



KeyCoNet 2012 Literature Review: Key competence development in school education in Europe

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KeyCoNet 2012 Literature Review:

Key competence development in school education in Europe

***Gordon, J., Rey, O., Siewiorek, A., Vivitsou, M.,
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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 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.

¹ OECD (2012) Bringing About Curriculum Innovations: Implicit approaches in the OECD AREA, OECD Education Working Papers No. 82

² J. Gordon et al (2009)

"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 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?"⁴

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)

³ Hoskins, B & Deakin Crick R., (2010)

⁴ Ibid

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;
- 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:

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.

Source: *New Skills for New Jobs. Action Now*, EU 2010

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:

Types of approaches:	Examples of countries:
Sets of broad cross-curricular skills or competences that are designed to ensure continuity across the formal learning system from early years education to higher education	None of the EU Member States.
Goals and/or cross curricular competences or skills that cover the whole school system	Austria (social and personal competences)

(primary education to the end of secondary school)	Belgium (NL), Bulgaria, Czech Republic, Estonia, Finland, Ireland (3 sets but similar), Sweden (early years, school and extra-curricular activities), UK: Wales (3 to 19 curriculum), Northern Ireland, Scotland
Cross-curricular competences that address specifically compulsory or basic education only or mainly	France, Belgium (FR), Luxembourg (cross-curricular key competences currently in the process of being implemented do not yet address also the upper secondary cycle).
Sets of key competences or skills or aims that address specific levels of the school systems (primary, lower secondary and upper secondary or basic/primary education and upper secondary)	Cyprus, Germany, Netherlands, Portugal, Slovenia (VET only), Spain, UK (England)
Sets of key competences / cross-curricular key competences that are valid for students and for teachers	None of the EU Members States

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 higher education. They all contain elements of cross-curricular key competences whether or not they are made explicit⁵.

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*

⁵ Gordon *et al.* Op cit.

*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.

⁶ AlphaPlus Consultancy Ltd (2006)

Section 1: Key competences in practice

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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 Fruedenthal and colleagues to address the problem of transfer (Fruedenthal, 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 Fruedenthal and colleagues to address the problem of transfer in mathematics education (Fruedenthal, 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 as 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 & Usluel; 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 1: REAL SCIENCE FOR DEVELOPING COMPETENCE and CIVIC ENGAGEMENT: Examples of new environments for involving students in real science research	
Zooniverse	An online collection of some of the world's biggest citizen science initiatives, created by the Citizen Science Alliance in cooperation with many universities and other organizations. Includes extensive information for teachers, and opportunities for laboratory as well as observational science.
FoldIt	Supported by the University of Washington, this online game helps scientists solve problems relating to protein folding, linked ultimately to treatments for AIDS, Cancer and Alzheimer's.
CamClicker	Teaches animal observations skills while students work on real tasks to help with data collection, one of the many collaborative programs from the Cornell University ornithology labs
Evolution MegaLab	A citizen science project hosted by the Open University monitoring evolution of organisms in Europe, which resources for teachers
BeelD	A project that monitored the population of pollinators in the British Isles using Flickr and Facebook
Planet Hunters	Using data from the NASA Kepler mission to, among other things, discover new planets. Part of the Zooniverse

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 Flickr 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 2.: CREATIVE and CRITICAL TECHNOLOGY COMPETENCE: Examples of tools and communities for learning programming and creating media online	
Hackasaurus.org	A tool for remixing and examining the underlying design of websites aimed at teenagers
School of Webcraft	From Peer to Peer University at p2pu.org, web-based, free peer learning on a variety of programming languages
Scratch.mit.edu	A powerful visual programming tool, also used for creating art and games with a related community for educators, ScratchEd
Gamestarmechanic.com	A website for making and designing games
Processing.org	Supports programming in the visual arts

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 ‘infosshops’ 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

- Allan, J. (2011). Responsibly Competent: teaching, ethics and diversity. *Policy Futures in Education*, 9(1), pp. 130-137.
- Anderson, J. (2010). ICT Transforming Education: A Regional Guide. Bangkok: UNESCO Bangkok.
- Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational Researcher*, 41(1), 16–25.
- Barab, S.A., Hay, K.E., Barnett, M., & Squire, K. (2001). Constructing virtual worlds: Tracing the historical development of learner practices. *Cognition and Instruction*, 19(1), 47-94.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1–26).
- Barendregt, Emanuelsson & Lindström (2009). The Number Practise Game: Visual recognition of numerosity and children's early development in mathematics. SAGSET Conference.
- Bednar, A.K., Cunningham, D., Duffy, T.M., & Perry, J.D. (1992). Theory into practice: How do we link? In Duffy, T.M., & Jonassen, D.H. (Eds.), *Constructivism and the technology of instruction: A conversation*, (pp. 17-34). Hillsdale, NJ: Lawrence Erlbaum.
- Bereiter, C. (2002). *Education and mind in the knowledge age*. Hillsdale, NJ: Erlbaum.
- Bernstein, B. (1996). *Pedagogy, Symbolic Control and Identity. Theory, Research, Critique*. London: Taylor & Francis.
- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Ricci-Miller, M., & Rumble, m. (2012). Defining 21st Century Skills. In P. Griffin, B. McGaw & E. Care (Eds.) *Assessment and teaching of 21st Century skills*, pp. 17-66). NY: Elsevier.
- Boud, D. & Feletti, G. (1991). The challenge of problem-based learning. London: Kogan Page.
- Boyd, S. & Watson, V. (2006). Shifting the frame: Exploring the integration of Key Competencies at 6 Normal Schools. New Zealand Council for Educational Research. Wellington, New Zealand: NZCER. Available: <http://nzcurriculum.tki.org.nz> Retrieved 20.07.2012.
- Boaler, J. (2002b). Learning from teaching: Exploring the relationship between reform curriculum and equity. *Journal for Research in Mathematics Education*, 33(4), 239–258.

- Bransford, J. D. & Schwartz, D. L. (1999) Rethinking Transfer: A Simple Proposal with Multiple Implications. *Review of Research in Education*, 24, pp. 61-100.
- Buchanan, M. (2002). *Nexus: small worlds and the groundbreaking science of networks*. NY: W.W. Norton. Cambridge, England: Cambridge University Press.
- Buckingham, D., & Scanlon, M. (2002). *Education, edutainment, and learning in the home*. Cambridge: Open University Press.
- Cavus, N., & Ibrahim, D. (2009). M-learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology*, 40(1), 78-91.
- Cejka, E., Rogers, C., & Portsmore, M. (2006) Kindergarten Robotics: Using Robotics to Motivate Math, Science, and Engineering Literacy in Elementary School. *International Journal of Engineering Education*, 22(4), 711-722.
- Clarke, J., & Dede, C. (2009). Design for scalability: A case study of the River City curriculum. *Journal of Science Education and Technology*, 18, 353–365.
- Clements, D. H., & Sarama, J. (2007). Effects of a preschool mathematics curriculum: Summative research on the Building Blocks project. *Journal for Research in Mathematics Education*, 38, 136-163.
- Dabrowski, M. & Wisniewski, J. (2011). Translating Key Competences into the School Curriculum: lessons from the Polish experience. *European Journal of Education*, 46(3), pp. 323-334.
- Deryakulu D., Buyukozturk S., Karadeniz S., & Olkun S., (2009). Satisfying and Frustrating Aspects of ICT Teaching: A Comparison Based on Self-Efficacy. *International Journal of Human and Social Sciences* 4 (9), 664-667.
- de Corte E. (2010) Historical Developments in the Understanding of Learning. The Nature of Learning: using research to inspire practice (Paris, OECD) pp. 35–68.
- de Jong, T., & van Joolingen, W.R. (1998). Scientific discovery learning with computer simulations of conceptual domains. *Review of Educational Research*, 68, 179-201.
- Denis, B & Hubert, S. (2001). Collaborative learning in an educational robotics environment. *Computers in Human behaviour*, 17, 465-480.
- Dewey, J. (1916). *Democracy and Education: an introduction to the philosophy of education*. New York: The Macmillan Company.
- Dewey, J. (1938). *Experience and Education*. NY: Collier Books.
- Dillenbourg, P., Baker, M., Blaye, A., & O'Malley, C. (1995). The evolution of research on collaborative learning. In P. Reimann, & H. Spada, *Learning in humans and machines. Towards an interdisciplinary learning science* (pp. 189–211). London: Pergamon.

