, will surely promote and rene teaching and learning in European countries.
References


Education.


Annex 1: KeyCoNet Literature Review Matrix

In this review we are trying to gain an understanding of:

- What types of research have been undertaken for the topics and issues that interest us and what are the key results and outcomes that influence how KCs are being developed and implemented in different countries?
- What are the major contributions of international (including European) organisations and research centres?
- What are the main issues or messages that will influence our work?
- Are countries designing and implementing KC (or other terminology) frameworks based on research or on other criteria?
- Do we know if KCs make a difference to learning and if so how? What is their contribution?
- Is there evidence to suggest that the EU framework could usefully be fine-tuned?
- Etc.

<table>
<thead>
<tr>
<th>Topics and issues</th>
<th>Scientific review/books</th>
<th>Reports international organisations/EU organisations</th>
<th>Key reports about initiatives (EU MS + other countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KC Theoretical framework:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research on the 8 KCs + key research on transversal skills and other foundational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>competences/capacities e.g. resilience, self-efficacy, etc. (UH, using ATC21s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scientific reviews)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**KC Implementation**

<table>
<thead>
<tr>
<th>Approaches to implementation at practice level (classroom/learning environment): (UH)</th>
</tr>
</thead>
</table>

**Themes:**
- carefully designed & appropriately orchestrated implementation strategy,
- appropriate resources used effectively
- pedagogy of competence development,
- innovative learning environments,
- intensive use of ICT facilities,
- project work & teamwork,
- individualised techniques of organising learning

**To be considered at:**
- School level (including networks, learning organisations)
- Local/regional
- National
- Interaction of all levels
- non formal environment (local and/or virtual)
**Approaches to implementation at system(ic) level:**

**Curriculum design and implementation (frameworks, etc.)** *(EIEPS + EUN)*

**Teacher training:** *(EUN)*

Consequences and implications for:
- Defining and acquiring their own KCs to facilitate learning of KCs
- Initial and continuous Professional Development (CPD)

**Assessment** of key competences

Issues: e.g. “measuring what matters”

New assessment methods

**School organisation:** *(EUN)*

- Opening to and partnership with the surrounding community
- Role of teachers (in the school) and team work at teacher level
- Etc.

**Non formal learning environments:** *(UH + EIEPS contribution)*

- Better suited/more efficient for some specific competences?
- Which complementarity with formal environment?
- Etc.

**Socio-economic issues:** *(EIEPS)*

- schools as learning communities to combat disadvantage
- school in its local environment
- school in its virtual environment (?)
- individual students background

**Research and evidence based policy implementation**  *(EIEPS + EUN)*

**Research:**
How countries use research or not and of what types? With what outcomes?

**Policy formulation:** what do we learn about different approaches to formulation in terms of outcomes?

**Policy evaluation:** is there any? who does it? how? What does it tell us?

**International influences on policy and research:**
E.g: DeSeCo, PISA, etc.
Annex 2: Major categories of terminology about competences and skills used in the EU

The data in this table was collected through country "fiches" used for J. Gordon, G. Halasz, M. Krawczyk, T. Leney, A. Michel, D. Pepper, E. Putkiewicz, J. Wisniewski, *Key Competences in Europe: Opening doors for lifelong learners across the school curriculum and teacher education*, (Warsaw, CASE-Center for Social and Economic Research) undertaken for the Directorate General Education and Culture of the European Commission, (2009). The examples are not exhaustive, but are given as illustrations.

<table>
<thead>
<tr>
<th>Major category of terminology</th>
<th>Sub-categories</th>
<th>Countries examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competences</td>
<td>(HU): “kompetencia”. A frequent synonym is “képesség” which can be translated as <em>aptitude</em> or <em>skill</em>. (see below also under key competences)</td>
<td>(IT) Competenze: knowledge and abilities that each pupil will turn into personal competencies with the help of the school. This was first introduced in the <em>Portfolio delle competenze</em> (portfolio), through the reform of 2003. (PT): <em>competência</em> - knowledge in action or in use. It refers to the integrated development of knowledge, skills and attitudes for all stages of basic education. Thus, competence does not involve adding a set of skills and attitudes to a certain body of knowledge. Instead, it relates to the promotion or integrated development of skills and attitudes which are conducive to the use of this knowledge in different situations with which the pupil may or may not be familiar. (SI): <em>Kompetenz</em> tends to be used. (traditionally Slovenian term was <em>zmoznost</em>): Developing and demonstrated abilities of individuals which enable them to act creatively, effectively and ethically in complex, unforeseeable and changed circumstances in professional, social and private life. Competence has three components: - Acquisition of theoretical, conceptual and abstract knowledge; - Developing skills, expertise and procedural knowledge to solve problems; - Developing an autonomous and ethical stance towards other people, community and environment – responsibility and autonomy. These are identified as cognitive, functional and socialisation perspectives.</td>
</tr>
<tr>
<td>Key competences</td>
<td>(AT) The terms <em>Schlüsselqualifikationen</em> (key qualifications), <em>Schlüsselkompetenzen</em> (key competencies) and, in particular, <em>dynamische Fertigkeiten</em> (dynamic skills) are used when talking about subject-independent, transversal competencies. The terms <em>Grundfertigkeiten</em> (basic skills) and <em>Grundkompetenzen</em> (basic competencies) are used when trying to convey the notion in its broadest sense. All subject-specific competence must therefore be supported and complemented by <em>Sozialkompetenz</em> (social competence, i.e. taking on responsibility, co-operation, initiative, active participation, team spirit) and <em>Selbstkompetenz</em> (personal competence, i.e. development of individual talents and capabilities, being aware of one’s own strengths and weaknesses, self-reflection). Promotion of these two dynamic skills should prepare pupils for real-life situations that cannot be addressed through the simple recall of information. Coping with such situations requires self-esteem, initiative, acceptance of responsibility, and cooperation with others. (see below basic competences)</td>
<td>(BG) <em>Kompetenctnost</em> no legal existence but used by teachers and decision-makers (CY) Key competences as core knowledge (CZ) <em>Klíčové kompetence</em></td>
</tr>
</tbody>
</table>
**DK**: Noglekompetence generally refers to the ability to apply knowledge and qualifications to differing situations but not part education terminology. The National Competence Account has identified competencies for professional life and personal development (environmental and natural competencies, physical competencies, social competencies and learning competencies) based on the DeSeCo Report. They are:

- social competence,
- literacy competence,
- learning competence,
- communicative competence,
- self-management competence,
- democratic competence,
- ecological competence,
- cultural competence,
- health, sports and physical competence,
- creative and innovative competence.

**FI**: Avaintaito = key competence & avaintaidot = key competences (see below cross-curricula themes)

**HU**: The strategy of the ministry contained a list of specific key competences to be developed, as follows:

- the capability of using various learning techniques (NB this is close to learning to learn)
- the capability of intelligent learning
- the capability to apply knowledge
- instrumental competences (like communication, mathematics or ICT-related competences)
- social competences
- value orientation (the capability to understand and use norms and values)

**LT**: Esminė kompetencija or Bendrasis gebėjimas

**MT**: Key competences—‘Competence’ is the proven ability to use knowledge, skills and other abilities to perform a function against a given standard in work or study situations and in professional and/or personal development. In the EQF, ‘competence’ is described in terms of responsibility and autonomy.

Educational objectives are defined and explained in a competence format, under the headings knowledge/information, skills, and attitudes as follows:

- Self-awareness and the development of a System of Ethical and Moral Values;
- The Development of Citizens and a Democratic Environment;
- Developing a Sense of Identity through Creative Expression;
- Religious Education;
- Strengthening of Gender Equality;
- Education on Human Sexuality;
- Preparing Education Consumers;
- Media Education;
- Effective and Productive Participation in the World of Work;
- Education for Leisure;
- Wise Choices in the Field of Health
Key Competences are listed as part of the National Qualifications Framework rather than as part of the curriculum (which predates the NQF). They are available for levels 1 to 3 of the NQF (up to the Secondary Education Certificate) and mirror the EU framework.

“The learning how to learn, self-directed learning and autonomous learning are the means for further personal development and keys to personal success in a career. There will hardly be any attempt at learning and training later on in life if the child is not equipped with literacy and numeracy, the ability to obtain and pass on information, the use [of] information and communication technology, the ability to analyse, to plan, to execute, the ability to work in a team – as a leader, as a team player, the need to be creative and entrepreneurial. This knowledge and these skills are essential elements of the National Framework curriculum.”

(NL) *Erkenententies* (meaning, literally, core competencies). (See also below under general objectives)

(RO) *Competență cheie*

(SK) *Kľúčové kompetence*

(SI) Key competences now described as: learning to learn; social skills; ICT; planning and developing one's career; entrepreneurship; environmental responsibility; safety at work.

| Cross-curricular key competences | (DE): general (subject-independent) competencies essential in order to operate effectively at personal and professional level. They are not limited to cognitive abilities and represent complex operational competencies:
|                               | - are required for and supported by different subjects and subject areas,
|                               | - help solve complex, holistic tasks in real-life contexts,
|                               | - can be transferred to new situations not covered by the curriculum,
|                               | - can be characterised as general abilities.

| Basic competences             | (AT) *Grundkompetenzen*— used to convey the notion in its broadest sense.
|                               | (EL) ΒΑΣΙΚΕΣ ΔΕΞΙΟΤΗΤΕΣ - referring to IT skills
|                               | ΕΠΙΚΟΙΝΩΝΙΑΚΕΣ ΔΕΞΙΟΤΗΤΕΣ - communications and social competencies
|                               | (ES) *Competencias Básicas*. The Spanish Royal Academy gives the following definition for *Competencia*: Skill, aptitude, suitability to do something or to take part in a subject. They are part of the *ensañanzas mínimas*, the core curriculum defined by central government (objectives, key competences, contents & evaluation criteria) that serves as a reference for the Autonomous Communities. The key competences respect at least 3 criteria: within reach of the majority, relevant in a wide range of areas of life, contribute to lifelong learning. They are:
|                               | - Competence in linguistic communication
|                               | - Mathematical competence
|                               | - Competence n knowledge of and interaction with the physical world
|                               | - Information processing and digital competence
|                               | - Social and civic competence
|                               | - Cultural and artistic competence
|                               | - Learning to learn
|                               | - Autonomy and personal initiative

- Greater Awareness of the Role of Science and Technology in Everyday Life;
- Competence in Communication;
- Preparation for Change.
In compulsory education there is the *Socles de compétences* (foundations of competences) and the *compétences terminales* (final competences achieved). The *socles de compétences* are a "formal system of reference that sets out, in a structured way, which competencies must be exercised until the end of the first eight years of compulsory education, and those for which proficiency must be attained at the end of each stage, because they are considered necessary for social insertion and the pursuit of studies". As guarantors of school democratisation, learning guides, and assessment watchdogs, the *socles de compétences* mark out the difficult path that must lead not only to equal access to school, but also to equal results from education and to equal requirements for all children. They include both interdisciplinairy and cross-curricula competencies, which, when gradually acquired, ensure the development of the pupil and his/her personality, and subject-related competencies.