- Dillenbourg, P. (2000). Virtual learning environments. Learning in the New Millenium: EUN Conference 2000, Brussels, March, 20–21.
- Duckworth, A. L., & Kern, M. L. (2011). A meta-analysis of the convergent validity of self-control measures. *Journal of Research in Personality*, 45, 259–268.
- ECBO (2008). Skills, competence development and innovative pedagogy. Retrieved 20.07.2012, http://www.ecbo.nl/ECBO/ReferNet/docs/080604_Skills_EN.pdf
- Egenfeldt-Nielsen, S. (2004). Practical barriers in using educational computer games. *On the Horizon special issue*.
- Engel, C. (1997). Not just a method but a way of learning. In D. Boud & G. Feletti (Eds), *The challenge of problem-based learning* (pp. 22–33). London: Kogan.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284.
- Fischer, D. A., Schwamb, M. E., Schawinski, K., Lintott, C., Brewer, J., Giguere, M., Lynn, S., Parrish, M., Sartori, T., Simpson, R., Smith, A., Spronck, J., Batalha, N., Rowe, J., Jenkins, J., Bryson, S., Prsa, A., Tenenbaum, P., Crepp, J., Morton, T., Howard, A., Belev, M., Kaplan, Z., vanNispen, N., Sharzer, C., DeFouw, J., Hajduk, A., Neal, J. P., Nemec, A., Schuepbach, N., & Zimmermann, V. (2012). Planet hunters: the first two planet candidates identified by the public using the Kepler public archive data. *Monthly Notices of the Royal Astronomical Society*, 419(4), 2900.
- Fisher, L. & Evans, M. & Esch, E. (2004). Computer-Mediated Communication: promoting learner autonomy and intercultural understanding at secondary level. *Language Learning Journal* 30(1), 50–58.
- Fruedenthal, H. (1968). Why to teach mathematics so as to be useful? *Educational Studies in Mathematics* 1(1-2), 3–8.
- Garris, R., Ahlers, R., & Driskell, J.E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*, 33(4), 441–467.
- Goode, J. & Margolis, J. (2011). Exploring Computer Science: A Case Study of School Reform. *ACM Transactions on Computing Education*, 11(2), 12:1–12:16
- Gordon J., Halasz G., Krawczyk M., Leney T., Michel A., Pepper D., Putkiewicz E., Wiśniewski J. (2009) *Key competences in Europe: opening doors for life-long learners across the school curriculum and teacher education*. CASE-Center for Social and Economic Research.
- Gredler, M.E. (1996). Educational games and simulations: a technology in search of a research paradigm. In: D. H. Jonassen (Eds.) *Handbook of research for educational communications and technology*, (pp. 521-540). New York: Simon & Schuster Macmillan.
- Haapasalo, H., & Hyvönen, J. (2001). Simulating business and operations management - a

learning environment for the electronics industry. *International Journal of Production Economics*, 73, 261-272.

- Hansen, F. A., Kortbek, K. J., & Grønbæk, K. (2012). Mobile urban drama: Interactive storytelling in real world environments. *New Review of Hypermedia and Multimedia*, 18(1-2), 63-89. doi:10.1080/13614568.2012.617842.
- Haßler, B., Hennessy, S. Lord, T., Cross, A., Jackson, A. & Simpson, M. (2011) "Appropriate New Technologies to Support Interactive Teaching in Zambian schools (ANTSIT)". A joint report from Aptivate and the Centre for Commonwealth Education (University of Cambridge).
- Haßler, B. & Jackson, A. M. (2010) "[Bridging the Bandwidth Gap: Open Educational Resources and the Digital Divide](#)", *IEEE Transactions On Learning Technologies, Special Issue On Open Educational Resources* (edited by Erik Duval and David Wiley), 3(2), pp. 110-115.
- Hohenwarter, M. (2006) *GeoGebra – didaktische Materialien und Anwendungen für den Mathematikunterricht*. Doctoral thesis accepted at Paris-Lodron University, Salzburg.
- Hutchins, E. (2000, May 18). *Distributed Cognition*. Retrieved April 23, 2012, from <http://files.meetup.com/410989/DistributedCognition.pdf>
- Jaakkola, T. (2012). Thinking Outside the Box: Enhancing Science Teaching by Combining (Instead of Contrasting) Laboratory and Simulation Activities. *Annales Universitatis Turkuensis*.
- Jared, L. (2010). Characterising Participation within a Communal Virtual World: A Second Learning Place. Research Presentation to the Science, Technology and Mathematics Education Group Seminar Series, University of Cambridge, 26 April 2010.
- Jenkins, H., Clinton, K., Purushotma, R., Robison, A. J., & Weigel, M. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. Tech. rep., The John D. and Catherine T. MacArthur Foundation.
- Johnson, D. W., Johnson, R.T., & Smith, K.A. (1991). *Active learning: Cooperation in the college classroom*. Edina, MN: Interaction Book Company.
- Jonassen, D., Howland, J., Marra, R. & Crismond, D. (2008). Meaningful Learning with Technology. (3rd edn). Upper Saddle River, New Jersey: Pearson Education.
- Jordan, R. C., Brooks, W. R., Howe, D. V., & Ehrenfeld, J. G. (2012). Evaluating the performance of volunteers in mapping invasive plants in public conservation lands. *Environmental Management*, 49(2), 425.
- Kafai, Y. B., & Peppler, K. A. (2011). Youth, technology, and diy : Developing participatory competencies in creative media production. *Review of Research in Education*, 35, 89–119.
- Kebritchi, M., & Hirumi A. (2008). Examining the pedagogical foundations of modern educational computer games. *Computers & Education*, 51, 1729-1743.