### (FR) Socles de connaissances et de compétences:
- Command of the French language
- Command of at least one modern foreign language
- Command of the main elements of mathematics and of science and technology
- Practical knowledge of information and communication
- Cultural education/awareness to enable participation in society/the exercise of citizenship
- Civic and social competencies
- Autonomy and initiative

### (LU) Socle de compétences. In German the term is: *Kompetenzorientierte Bildungsstandards*:
- Logical reasoning - mathematics
- Language, Letzeburgesch and opening to languages
- Discovery of the world by all the senses
- Psycho-motor skills, corporal expression and health
- Creativity, awakening to aesthetics and culture
- Living together and values.

There are transversal competences: citizenship, autonomy and personal aspirations

### General competences
*üldpädevus* - general competence is used in the national curriculum and consists of four competences:
- learning competence – the ability to manage one’s learning activities by using efficient learning strategies and suitable learning style; to motivate oneself to learning, to search for necessary information, have an overview of one’s knowledge, to relate one’s knowledge to that created by other people and create new knowledge, to monitor and assess one’s thinking and learning activities.
- activity competence – ability to notice problems and to solve them, to plan one’s activities, set goals and foresee expected results, to choose activity means, to assess the results on activities, ability to cooperate.
- value competence - ability to perceive one’s relation to other people, to one’s own and other cultures nature and things created by humans to assess relations between people and activities in relation to general moral norms.
- Self-definition competence – ability to understand and assess oneself, understand the meaning of one’s activities and behaviour in society, to shape one’s personality.
They are specified depending on the age group. There are also subject competences which describe the content of each subject (see section 1 for the list of subjects). As a result of the integration of subject competences and general competences students will have domain-specific competences:
- **valdkonnnapädevus** – domain-specific competence. There are seven domain-specific competences that are wider than those covered by individual subjects and should cover each aspect of the interaction a person has with the world surrounding him/her as well as her/himself. They are: nature competence; social competence; reflection & interaction competence; communication competence; technology competence; art competence; mathematics competence. There are expected outcomes per age group.
- **kohustuslikud läbivad teemad** – compulsory cross-curricular themes. There are four that are not taught as separate subjects (although they can be) but have to be covered while learning other subjects. They are: environment and sustainable development, career & career planning, media studies, ICT & security.
- **ainealased teadmised ja oskused** – skills and knowledge in specific subjects. The second part of the national curriculum that consists of subject curricula states the competences for each one to be attained by all pupils at a specific school stages.

### New competences

**LT** The Provisions of the National Education Strategy 2003-2012 stresses the need to develop citizenship, entrepreneurship, digital competences, learning to learn and cultural awareness competences. It refers to cross curricular competences: To ensure the quality of education development the contents of education shall be updated and related to new competencies of an individual: a more consistent transition to the new contents development policy oriented towards development of general abilities, values, provision of the necessary competencies based not so much on the transfer of knowledge, as on their analysis, critical assessment and practical application; such competencies shall relate the contents of education to actual life, actual problems and their solutions.

### Essential competences

**PT** Competências essenciais (essential competencies) constitute the body of general and subject specific knowledge which is considered indispensable for all citizens in today’s society. In particular, it is essential to identify the knowledge which enables pupils to develop their understanding of the nature of each subject and its processes, as well as a positive attitude towards intellectual activity and the practical work it entails.

At the end of basic education, it is expected that pupils should have acquired the following general essential competencies, involving the ability to do the following:
- mobilise cultural, scientific and technological knowledge to understand reality and deal with everyday situations and problems;
- use languages from the different fields of cultural, scientific and technological knowledge to express themselves effectively;
- use the Portuguese language to communicate proficiently and structure their thoughts;
- use foreign languages to communicate proficiently in everyday situations and assimilate information;
- adopt personalised working and learning methodologies geared to achieving set objectives;
- investigate, select and organise information in order to transform it into knowledge that can be mobilised;
- adopt appropriate problem-solving and decision-making strategies;
- carry out activities independently, responsibly and creatively;
- cooperate with others in common tasks and projects.

### Capacities

**UK - Scot.** The purpose of the Curriculum for Excellence is encapsulated in the four capacities - to enable each child or young person to be a successful learner, a confident individual, a responsible citizen and an effective contributor.

The curriculum aims to ensure that all children and young people in Scotland develop the knowledge, skills and attributes they will need if they are to flourish in life, learning and work, now and in the future. Each one is expressed as attributes and capacities to be achieved through learning experiences and outcomes which are a set of statements which describe the expectations for learning and progression for...
Each curriculum area.

### Competence Account

**National Competence Account** (DK) — key competences defined as acting as axes of rotation, activating professional competences and serving as a pre-requisite for the acquisition of professional competences.

### Skills

**Skills** (UK-Eng.)

- personal learning and thinking skills
- key skills/functional skills
- cross-curricular themes/whole curriculum dimensions

The personal learning and thinking skills (PLTS) ‘framework' contains six groups of skills: independent enquirers; creative thinkers; reflective learners; team workers; self-managers; effective participators. There are also cross-curriculum dimensions which can provide a focus for work within and between subjects and across the curriculum. They include: identity and cultural diversity; healthy lifestyles; community participation; enterprise; global dimension and sustainable development; technology and the media; creativity and critical thinking.

UK (Nn. Ire.): At the heart of the curriculum lies an explicit emphasis on the development of skills and capabilities for life-long learning and for contributing effectively to society. These whole curriculum skills and capabilities consist of:

- Cross-Curricular Skills (Communication, Using Maths and Using ICT)
- Thinking Skills and Personal Capabilities – TSPCs - (including Managing Information, Thinking, Problem Solving and Decision-Making, Being Creative, Working with Others, and Self-Management)

They are embedded and infused throughout the revised Northern Ireland Curriculum at each key stage and pupils should have opportunities to acquire, develop and demonstrate these skills in all areas of the curriculum.

**UK (Wales): Skills Framework for 3 to 19 year olds:**

- Developing thinking: Learners develop their thinking across the curriculum through the processes of planning, developing and reflecting.
- Developing communication: Learners develop their communication skills across the curriculum through the skills of oracy, reading, writing and wider communication.
- Developing ICT: Learners develop their ICT skills across the curriculum by finding, developing, creating and presenting information and ideas and by using a wide range of equipment and software.
- Developing number: Learners develop their number skills across the curriculum by using mathematical information, calculating, and interpreting and presenting findings.

### Basic skills

**Grundfertigkeiten** – used to convey the notion in its broadest sense. (see also above under key competences)

### Dynamic skills

**Dynamische Fertigkeiten** (dynamic skills) – subject-independent transversal competencies. (see also above under key competences)

### Skill / aptitude

**kompetencia** - a frequent synonym is “képesség” which might be translated as aptitude or skill (see also above under competences)

### Key skills

**Key Skills Framework:**

- Primary: the ability to question, analyse, investigate, think critically, solve problems
- Junior secondary: interact effectively with others: communication and literacy, numeracy, manipulative skills, information technology, thinking and learning, problem solving, personal and interpersonal, social
- Senior cycle: information processing, critical and creative thinking, working with others, communicating, being personally effective.

### Cross-curricular skills

**A number of cross-curricular transversal skills are mentioned:**
<table>
<thead>
<tr>
<th>Goals and objectives</th>
<th>Core objectives</th>
<th>(NL) Core objectives (which relate to subjects) and general objectives (which are cross-curricular) are used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development objectives and final objectives</td>
<td>(BE-fl) Ontwikkelingsdoelen and Eindtermen</td>
<td>Final objectives are minimum objectives with regard to knowledge, insight, skills and attitudes, which the educational authorities consider necessary and attainable for a specific pupil population. Developmental objectives are minimum objectives which the educational authorities consider desirable for a specific pupil population (Decree 4 February 2003). The final objectives and developmental objectives define which knowledge, insight, skills and attitudes society considers necessary or desirable for pupils at the various levels of education. Thus, final objectives and developmental objectives define which knowledge, insight, skills and attitudes society considers necessary or desirable for pupils at the various levels of education.</td>
</tr>
<tr>
<td>Goals to be achieved and goals to strive for</td>
<td>(LV) The National Standard for General Secondary Education determines the goals common for all general secondary education curricula:</td>
<td>- to provide pupils with knowledge and skills enabling them to prepare for further education; - to encourage the development of their personality and of their physical and mental capacities, and to develop their understanding of health as a condition for the quality of life; - to encourage the development of positive, critical and socially active attitude, and to develop understanding of rights and obligations of Latvian citizens; to develop the ability to study independently and improve knowledge as well as create motivation for lifelong learning and a purposeful career.</td>
</tr>
<tr>
<td>(SE) The term &quot;key competences&quot; does not figure in the documents determining the Swedish education system. Instead the concept of goals is used: goals to strive for (quality of education process) and goals to be attained (learning outcomes). Amongst the goals are the knowledge, skills and attitudes corresponding to particular key competences. The goals are not ranked in order of importance. There is a nation-wide curriculum for pre-school, compulsory school and upper secondary school. (See annex 1 for list)</td>
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<tr>
<td>General Objectives</td>
<td>(NL) General objectives are regarded as important for all learning areas in the primary curriculum are:</td>
<td>• A good working attitude • Use of learning strategies • Reflection on one’s own actions and learning • Expression of one’s own thoughts and feelings • Respectful listening to and criticising of others’ opinions • Acquisition and processing of information • Development of self-confidence • Respectful and responsible dealing with others • Care and appreciation for the living environment</td>
</tr>
</tbody>
</table>
Secondary level: the six general objectives are:
- Cross-disciplinary themes: Within the context of broad and balanced consideration of people and society, pupils should obtain a certain level of insight into their position within their immediate personal environment, as well as the wider social environment.
- Learning to do: In situations as close as possible to real life, pupils should learn how to develop further certain skills acquired at school, making use of ICT where appropriate.
- Learning to learn: Pupils should learn to acquire knowledge and skills, making use of ICT where appropriate. To this end, they should learn (amongst other things) certain strategies for improving the learning process.
- Learning to communicate: Pupils should learn how to develop further certain social and communicative skills, on an interactive basis where appropriate.
- Learning to reflect upon the learning process: Pupils should learn to be analytical about and to control the learning process, by reflecting upon their own performance.
- Learning to reflect upon the future: Pupils should learn to be analytical about their options for the future/prospects and interests, by reflecting upon their own performance.

Training objectives
(CY) TVET Curriculum includes training objectives (the content, the teaching materials, the students’ profile and suggested approaches and methods in order to achieve the training objectives.)

Goals in the curriculum
(HU) The NCC contains the following parts: (1) the description of the role of the NCC in public education, (2) the common values of education, (3) the basic goals (including the development of key competencies and the development of a number of other areas), (4) the principles of differentiation, (5) equity principles, (6) the principles of the elaboration of school level curricula with references to other national regulatory documents, (7) the standards themselves.

In the NCC the standards are defined as learning outcomes, i.e. knowledge, skills, competencies, attitudes etc. To be possessed by the pupils by the end of the specific cycle.

The NCC 2003 also contained a thesaurus which defined the notion of “competence based” and the relation between “competence” and “knowledge”. According to this, “The ‘competence based approach means a commitment that determines the taxonomy of the curriculum.” In the background of this approach there is a theory of personality which considers the competences (personal, cognitive, social and special competences) as the main components of the personality... [This approach] links the competences to specific activities and tasks that are achieved by the human being: someone is competent in relation with an activity if he/she is capable to achieve the tasks related with this activity.” This was the basis for restructuring the NCC so that instead of the element of national culture (“knowledge”) it was focusing on specific developmental tasks that are supposed to develop specific competences.