- Kebritchi, M., Hirumi, A., & Bai, H. Y. (2010). The effects of modern mathematics computer games on mathematics achievement and class motivation. *Computers & Education*, 55(2), 427–443.
- Kennedy, C., & Levy, M. (2008). L'italiano al telefonino: Using SMS to support beginners' language learning. *European Association for Computer Assisted Language Learning*, 20(3), 315-330.
- Keskitalo, T., Pyykkö, E., & Ruokamo, H. (2011). Exploring the meaningful learning of students in Second Life. *Educational Technology and Society*, 14(1), 16–26.
- Khatib, F., Cooper, S., Tyka, M. D., Xu, K., Makedon, I., Popovic, Z., & Baker, D. (2011). Algorithm discovery by protein folding game players. *Proceedings of the national academy of sciences of the United States of America*, 108(47), 18949.
- Kolb D.A. (1984). *Experiential Learning experience as a source of learning and development*. New Jersey: Prentice Hall.
- Kriz, W.C. (2010). A Systemic-Constructivist Approach to the Facilitation and Debriefing of Simulations and Games. *Simulation & Gaming*, 41(5), 663-680.
- Kuutti, K. (1996). Activity theory as a potential framework for human computer language learning. *European Association for Computer Assisted Language Learning*, 20(3), 315-330.
- Lan, Y.-J., Sung, Y.-T., Tan, N.c., Lin, C.-P., & Chang, K.-E. (2010). Mobile-Device-Supported Problem-Based Computational Estimation Instruction for Elementary School Students. *Educational Technology & Society*, 13 (3), 55–69.
- Lave, J. & Wenger, E. (1991). *Situated Learning: legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lawn, M. & Grek, S. (2012). *Europeanizing Education - governing a new policy space*. Oxford: UK, Symposium Books.
- Lepper, M. R., & Henderlong, J. (2000). Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In C. Sansone & J. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 257-307). San Diego: Academic Press.
- Lewis, S., Pea, R., & Rosen, J. (2010). Beyond participation to co-creation of meaning: mobile social media in generative learning communities. *Social Science Information*, 49(3), 1–19.
- Liu, E. Z. F. and Chun, H. I. and Chang, C. S. (2010) Student satisfaction and self-efficacy in a cooperative robotics course. *Social Behavior and Personality*, 38(8), 1135-1146.
- Livingstone, S. (2011). Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, 38(1), 9—24.

- Lombardo, V., & Damiano, R. (2012). Storytelling on mobile devices for cultural heritage. *New Review of Hypermedia and Multimedia*, 18(1-2), 11-35. doi:10.1080/13614568.2012.617846.
- Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning*, 24, 515-525.
- MacManus, R. (2009). 40% of People 'Friend' Brands on Facebook, ReadWriteWeb, 10 November.
http://www.readwriteweb.com/archives/survey_brands_making_big_impact_on_facebook_twitter.php
- Malmivuori, M.-L. (2006). Affect and self-regulation. *Educational Studies in Mathematics*, 63(2), 149–164.
- Mama, M., & Hennessy, S. (2010). Level of technology integration by primary teachers in cyprus and student engagement. *Technology, Pedagogy and Education*, 19(2), 269–275.
- Mayo, K. & Newcomb, P. (2008). How the Web was Won, Vanity Fair, July.
<http://www.vanityfair.com/culture/features/2008/07/internet200807>
- Mazman S. G., & Usluel, Y. K. (2010). Modeling educational usage of Facebook. *Computers & Education*, 55(2), 444–453.
- McFarlane, A., Sparrowhawk, A., & Heald, Y. (2002). *Report on the educational use of games. Teachers Evaluating Educational Multimedia*. Cambridge.
- Moreno, R., & Durán, R. (2004). Do multiple representations need explanations? The role of verbal guidance and individual differences in multimedia mathematics learning. *Journal of Educational Psychology*, 96, 492–503.
- Multisilta, J. (2012). Designing learning ecosystems for mobile social media. In A. D. Olofsson, & J. O. Lindberg (Eds.) *Informed Design of Educational Technologies in Higher Education*, chap. 14, (pp. 270–291). IGI Global.
- Mylläri, J., Åhlberg, M., & Dillon, P. (2010). The dynamics of an online knowledge building community: A 5-year longitudinal study. *British Journal of Educational Technology*, 41(3), 365—387.
- Niemi, H., Kynäslähti, H., & Vahtivuori-Hänninen, S. (2012). Towards ICT everyday life in Finnish schools: seeking conditions for good practices. *Learning, Media and Technology*, DOI:10.1080/17439884.2011.651473.
- Niemi, H., Nevgi, A., & Virtanen, P. (2003). Towards self-regulation in web-based learning. *Journal of Educational Media*, 28(1), 49–71.
- OECD—Organization for Economic and Co-operative Development (2005). *Definition and Selection of Key Competencies: Executive Summary (DeSeCo)*.
<http://www.oecd.org/pisa/35070367.pdf>.

- Pegrum, M. (2010). I Link, Therefore I Am': network literacy as a core digital literacy. *E-Learning and Digital Media* 7(4), pp. 346-354.
- Pepper, D. (2011). Assessing Key Competences across the Curriculum — and Europe. *European Journal of Education*, 46(3), pp. 335-354.
- Pirrie, A. (2004). Analysis of the Mapping of Key Competency Frameworks. Implementation of 'Education & Training 2010' Work Programme, Group B 'Key Competences', European Commission. Available <http://ec.europa.eu/education/policies/2010/doc/basicnational2004.pdf>. Retrieved 27.07.2012.
- Purcell, K., Rainie, L., Mitchell, A., Rosenstiel, T. & Olmstead, K. (2010). Understanding the Participatory News Consumer: how internet and cell phone users have turned news into a social experience. 1 March. Washington: Pew Internet & American Life Project. <http://www.pewinternet.org/Reports/2010/Online-News.aspx>
- Ravitz, J., Hixson, N., English, M., & Mergendoller, J. (2012). *Using project based learning to teach 21st century skills: Findings from a statewide initiative*. Paper presented at Annual Meetings of the American Educational Research Association. Vancouver, BC. April 16, 2012.
- Repenning, A. (2012). Programming goes back to school - Broadening participation by integrating game design into middle school curricula. *Communications of the ACM*, 55(5), pp. 38-40.
- Rieber, L. P. (2000). *Computer, Graphic and Learning*. The University of Georgia, GA.
- Saari, J. (2012). First Robotics Finland? An example of a successful public private partnership to promote science, technology and engineering. Peer reviewed conference presentation at OECD Center for Effective Learning Environments Conference 2012, 24 February 2012, Kaarina & Rauma, Finland.
- Sandoval, W., & Bell, P. (2004). Design-based research methods for studying learning in context: Introduction. *Educational Psychologist*, 39(4), 199–201.
- Sasaki, D. (2009). Cloud Intelligence, el-oso.net. <http://el-oso.net/blog/archives/2009/06/12/cloud-intelligence/>
- Sawyer, R. K., & Greeno, J. (2009). Situativity and learning. In P. Robbins & M. Aydede (Eds.), *The Cambridge handbook of situated cognition* (pp. 347–367). New York, NY: Cambridge University Press.
- Schank, R. C. (2005). *Lessons in learning, eLearning, and training: Perspectives and guidance for the enlightened trainer*. San Francisco: Pfeiffer.
- Schwartz, D. L., & Moore, J. L. (1998). On the role of mathematics in explaining the material world: Mental models for proportional reasoning. *Cognitive Science*, 22(4), pp. 471—516.