Cross-curricular themes
(FI) The national core curriculum defines the goals, main content of the various subjects & cross-curricular themes. They are intended as an explicit part of the curriculum to be taught across the whole curriculum, and anchored in particular areas of the subject curriculum. They are educational challenges with social significance. At the same time, they are current statements on values. The objectives behind them are
- observe and analyse contemporary phenomena and operating environments;
- express justified ideas of a desirable future;
- assess their own lifestyle and prevailing trends from a future perspective; and
- make choices and take action for the future that they consider as being desirable.

For the upper grades of basic education, the cross-curricular themes are:
- Growth of the person
- Cultural identity and internationalism
- Media skills and communication
- Participatory citizenship and entrepreneurship
- Responsibility for the environment, well-being and a sustainable future
- Safety and traffic competences
- Technology and the individual

For all upper secondary pupils in both the general and vocational strands the cross-curricular themes are:
- Active citizenship and entrepreneurship
- Welfare and safety
- Sustainable development
- Cultural identity and knowledge of cultures
- Technology and society
- Communication and media competence
Annex 3: Sweden: goals to strive towards and goals to attain

The ‘goals to strive towards’ detailed in the curriculum documents include that schools should ensure that all pupils:
- Develop the ability to form and express ethical viewpoints based on knowledge and personal experiences.
- Respect the intrinsic value of other people.
- Reject the oppression and abusive treatment of other people and assist in supporting them.
- Can empathise with and understand the situations other people are in and can develop the will to act with their best interests at heart.
- Show respect for their immediate environment as well as for the environment in its wider perspective.
- Develop a sense of curiosity and the desire to learn.
- Develop their own individual way of learning.
- Develop confidence in their own ability.
- Feel a sense of security and learn to consider and show respect in their dealings with others.
- Learn to carry out research, and to learn and work independently and together with others.
- Acquire good knowledge in school subjects and subject areas to develop themselves and prepare for the future.
- Develop a rich and varied language and understand the importance of cultivating this.
- Learn to communicate in foreign languages.
- Learn to listen, discuss, reason and use their knowledge as a tool to formulate and test assumptions as well as to solve problems.
- Reflect on their experiences and critically examine and value statements and relationships.
- Acquire sufficient knowledge and experience to be able to make well considered choices over further education and vocational orientation.
- Take personal responsibility for their studies and working environment.
- Gradually exercise increasingly greater influence over their education.
- Have an understanding of democratic principles and develop their ability to work democratically.
- Acquire sufficient knowledge and experience to be able to examine different options and make decisions concerning their own future.
- Develop the ability to assess their results themselves.

‘Goals to attain’ in the compulsory school include to:
- Have mastered Swedish and to be able to listen and read as well as to express ideas and thoughts in the spoken and written language.
- Have mastered basic mathematical principles and be able to use these in everyday life.
- Know and understand basic concepts and contexts within the natural sciences as well as within technical, social and human areas of knowledge.
- Have developed the ability to express themselves creatively and be interested in participating in the range of cultural activities that society has to offer.
- Be familiar with central parts of the Swedish, Nordic and Western cultural heritages.
- Be aware of the culture, language, religions and history of national minorities.
- Be able to develop and use their knowledge and experience in as many different forms of expression as possible covering language, images, music, drama and dance.
- Have developed their understanding of other cultures.
- Be able to communicate in speech and writing in English.
- Know the basis of society’s laws and norms as well as their own rights and obligations in school and society.
- Be aware of the interdependence of countries and different parts of the world.
- Be aware of the requirements for a good environment and understand basic ecological contexts.
- Have a basic knowledge of the requirements to maintain good health and to understand the importance of lifestyle for health and the environment.
- Have some knowledge of the media and of their role in relation to the media.
- Be able to use information technology as a tool in their search for knowledge.
- Develop their learning and to acquire deeper knowledge in a number of individually selected subject areas.

Sources: Eurydice note and Skolverket [http://www.skolverket.se/sb/d/354/a/959](http://www.skolverket.se/sb/d/354/a/959)
<table>
<thead>
<tr>
<th>GC Domain</th>
<th>Context</th>
<th>Min competence</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Mid competence</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
<th>Max competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing myself</td>
<td>Reflection</td>
<td>Has a tendency to brood about past failures. Can become depressed.</td>
<td>Personal reflection often leads to a somewhat negative outlook on life.</td>
<td>Spends more time thinking about the past than the future.</td>
<td>Uses personal reflection to adopt a more positive approach to life.</td>
<td>Reflects on past experience in order to adopt a more positive view of life.</td>
<td>Is mostly forward looking and knows how to learn from personal experience.</td>
<td>Is very forward-looking. Learns well from personal experience.</td>
<td></td>
</tr>
<tr>
<td>Knowing myself</td>
<td>awareness of own qualities and options for change</td>
<td>Has no significant awareness of own qualities and options for change.</td>
<td>Has little awareness of own qualities and options for change.</td>
<td>Has a limited awareness of own qualities and options for change.</td>
<td>Is aware of own qualities and options for change.</td>
<td>Shows a broad awareness of own qualities and options for change.</td>
<td>Is well aware of own qualities and options for change.</td>
<td>Is fully aware of own qualities and options for change.</td>
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</tr>
<tr>
<td>Coping with Feelings</td>
<td>understanding feelings and how they influence thinking and behavior</td>
<td>Always displays continuous outbursts of temper. Reacts negatively to any criticism. Unable to identify and name own feelings</td>
<td>Nearly always displays frequent outbursts of temper, unable to take criticism, unable to name or identify own feelings and the affect on their reactions</td>
<td>Frequently displays outbursts of temper, reacts defensively to criticism. Able to name and describe feelings. Often able to identify and name own feelings, but displays lack of understanding of the impact on their reactions</td>
<td>Displays occasional outbursts of temper or extreme mood swings due to factors beyond their control. Can accept criticism but does not take positive action. Can identify their own feelings but do not always reflect on how it affects their reactions</td>
<td>Occasionally loses their temper with others or in stressful situations. Usually accepts criticism and sometimes takes positive action as a result. Can identify their feelings and sometimes show understanding of how it influences their reactions</td>
<td>Rarely loses their temper with others or in stressful situations. Accepts most criticism and often takes positive action as a result. Can identify their feelings and understand how it influences their reactions and the reactions of others.</td>
<td>Never loses their temper with others or in stressful situations. Accepts criticism and takes positive action as a result. Can identify their feelings and understand how it influences their reactions and the reactions of others.</td>
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<tr>
<td>GC Domain</td>
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<td>Max competence Level 7</td>
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<tr>
<td>Coping with Feelings</td>
<td>appropriate expression in situations and linking feelings to actions</td>
<td>Finds considerable difficulty expressing personal feelings. Is unable to link feelings to actions.</td>
<td>Is largely unable to express personal feelings. Has little ability to link feelings to actions.</td>
<td>Can sometimes express personal feelings. Has a limited ability to link feelings to actions.</td>
<td>Displays some ability to express personal feelings. Can sometimes link feelings to actions.</td>
<td>Is usually able to express personal feelings. Is mostly able to link feelings to actions.</td>
<td>Is good at expressing personal feelings. Is able to link feelings to actions.</td>
<td>Expressed personal feelings with complete ease. Is always able to link feelings to actions.</td>
<td></td>
</tr>
<tr>
<td>Coping with feelings</td>
<td>understand and respond to feelings of others</td>
<td>Shows no awareness or understanding of the feelings of others.</td>
<td>Shows little awareness or understanding of the feelings of others.</td>
<td>Shows some awareness and understanding of the feelings of others but makes little attempt to respond to them.</td>
<td>Usually shows awareness and understanding of the feelings of others and responds to a limited degree.</td>
<td>Usually shows awareness and understanding of the feelings of others and is able to respond in a suitable way.</td>
<td>Almost always shows awareness and understanding of the feelings of others and makes an effort to respond appropriately.</td>
<td>Shows a sensitive awareness and understanding of the feelings of others and always responds sympathetically.</td>
<td></td>
</tr>
<tr>
<td>Holding Beliefs</td>
<td>put forward your opinion, appreciate others and recognise their influence</td>
<td>Never puts forward an opinion. Does not appreciate others or recognise their influence.</td>
<td>Rarely puts forward an opinion. Has a very limited appreciation of others and usually fails to recognise their influence.</td>
<td>Will put forward an opinion but with little confidence. Has some appreciation of others and can sometimes appreciate their influence.</td>
<td>Is willing to put forward an opinion on occasions and makes a real effort to appreciate others and recognise their influence.</td>
<td>Is able to put forward an opinion with some conviction. Shows some appreciation of others and can recognise their influence.</td>
<td>Usually puts forward an opinion confidently. Mostly appreciates others and recognises their influence.</td>
<td>Puts forward an opinion with confidence. Always appreciates others and recognises their influence.</td>
<td></td>
</tr>
<tr>
<td>Holding Beliefs</td>
<td>understand what beliefs are and how they affect attitudes and behavior</td>
<td>Shows no understanding of the beliefs of others. Is insular in outlook. Prefers not to mix with people of different beliefs.</td>
<td>Shows little understanding of the beliefs of others. Has little interest in how beliefs affect attitudes and behaviour.</td>
<td>Makes some effort to understand the beliefs of others. Limited understanding of how they affect attitudes and behaviour.</td>
<td>Shows some understanding of what beliefs are and how they affect attitudes and behaviour. Can be suspicious of people with different beliefs.</td>
<td>Usually shows understanding of the beliefs of others. Realises how they affect attitudes and behaviour.</td>
<td>Almost always shows understanding of the beliefs of others and how they affect attitudes and behaviour.</td>
<td>Shows a deep understanding of the beliefs of others. Is very open-minded and receptive to the beliefs of others.</td>
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<tr>
<td>GC Domain</td>
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<tr>
<td>Handling Relationships</td>
<td>recognise and use skills to make and keep different types of relationship</td>
<td>Is unable to recognise and use skills to make and keep different kinds of relationships.</td>
<td>Has difficulty in recognising and using skills to make and keep different kinds of relationships.</td>
<td>Has a limited ability to recognise and use skills to make and keep different kinds of relationships.</td>