- Sharples, M., Taylor, J., & Vavoula, G. (2005, October). *Towards a theory of mobile learning*. Paper presented at 4th World Conference on mLearning, Cape Town, South Africa. Retrieved from <http://www.mlearn.org.za/CD/papers/Sharples%20Theory%20of%20Mobile.pdf>
- Sharples, M., Taylor, J., & Vavoula, G. (2007). A theory of learning for the mobile age. In R. Andrews & C. Haythornthwaite (Eds.), *The Sage handbook of e-learning research* (pp. 221-247). London: Sage Publications.
- Silvertown, J., Cook, L., Cameron, R., Dodd, M., McConway, K., Worthington, J., Skelton, P., Anton, C., Bossdorf, O., Baur, B., Schilthuizen, M., Fontaine, B., Satttmann, H., Bertotrelle, G., Correia, M., Oliveira, C., Pokryszko, B., Ozgo, M., Stalazas, A., Gill, E., Rammul, U., Solymos, P., Feher, Z., & Juan, X. (2011). Citizen Science Reveals Unexpected Continental-Scale Evolutionary Change in a Model Organism. *PLoS ONE* 6(4): e18927. doi:10.1371/journal.pone.0018927.
- Skolverket (2003). School choice and its effects in Sweden. Report 230. Stockholm: Skolverket: Swedish National Agency for Education.
- Smith, R. E., Chen, H. L., Johnson, M., O'Brien, A. J., & Huang-DeVoss, C. (2012). Priorities in the classroom: Pedagogies for high performance learning spaces. In A. D. Olofsson, & J. O. Lindberg (Eds.) *Informed Design of Educational Technologies in Higher Education*, (pp. 474–495). Hershey, PA: IGI Global.
- Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 449–460). New York: Springer.
- Stafford, R., Hard, A. G., Collins, L., Kirkhope, Claire L., Williams, R. L., Rees, S. G., Lloyd, J. R. & Goodenough, A. E. (2010) EU Social Science: The Role of Internet Social Networks in the Collection of Bee Biodiversity Data. *PLoS ONE* 5(12): e14381.
- Stahl, G. (2003). Meaning and interpretation in collaboration. Design for change in networked Learning environments. Available at: <http://www.cis.drexel.edu/faculty/gerry/publications/conferences/2003/cscl/cscl2003.doc>
- Suchman, L. (1987). *Plans and situated actions: The Problem of Human-Machine Communication*. NY: Cambridge University Press.
- Suomala, J. (1999). *Students' problem solving in the Lego/Logo learning environment*. PhD thesis, University of Jyväskylä.
- Tågerud, Y. (2010). Pedagogical competence – experiences from an institution in the process of being merged. In Ryegård Å., Apelgren K. and Olsson T. (Eds.), Eriksson, R. (Trans.) *A Swedish perspective on Pedagogical Competence*. Uppsala: Uppsala University, Division for Development of Teaching and Learning.
- Terwel, J. , Herf, P.G.P., Mertens, E.H.M., Perrenet, J. Chr. (1994). Co-operative learning and adaptive instruction in a mathematics curriculum. *Journal of Curriculum Studies*, 26 (2), 217—233.

- Thorndike, E. L., & Woodworth, R. S. (1901). The influence of improvement in one mental function upon the efficacy of other functions. *Psychological Review*, 8, 247-261.
- Tiana, A., Moya, J. & Luengo, F. (2011). Implementing Key Competences in Basic A Education: reflections on curriculum design and development in Spain. *European Journal of Education*, 46(3), pp. 307-322.
- Vos, P. (2010). The Dutch Maths Curriculum: 25 years of Modelling. *Modelling Students' Mathematic Modeling Competencies*. Part 13, pp. 611-620.
- Vygotsky, L. (1978). *Mind in Society: the development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wagner, T. (2010). *The Global Achievement Gap*. NY: Basoc Books.
- Wagner, T. (2012). *Creating innovators: the making of young people who will change the world*. NY: Scribner.
- Wang, Q. Y., Woo, H. L., Quek, C. L., Yang, Y. Q., & Liu, M. (2012). Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology*, 43(3), 428–438.
- Weinert, F. E. (2001). Concept of Competence: a conceptual clarification, in D.S. Rychen & L.H. Salganik (Eds). *Defining and Selecting Key Competencies*. Seattle: Hogrefe & Huber.
- Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.
- Wertsch, J.V. (1991). *Voices of the mind: A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.
- Wertsch, J.V. (1998). *Mind as action*. New York: Oxford University Press.
- Winn, W. (2002). Current trends in educational technology research: The study of learning environments. *Educational Psychology Review*, 14, 331-351.
- Veermans, K., de Jong, T., & van Joolingen, W.R. (2006). Using heuristics to facilitate discovery learning in a simulation learning environment for a physics domain. *International Journal of Science Education*, 21, 341-361.
- Zahn, C., Pea, R., Hesse, F. W., & Rosen, J. (2010). Comparing simple and advanced video tools as supports for complex collaborative design processes. *Journal of the Learning Sciences*, 19, 403–440.

Section 2: Key competences in policy

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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.⁷ 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.

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

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

⁷ Gordon *et al*. Op cit. and Leney *et al* (2008)

learning outcomes for professional and private life in a perspective of lifelong and life-wide learning. Emphasis is placed on the 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 (*valdkonnapädevus*) 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.

Hungary: the strategy of the ministry contained a list of specific key competence to be developed in primary school:

- the capability of using various learning techniques⁸
- 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) “

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

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.

⁸ This notion is considered to be close to “learning to learn”.

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.

The Irish Key Skills Frameworks:

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

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 and 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:

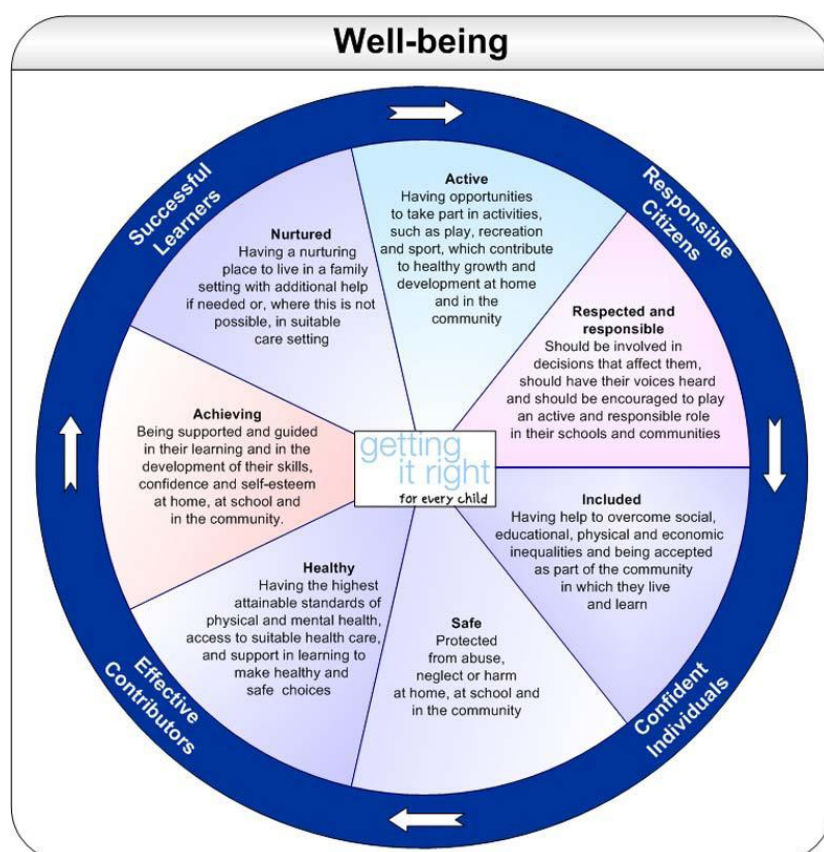
- The need for students to understand about how one learns best, that is one's individual learning patterns and preferences, is not well developed.
- There is little reference to the need to develop a sense of self and of understanding of self. The main references are the interpersonal skills/competences 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>



successful learners	confident individuals	responsible citizens	effective contributors
attributes <ul style="list-style-type: none"> • enthusiasm and motivation for learning • determination to reach high standards of achievement • openness to new thinking and ideas capacities <ul style="list-style-type: none"> • use literacy, communication and numeracy skills • use technology for learning • think creatively and independently • learn independently and as part of a group • make reasoned evaluations • link and apply different kinds of learning in new situations. 	attributes <ul style="list-style-type: none"> • self-respect • a sense of physical, mental and emotional well-being • secure values and beliefs • ambition capacities <ul style="list-style-type: none"> • relate to others and manage themselves • pursue a healthy and active lifestyle • be self-aware • develop and communicate their own beliefs and view of the world • live as independently as they can • assess risk and make informed decisions • achieve success in different areas of activity. 	attributes <ul style="list-style-type: none"> • respect for others • commitment to participate responsibly in political, economic, social and cultural life capacities <ul style="list-style-type: none"> • develop knowledge and understanding of the world and Scotland's place in it • understand different beliefs and cultures • make informed choices and decisions • evaluate environmental, scientific and technological issues • develop informed, ethical views of complex issues. 	attributes <ul style="list-style-type: none"> • an enterprising attitude • resilience • self-reliance capacities <ul style="list-style-type: none"> • communicate in different ways and in different settings • work in partnership and in teams • take the initiative and lead • apply critical thinking in new contexts • create and develop • solve problems

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

A. Tiana, J. Moya & F. Luengo, "Implementing key competences in basic education: reflections on curriculum design and development in Spain" (EJE, 3/2011)

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).

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

M. Dabrowski & J. Wisniewski, "Translating key competences into the school curriculum: lessons from the Polish experience" (EJE, 3/2011)

This article which focuses on general education in primary and secondary schools is set 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. It was written by authors who 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 team

work, 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

C. Lelièvre, "La difficile (et chaotique) histoire de la mise en place du socle", **Administration et Education** (2/2012).

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.

Bertelsmann Stiftung: Selbsevaluation in Schulen

<http://www.bertelsmann-stiftung.de/cps/rde/xchg/SID-A71F7D30-C0E7B958/bst/hs.xsl/5278.htm>

The second example in this section is from a self-evaluation tool built by the Bertelsmann Foundation for use by schools. The Bertelsmann Foundation has developed SEIS (*Selbsevaluation in Schulen*), which is a self-evaluation instrument for schools that can be administered through a computer or in a pen and paper format. It was originally developed in the mid-nineties 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. The types of outcomes expressed as skills that are contained in the student survey 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.

Personal well-being	<ul style="list-style-type: none"> - setting personal goals for improvement - explain ideas well in writing and orally
Relationships	<p>Relationship with teachers</p> <ul style="list-style-type: none"> - support from teachers - encouragement - promoting - pay attention <p>Feeling that the class has taught to:</p> <ul style="list-style-type: none"> - work well with others, respecting & paying attention;

	participating in group work; solving tasks, confidence, do group-work - get along with others
Impact of environment: school, community or home (In this case school)	Feeling that the class has taught to: - to recognise strengths & weaknesses - learn from mistakes - solve a task - recognise what I am good at & what needs improving 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 Satisfaction with going to school: - overall satisfaction - feeling that school promotes talent - feeling that school treats students fairly - satisfaction with teaching & learning methods - satisfaction with what needs to be done to achieve academically - pupils assess lessons - school recognised good effort & achievement - school provides healthy and nutritious meal plans - active promotion of health is important at school
Activities and agency	School has helped:

	<ul style="list-style-type: none"> - act as leaders in a group - solve disagreements <p>Participation with extra-curricular activities at school</p> <ul style="list-style-type: none"> - Use of school campus beyond class time <p>Student opinion is considered on decision that affect students</p> <ul style="list-style-type: none"> - Feeling safe in school - school is welcoming and friendly - existence of counsellors & support services for parents - student council can influence decisions regarding school life & work - students are involved in planning of school life <p>Support:</p> <ul style="list-style-type: none"> - Teachers effectively deal with bullying and bad treatment by other students; inappropriate behaviour - students with personal problems receive help & support - someone to turn to in school for assistance
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Source: Gordon et al, 2009-2010

Learning for Well-being

<http://www.eiesp.org/site/pages/view/80-learning-for-well-being-conference-february.html>

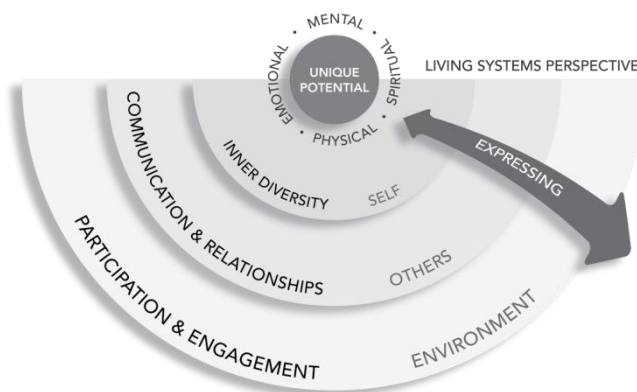
In 2009, convened by the Universal Education Foundation, a group of foundations established the 'Learning for Well-being' Consortium of Foundations in Europe⁹ to articulate a new vision of Learning for Well-being. The Consortium participates in Learning for Well-being, which is a global initiative of partners that work together *to develop and support the process of how each child and young person learns to realize their unique potential in harmony with others and the environment*. In this way, it contributes to an inclusive society where more and more children and youth learn how to live joyful, meaningful and healthy lives. During 2010 to early 2012 the Consortium developed and launched, ***Learning for Well-being; a Policy Priority for Children and Youth in Europe: A Process for Change***. In the wake of the financial crisis, new stimulus has been given to the challenge of formulating policies that take us beyond the economic imperatives, and aim to increase Well-being for All. The policy glossary represents a cross-sector perspective developed through a consultative process involving a broad range of stakeholders. To ensure integration of state-of-the-art research and policy, there were consultations with OECD, the Council of Europe, the EU and many experts, foundations,

⁹ The current members are: Bertelsmann Stiftung, Evens Foundation, Fondation Roi Baudouin, Freudenberg Stiftung, Guerrand-Hermès Foundation for Peace, Fondation M, Robert Bosch Stiftung and Universal Education Foundation.

youth organizations, government and non-government organizations across education, health, social affairs, children's rights, media, ICT, family, etc. Very briefly stated, the policy glossary identified five priority principles as foundational for a Learning for Well-being approach:

1. Need for all of society to contribute
2. Sectors working together in integrated, proactive, multi-dimensional approaches
3. Children and Youth are part of the policy process
4. Learning for Well-being: A Process Approach
 - Take the child's perspective
 - Encourage expression of each child's unique potential
 - Focus on strengths and inner differences
 - Emphasize the nature and quality of relationships
 - Be holistic
5. Measuring what matters

Learning for Well-being has developed, including through working with research partners, a conceptual framework and a first set of core capacities (as well as a pilot Voice of Children survey):



Core Capacities:

Unfolding Unique Potential	<ul style="list-style-type: none"> • Awareness of one's life purpose • Awareness of sacredness of life – mindfulness towards all beings • Appreciation and gratitude for one's self • Autonomy (to know oneself as independent & unique) • Awareness of one's particular gifts & contributions • Being at peace with one's way of being
Appreciating/Understanding Inner Diversity	<ul style="list-style-type: none"> • Being appreciated and respected • Awareness of one's learning processes/needs • Knowing about one's inner world • Understanding the uniqueness of others
Relationships/Communication	<ul style="list-style-type: none"> • Self-esteem/self-worth • •Knowing one's communication needs/processes • •Knowing one's feelings/beliefs • •Empathy • •Curiosity • •Playfulness
Participation/Engagement	<ul style="list-style-type: none"> • Capacity to choose (sense of agency) • Self-motivation • Capacity to plan/organize • Connecting to inner resources (creativity, intuition, somatic experiences) • Knowing how to engage/disengage using your own limits and boundaries • Knowing one's responsibility/duty • Awareness of one's contribution/role in the current circumstances
Systems Perspective/Self-organization	<ul style="list-style-type: none"> • Understanding interdependence & interconnectedness • Knowing oneself as a whole system: knowledge of mind-body connection • Sensory awareness (inputs of all kinds) • Seeing/recognizing patterns – macro/micro • Universal sense of belonging and connectedness
Others	<ul style="list-style-type: none"> • Consciousness (being awake/mindful) • Knowing how to care for one's physicality • Relaxation (all levels) • Coping with stress, difficulties, and trauma • Emotional self-regulation

Adapted from Lippman & O'Toole, 2011

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 or 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 disadvantage issues by emphasising the conditions under which children can or cannot learn - if you are hungry, afraid, in pain, etc. your learning will be less effective.

However, the research literature on disadvantage does not address directly the issue of competence development. The articles taken from the INCLUDE-ED project, focus strongly on the participation and engagement of pupils and their families/communities in developing the educational project of the school and learning communities.

Three of the articles in this section were based on the work of the INCLUD-ED project funded by FP6 from 2006-2011, *Strategies for inclusion and social cohesion from education in Europe*. The project website is a rich source of data for this theme and for the role of local communities: (<http://creaub.info/included/results/> - see Project 2 on effective educational practices).

P. Melgar, R. Larena, L. Ruiz & S. Rammel, "How to Move from Power-based to Dialogic Relations? Lessons from Roma Women" (EJE, 2/2011).

The emphasis in this article is 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. Thus in the case of the INCLUDE-ED project sites (parents <http://creaub.info/included>) proposals put forward by the professionals did not take priority over those of the Roma parents. Instead 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 of participate in the decision-making spaces. In parallel to co-creating strategies for Roma children to succeed in developing their capacities in school, the authors underline the importance of implementing effective strategies for Roma women to enter the labour market in appropriate areas that use their skills and the effect this has overtime on reducing poverty. 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 article the emphasis is not so much on specific key competences as such 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.

INCLUDE-ED focused on developing 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. The outcomes of the project funded under FP6 focus on the improvements experienced in schools after five years of implementation of the SEAs. School widely reduced early school leaving, improved pupil's academic results and eradicated conflicts fostering social cohesion in the community. The project team observed that successful actions do not require additional resources but rather a reorganization 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.

R. Valls & M. Padrós, "Using Dialogic Research to Overcome Poverty: from principles to action" (EJE, 2/2011)

This article which draws on the experience and data of the INCLUDE-ED programme, focuses on using the Critical Communicative Methodology in action research to contribute to alleviating effects of poverty and disadvantage taking account of the fact that 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. The article argues that egalitarian dialogue, successful actions' approach and informing effective policies facilitate the engagement between researchers, end-users, and all the other involved stakeholders and therefore the move from principles to action in the process of overcoming poverty in Europe. Education is seen to be a major player in that process. The authors argue that for education to be an effective tool in fighting poverty, one 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.

An example of the dialogic process in Spain is examined especially as it led the stakeholders and community members to ask the researchers to extend the same procedure to transform the entire neighbourhood and to an agreement between the City Council of Albacete and the Research Centre on Theories and Practices that Overcome Inequalities (CREA) that coordinates INCLUD-ED to ground an URBAN programme³ (2007–2013). This time the transformation was planned and undertaken 'with' the neighbours in the same critical communicative procedure that had been previously applied with success in the school.

J. Diez, S. Gatt & S. Racionero, "Placing Immigrant and Minority Family and Community Members at the Scholl's centre: the role of community participation" (EJE, 2/2011)

This article takes as its starting point that 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. However, families from such backgrounds often participate in their schools only peripherally because the schools take a 'tourist' approach, call parents to inform them about school projects and teachers' programmes, or consult them about decisions to be made by professionals, rather than engaging them in their children's education. In contrast, the INCLUD-ED project studied schools across Europe whose students are culturally diverse and from low SES backgrounds; here, the communities are deeply involved in the schools and the students do well academically. This article focused on three strategies used by these successful schools to engage immigrant and minority community members in more active,

decisive, and intellectual ways and thus have greater impact on the school and the students' learning:

1. Overcoming Intentions, Ensuring Participation: The article reports that staff in schools where a real effort was made to ensure the participation of minority and immigrant families in the governance structures had a positive impact on the school life, helping them reach out to more families who could better understand how the school worked, thus improving home-school coordination; it also provided positive role models for the children.
2. Creating Informal Spaces for Dialogue and Participation where all parents are encouraged to participate in discussing issues related to the school and their children's learning.
3. From Folkloric to Intellectual Contributors: A crucial element identified was when teachers had high expectations of the families no matter their literacy status, capacity to speak the language of the country, etc..
4. Though the schools studied use different practices, the three strategies were found to contribute to a transformative result in all schools: moving minority and disadvantaged families from the periphery of school participation to the centre.

Early childhood education and care in promoting educational attainment, including the social development of children from disadvantaged backgrounds and in fostering social inclusion (EU-Australia joint study).

This study is currently underway, led by the Sofreco and so any comments and references are preliminary to its finalisation and approval. The combined influence of schools and the environment do not start with compulsory education. In early childhood education and care, and focusing here in particular on the pre-school phase (generally about age 3 - 6 years or to the start of compulsory education), multiple factors affect children in vulnerable situations¹⁰ and how they learn. This study is underway for DG EAC and it includes an extensive literature review and case studies which will be completed in the autumn. Preliminary findings emphasise that poverty is one of several risk factors facing poor children, as well as readiness of kindergartens to accept diverse children; the level of preschool attendance; the quality of kindergartens; the nurturing capacity of educators and the extent of their outreach to parents; the level of parental behaviour, education and language mastery; prenatal exposure to alcohol, tobacco and depression leading to high infant mortality rates, low birth weight and special needs in infants.

2.2. School in its local environment

The first article included is about creating the conditions where the whole community (parents and school) will participate in establishing a solid basis on which children's learning can take place. As work on the social determinants of health has demonstrated, health, physical emotional and mental have an effect on learning.

¹⁰ This notion covers a broad range of situations such as children living in poverty; children from low-income immigrant backgrounds; children from illiterate or poorly educated parents; children from second language backgrounds; children from marginalised rural areas; and specific groups such as Roma children. It also in some case covers children with a physical, sensory or learning disability.

A. Flecha, R. Garcia & R. Rudd, "Using Health Literacy in School to overcome inequalities" (EJE, 2/2011)

This article is focusing on the notion of cultural intelligence and improving the health literacy of adults from vulnerable groups. It is based on the key idea that "Health literacy interventions could be broader in scope and include the cultural intelligence of adults from vulnerable groups throughout the life cycle of the programmes: from design, through organisation, to implementation." It entails residents in the community being perceived as capable of entering into dialogue with professionals and making decisions about the life they want for themselves and for their children in relation to health. The article, drawn from the INCLUDE-ED research, explores the outcomes of a community-based approach to empowering adults (parents of pupils) to make appropriate decisions about health issues and access services. This includes incorporating healthier habits into their daily lives (and those of their children) and regardless of their overall literacy status, becoming active in overcoming health inequalities and strengthening social cohesion. Transformation based on dialogue.