<td>Shows some ability to recognise and use skills to make and keep different kinds of relationships.</td>
<td>Is usually able to recognise and use skills to make and keep different kinds of relationships.</td>
<td>Is almost always able to recognise and use skills to make and keep different kinds of relationships.</td>
<td>Is always able to recognise and use skills to make and keep different kinds of relationships.</td>
<td></td>
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<tr>
<td>Handling Relationships</td>
<td>understand and use approaches to difficult relationships</td>
<td>Has no understanding of how to use approaches to difficult relationships.</td>
<td>Has little understanding of how to use approaches to difficult relationships.</td>
<td>Has a limited ability to recognise proper and improper use of power and control.</td>
<td>Shows some ability to understand how to use approaches to difficult relationships.</td>
<td>Is usually able to understand how to use approaches to difficult relationships.</td>
<td>Is almost always able to understand how to use approaches to difficult relationships.</td>
<td>Is highly skilled at understanding how to use approaches to difficult relationships.</td>
<td></td>
</tr>
<tr>
<td>Handling Relationships</td>
<td>recognise proper and improper use of power and control</td>
<td>Is unable to recognise proper and improper use of power and control.</td>
<td>Has little ability to recognise proper and improper use of power and control.</td>
<td>Has a limited ability to recognise proper and improper use of power and control.</td>
<td>Shows some ability to understand how to use proper and improper use of power and control.</td>
<td>Shows a broad awareness of how to recognise proper and improper use of power and control.</td>
<td>Is almost always able to recognise proper and improper use of power and control.</td>
<td>Is highly skilled at recognising proper and improper use of power and control.</td>
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</tr>
<tr>
<td>Handling Relationships</td>
<td>recognise differences between aggressive and assertive behaviour</td>
<td>Is unable to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is rarely able to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is only occasionally able to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is usually able to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is almost always able to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is always able to recognise the difference between aggressive and assertive behaviour.</td>
<td>Is always able to recognise the difference between aggressive and assertive behaviour.</td>
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<tr>
<td>Handling Relationships</td>
<td>use different approaches to giving and receiving feedback</td>
<td>Has no understanding of how to use different approaches to giving and receiving feedback.</td>
<td>Has only a minimal understanding of how to use different approaches to giving and receiving feedback.</td>
<td>Has a limited understanding of how to use different approaches to giving and receiving feedback.</td>
<td>Shows some understanding of how to use different approaches to giving and receiving feedback.</td>
<td>Is usually able to understand how to use different approaches to giving and receiving feedback.</td>
<td>Is almost always to understand how to use different approaches to giving and receiving feedback.</td>
<td>Is highly skilled at understanding how to use different approaches to giving and receiving feedback.</td>
<td></td>
</tr>
<tr>
<td>Getting and giving support</td>
<td>knowledge and understanding of available support</td>
<td>Has no knowledge or understanding that help or support is available.</td>
<td>Has only minimal knowledge and understanding of the help and support that is available.</td>
<td>Has a limited knowledge and understanding of the help and support that is available.</td>
<td>Is aware of some knowledge and understanding of the help and support that is available.</td>
<td>Shows broad awareness, knowledge and understanding of the range of help and support that is available.</td>
<td>Is well aware of and understands well the range of help and support that is available.</td>
<td>Is fully aware of the full range of help and support that is available.</td>
<td></td>
</tr>
<tr>
<td>GC Domain</td>
<td>Context</td>
<td>Min competence Level 1</td>
<td>Level 2</td>
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<tr>
<td>Getting and giving support</td>
<td>understands how to get support</td>
<td>Never knows where or to whom to turn for appropriate help and support.</td>
<td>Rarely knows where or to whom to turn for appropriate help and support and only rarely follows this through.</td>
<td>Occasionally seems to know where or to whom to turn for appropriate help and support but often fails to follow this up.</td>
<td>Is likely to know where and who to contact for appropriate help and support and quite often follows this up - but not always.</td>
<td>Usually knows where to get help and support and, more often than not, follows things through.</td>
<td>Often turns to the appropriate source of help and support, and mostly follows things through.</td>
<td>Always turns to the appropriate source of help and support, and always follows things through.</td>
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</tr>
<tr>
<td>Getting and giving support</td>
<td>understands how to give support to others</td>
<td>Has a very poor grasp of how to help others and is almost never prepared to give the help that others may need.</td>
<td>Has only a very limited grasp of the needs of others in terms of the support they may require or how to provide it.</td>
<td>Has only a limited grasp of the needs of others in terms of the support they may require or how to provide it.</td>
<td>Has some grasp of the needs of others in terms of the support they may require and an understanding of how to provide it.</td>
<td>Usually appreciates that others may need help at times and is usually willing to provide the support they need.</td>
<td>Almost always appreciates when others may need help and is almost always willing to provide it.</td>
<td>Always appreciates that others may need help at times and is always willing to provide it.</td>
<td></td>
</tr>
<tr>
<td>Exploring risks</td>
<td>personal motivation and recognising own reaction to taking risks</td>
<td>Shows almost no motivation, fails to see opportunities and is unable to recognise when a risk is worth taking or not.</td>
<td>Shows a little self-motivation and is very occasionally aware of the possible repercussions and reactions of risk taking to self.</td>
<td>Shows some self-motivation and is occasionally aware of some of the possible repercussions and reactions of risk taking to self.</td>
<td>Shows reasonable self-motivation and is aware of some of the possible repercussions and reactions of risk taking to self.</td>
<td>Shows self-motivation and is aware of many of the possible repercussions and reactions of risk taking to self.</td>
<td>Is well motivated and is well aware of many of the possible repercussions and reactions of risk taking to self.</td>
<td>Is very well motivated and is fully aware of all the possible repercussions and reactions of risk taking to self.</td>
<td></td>
</tr>
<tr>
<td>Exploring risks</td>
<td>shows awareness of situations that may present risk to self and/or others</td>