2.3. School in its virtual environment

J.F. C  risier & A. Popuri, "Computers and School: Indian and French students' discourse". (EJE, 3/2011)

This article which describes a survey carried out in schools in India (621 usable responses) and France (339 usable responses) with pupils aged 11 - 18 years old. The aim was to explore students' perspectives and the impact that school computers have on their school and personal lives. Hence the survey was exploring the dynamics of students' relationships with computers at school and how they differ from their relationships with computers in general. The results show the extent to which their behaviours are determined by local cultures which in fact illustrate intersections between digital competence and social competence and expectations. For the French students there is a clear issue of conquering "margins of freedom" both in school and at home. Interestingly their results showed differences with comparable surveys some years ago when the use of the computer was very important for communicating with friends whereas in the current survey a lot of communication related activities appear to have migrated to mobile phones. On the other hand using computers to search for information showed an increase in this survey. The authors suggest that in school information searching which is assisted by staff gives way to networking and collaborative working at home that includes instant messaging. Their research shows the importance young people attribute to technology in the way they conduct their social lives, i.e. in the case of French students using technologies to shape private and community spaces partly because of the huge lack of public spaces that respond to their needs. Technology is also a form of emancipation from very organised and full timetables! This contrasts with more circumscribed and normative uses in school. The authors conclude: "policy makers would also benefit, both in India and in France, from a study of how young people make the best of the small gaps left to them by the educational system and which they use to create their own private culture and world that they share with their peers".

2.4. Individual students 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:

Andy Green, "Lifelong Learning, Equality and Social Cohesion" (EJE 2/2011)

This article compares the evidence from the 2009 PISA survey on the distribution of skills amongst 15-year-olds in different regions and country groups and explores how education systems in these regions contribute to different levels of inequality. In the second part, it presents evidence from surveys on adult skills and attitudes on how skills inequality affects social attitudes and social cohesion. It argues that 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. The author refers evidence that more educated people tend to be healthier, to live longer, to commit fewer violent crimes (McMahon, 1999) and to experience a greater sense of well-being (Schuller et al., 2001), 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 (Putnam, 2000). 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). The article examines the importance of how education and skills are distributed, rather than the average levels of education noting that education and training systems shape social outcomes both in the way they socialise children and in the way they distribute skills. The author analyses data from PISA including the influence of socio-economic backgrounds and family background. The principal message from the 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".

I. Nicaise, "A Smart Social Inclusion Policy for the EU: the role of education and training", (EJE, 2/2012)

This article by Nicaise focuses on education and the cycle of disadvantage and the strong correlation between the poverty risk of households and the level of education of their head 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). The article examines how 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, start primary school with more arrears, accumulate larger deficits throughout their education careers, are more often referred to special education, are systematically orientated into lower-quality vocational tracks, and drop out more easily without any qualification. It refers to empirical research for the EU that 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 ([Machin, 2006](#)).

The author 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 discusses the link between early school leaving and social disadvantage, including the need for cross-sectoral policies involving education, social work, youth, employment and social protection as well as education system reforms that reduce stratification, disenchantment and exclusion of vulnerable groups as well as early targeting. 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 in E&T systems 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:

Farrington, C.A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T.S., Johnson, D.W., & Beechum, N.O. (2012). *Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical literature review*. Chicago: University of Chicago Consortium on Chicago School Research.

This literature review was 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.

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:

ACADEMIC BEHAVIORS: Going to Class, Doing Homework, Organizing Materials, Participating, Studying

ACADEMIC PERSEVERANCE: Grit, Tenacity, Delayed Gratification, Self-Discipline, Self-Control

ACADEMIC MINDSETS: 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.

LEARNING STRATEGIES: Study Skills, Metacognitive Strategies, Self-Regulated Learning, Goal-Setting

SOCIAL SKILLS: Interpersonal Skills, Empathy, Cooperation, Assertion, and Responsibility

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, to see the skills and achievements they already have and how to use them to make plans. The aim is that young people are engaged in their transition, they know who they are, where they want to go and what they need to get there. The guide presents a methodology for planning and as part of that lists of questions that echo the Curriculum for Excellence aims.

<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 in the Curriculum of Excellence in the specific situation of transition from school to work 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).

Am I Safe, Healthy and Nurtured? Do I

- have a place to live where I feel supported, happy and cared for?
- feel secure in my home and community and safe from people who could harm me?
- have confidence to be able to plan for myself and to take informed risks?
- maintain a healthy body and mind?
- 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?

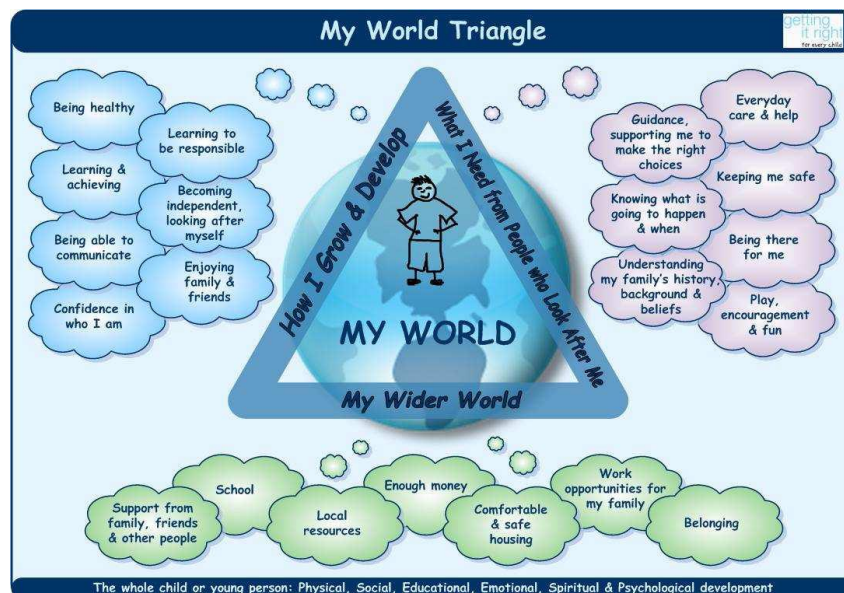
The aims of the Transition Map are to

- help you to think about your own wishes.

- help you to think about the support you might need.

- give you a tool to help you to plan and be heard.

They are illustrated in this star and the image below:



3. Specific key competences

This section considers two out of the four transversal competences within the European Reference Framework. The competences 'learning to learn' and 'sense of initiative and entrepreneurship' will be considered in the next updated version of this literature review. The key competences that tend to be more linked to specific school disciplines are not included in this section, i.e.

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

3.1. Social and civic competences

This section addresses on the one hand social and emotional literacy/learning and on the other hand civic competences.

3.1.1. Social and Emotional Learning/Literacy:

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. This includes moving from teaching to learning and to the "deep learning" that will equip students for the 21st century world of work. 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 on 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. It 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).

The CASEL research suggests that benefits of paying attention to social and emotional learning include the following:

Better academic performance: Students who participated in SEL programs increased achievement scores an average of 11 percentile points versus students who did not participate.

Improved school attitudes and behaviours: SEL instils greater motivation to learn, deeper commitment to school, increased time devoted to schoolwork, better classroom behaviour, and improved attendance and graduation rates.