<td>Shows no awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Shows minimal awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Occasionally shows some awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Displays some awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Frequently shows awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Nearly always shows awareness of situations and occasions that may present risks to self and/or others.</td>
<td>Always shows awareness of situations and occasions that may present risks to self and/or others.</td>
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<tr>
<td>Exploring risks</td>
<td>understands how to practise safe sex</td>
<td>Displays no awareness, interest or understanding of how to practise safe sex.</td>
<td>Displays little awareness and understanding of how to practise safe sex.</td>
<td>Displays limited awareness and understanding of how to practise safe sex.</td>
<td>Displays an awareness and understanding of how to practise safe sex.</td>
<td>Displays good awareness and a sound understanding of how to practise safe sex.</td>
<td>Displays almost complete awareness and understanding of how to practise safe sex.</td>
<td>Displays complete awareness and understanding of how to practise safe sex.</td>
<td></td>
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<tr>
<td>GC Domain</td>
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<tr>
<td>Exploring risks</td>
<td>recognise risk of drug use and how to reduce it</td>
<td>Shows no recognition of the risks involved in drug use or how to reduce them.</td>
<td>Can only recognise a very small number of risks involved with drug use and very few ways of reducing them.</td>
<td>Is able to recognise a number of the risks of drug use and knows a few ways of reducing them.</td>
<td>Is able to recognise some of the risks of drug use and knows a few ways of reducing them.</td>
<td>Has a sound knowledge and understanding of many of the risks involved in drug use and appropriate ways of reducing them.</td>
<td>Has a very good knowledge and understanding of most of the major risks involved in drug use and all appropriate ways of reducing them.</td>
<td>Shows complete knowledge and understanding of all the major risks involved in drug use and all appropriate ways of reducing them.</td>
<td></td>
</tr>
<tr>
<td>Managing Myself</td>
<td>appreciate resources required to achieve personal goals</td>
<td>Is unable to appreciate resources required to achieve personal goals.</td>
<td>Is largely unable to appreciate resources required to achieve personal goals.</td>
<td>Has only a limited ability to appreciate resources required to achieve personal goals.</td>
<td>Has some appreciation of resources required to achieve personal goals.</td>
<td>Has a sound appreciation of resources required to achieve personal goals.</td>
<td>Has a good appreciation of resources required to achieve personal goals.</td>
<td>If fully appreciative of resources required to achieve personal goals.</td>
<td></td>
</tr>
<tr>
<td>Managing Myself</td>
<td>ability to manage time, money and lifestyle</td>
<td>Shows no ability to manage time, money and lifestyle.</td>
<td>Is largely unable to manage time, money and lifestyle.</td>
<td>Shows only a limited ability to manage time, money and lifestyle.</td>
<td>Shows some ability to manage time, money and lifestyle.</td>
<td>Is usually able to manage time, money and lifestyle.</td>
<td>Is mostly able to manage time, money and lifestyle.</td>
<td>Is fully able to manage time, money and lifestyle.</td>
<td></td>
</tr>
<tr>
<td>Managing Myself</td>
<td>understand importance of diet and exercise in a healthy lifestyle</td>
<td>Shows no understanding of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Shows little understanding of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Shows only a limited understanding of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Shows some understanding of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Shows a sound understanding of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Has a very good understanding and appreciation of the importance of diet and exercise in a healthy lifestyle.</td>
<td>Has a full understanding and appreciation of the importance of diet and exercise in a healthy lifestyle.</td>
<td></td>
</tr>
<tr>
<td>Using Information</td>
<td>understand how to get information</td>
<td>Does not understand how to get information.</td>
<td>Has a little understanding of how to get information.</td>
<td>Occasionally understands how to get information.</td>
<td>Has a reasonable understanding of how to get information.</td>
<td>Has a good understanding of how to get information.</td>
<td>Has a very good understanding of how to get information.</td>
<td>Fully understands how to get information.</td>
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<tr>
<td>Using Information</td>
<td>understand how to supply information</td>
<td>Does not understand how to supply information.</td>
<td>Has a little understanding of how to supply information.</td>
<td>Occasionally understands how to supply information.</td>
<td>Has a reasonable understanding of how to supply information.</td>
<td>Has a good understanding of how to supply information.</td>
<td>Has a very good understanding of how to supply information.</td>
<td>Fully understands how to supply information.</td>
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<tr>
<td>Rights and responsibilities</td>
<td>understand personal rights and responsibilities</td>
<td>Never displays any understanding of personal rights and responsibilities.</td>
<td>Only rarely displays an understanding of personal rights and responsibilities.</td>
<td>Occasionally displays an understanding of personal rights and responsibilities.</td>
<td>Usually displays some understanding of personal rights and responsibilities.</td>
<td>Displays a good understanding of personal rights and responsibilities on most occasions.</td>
<td>Displays a very sound understanding of personal rights and responsibilities on most occasions.</td>
<td>Fully understands his/her personal rights and responsibilities.</td>
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<tr>
<td>GC Domain</td>
<td>Context</td>
<td>Min competence Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Mid competence Level 4</td>
<td>Level 5</td>
<td>Level 6</td>
<td>Max competence Level 7</td>
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<td>Rights and</td>
<td>understand how your attitudes to R&amp;R affect</td>
<td>Has a virtually no</td>
<td>Has a</td>
<td>Has a</td>
<td>Has some</td>
<td>Has a</td>
<td>Has a</td>
<td>Fully understands</td>
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<td>you and others</td>
<td>understanding of</td>
<td>limited</td>
<td>understanding of</td>
<td>sound</td>
<td>very good</td>
<td>max</td>
<td>how personal attitudes towards rights and responsibilities are likely to affect oneself and others.</td>
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<td>oneself and others.</td>
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</tbody>
</table>

Rights and responsibilities

- **Level 2**: Displays no appreciation of personal rights and responsibilities and never knows how to act on them.
- **Level 3**: Displays limited appreciation of personal rights and responsibilities but occasionally knows how to act on them.
- **Level 4**: Displays sound appreciation of personal rights and responsibilities and usually knows how to act on them.
- **Level 5**: Displays very good appreciation of personal rights and responsibilities and often knows how to act on them in most instances.
- **Level 6**: Fully appreciates his/her personal rights and responsibilities and knows exactly how to act on them.