Fewer negative behaviours: Among students receiving SEL instruction, disruptive class behaviour, noncompliance, aggression, delinquent acts, and disciplinary referrals decrease significantly.

Reduced emotional distress: Reports of student depression, anxiety, stress, or social withdrawal significantly decrease among students receiving SEL instruction.

Kevin Haggerty, Jenna Elgin, Andrew Woolley, (2011) *Social-Emotional Learning Assessment Measures for Middle School Youth*, Social Development Research Group, University of Washington. Commissioned by the Raikes Foundation

This is a review carried out to identify solid assessment tools for social and emotional learning from among the tools that exist for use by US schools. For the purpose of the review, the researchers used the social and emotional competencies identified by the CASEL as a framework for identifying and reviewing various assessment measures. The five interrelated social and emotional competencies as described by CASEL include:

- **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 rationale of the review is that children with strong Social-Emotional Learning (SEL) skills have been shown to excel in school, both socially and academically and it is considered that SEL programmes are imperative to address the social, emotional, and academic needs of students

The research conducted an extensive review of the literature on social and emotional learning in US middle school students and identified and evaluated 73 instruments. The criteria used were: what the constructs measure, target age group, strengths and

weaknesses of the tool, reliability and validity. 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. 73 instruments were reviewed and 10 met their criteria for inclusion in this report.

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.

Immordino-Yang, M.H., Damasio, A. (2007) 'We Feel Therefore We Learn: The Relevance of Affective and Social Neuroscience to Education', *Mind Brain and Education*.

In their article, *We Feel Therefore We Learn: The Relevance of Affective and Social Neuroscience to Education*, Mary Helen Immordino-Yang and Antonio Damasio explore how the connections between emotion, social functioning and decision-making have the potential to revolutionize 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*".

C. Pert & N. Marriott, "The Science of Emotions and Consciousness" in Goleman D. et al, (2008) ***Measuring the Immeasurable; the scientific case for spirituality***, Sounds True.

The research of Candace Pert, a neuroscientist and pharmacologist, explores the importance of emotions to learning based on a theory of emotions and on the notion of a vast network of communication coordinating the brain and body that she calls the "bodymind". 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. She discusses how the experience of reality is filtered through memories, which give a specific interpretation and meaning to each person's experience in so far that everything that is learned is filtered through past experience: "what you experience as reality is your story of what happened". She links this to trauma, but also to the ordinary scars of growing up that continue to affect our lives. Her research and that of others 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.

3.1.2. Civic competences

W. Edelstein, "Education for Democracy: reasons and strategies", (EJE, 1.2011)

The author 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. HE argues that the school is the only institution that can provide the appropriate experience of a democratic life to all members of society. At present, however, schools are generally far from this goal. This article describes 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.

3.2. Cultural awareness and expression

The next contribution moves from the immediately "local" environment to partnerships in the case of Creative Partnerships:

McLellan, R., Galton, M., Steward, S. and Page, C. (2012). *The Impact of Creative Partnerships on the Wellbeing of Children and Young People*. Newcastle: CCE

<http://www.creativitycultureeducation.org/the-impact-of-creative-initiatives-on-wellbeing-a-literature-review>

This study aimed to explore how the Creative Partnerships programme had affected student wellbeing and the degree to which creative approaches had become embedded in areas of the curriculum other than those directly involving creative practitioners. The researchers discuss approaches to creativity and creative learning, including the Creative Partnerships programme, the notion of wellbeing and interests in measuring it, and motivation as the link between creative learning and wellbeing. The research draws on self-determination theory (SDT) where the achievement of learning goals associated with developing expertise and metacognitive wisdom, result in a sense of psychological wellbeing through satisfaction of core needs. This theory suggests that people's innate needs include competence, autonomy and relatedness, and the findings of this report suggest that these are the very qualities that underpin the central aim of the Creative Partnerships programme. Important themes are discussed in the report, including student voice, school ethos, the development of creative transferable skills, the effects of performativity culture, collaborative approaches, levels of student engagement, positive relationships in the classroom, and pastoral care.

Impact on primary schools

- Creative Partnerships' approach to fostering wellbeing was radically different from that in the other case study schools. In the latter wellbeing was a means to an end whereas in Creative Partnerships schools no distinction was made between creativity and wellbeing which meant that creative learning tended to permeate the whole curriculum.
- Student voice was crucial to promoting wellbeing and in helping students to function effectively both personally and socially. The extent to which students were able to have their views recognized and contribute to decision making had been taken further in Creative Partnerships schools.
- There was little evidence to suggest that there was a typology of creative practices. Where differences did exist this could be attributed to the fact that Creative Partnerships schools were at different stages of their learning journey, rather than because they adopted different approaches for developing their pupils' creativity.

- There was little evidence that creative learning was promoted through specific 'arts based' approaches to learning. In all Creative Partnerships schools the emphasis was on generic pedagogies rather than pedagogic subject knowledge. Specialist knowledge and skills were only introduced when it helped students to develop their own ideas. The emphasis was mainly on helping students to think flexibly, strategically and creatively.

Impact on secondary schools

- In general, the survey indicated that there were no overall differences in wellbeing between students attending Creative Partnerships schools and other schools. Issues in the matching of schools at secondary level, together with previous research indicating that variation in wellbeing scores attributable to between school differences is small, might have accounted for this finding.
- The qualitative data can provide insight into how Creative Partnerships work impacts upon student wellbeing but as schools have many strategies in place to support wellbeing disaggregating the impact of any one strategy is difficult. The context within which secondary schools operate cannot be ignored, particularly the performativity culture with its focus on examination results. This has implications for student wellbeing in terms of lack of choice and exam pressures can be controlling and therefore thwart the need for autonomy, and can also lead to a de-valuing of creativity and wellbeing.
- The main motivation for schools joining the Creative Partnerships Programme was school improvement. Creative Partnerships work had generally focused on one departmental area or an identified group of students (e.g. disaffected Year 9 boys) in the first instance, although the number of departments and variety of projects undertaken increased as schools gained more experience of Creative Partnerships work. There was little evidence in the two case studies that where creative practitioners had worked with teachers to improve practice, this had impacted on pedagogy in other lessons beyond the Creative Partnerships projects.
- Self-determination theory was applied to identify elements of Creative Partnerships work that promoted wellbeing through the satisfaction of the core needs for autonomy, competence and relatedness. A number of projects were seen to meet these needs in different ways and particularly promoted interpersonal and perceived competence wellbeing. There was less evidence that Creative Partnerships work influenced life satisfaction. It also had the potential to have a positive impact on wellbeing through factors not captured by SDT, e.g. aspiration and teacher wellbeing. In a small number of cases, Creative Partnerships work also had the potential to reduce wellbeing in the way it had been implemented, i.e. depending on the quality of the work.

References

AlphaPlus Consultancy Ltd, *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* (2006), Netton Old Farmhouse, Bishopstone, Salisbury, Wiltshire, UK -SP5 4DD.

Clouder C. (ed) (2008) *Social and Emotional Education- An International Analysis. Fundación Botín Report 2008*, Santander, Fundacion Marcelino Botin,

Clouder C. (ed) (2011) *Social and Emotional Education- An International Analysis. Fundación Botín Report 2011*, Santander, Fundacion Marcelino Botin,

http://www.fundacionbotin.org/international-analysis_botin-platform_education.htm

Curriculum for Excellence: health and well-being. Principles and practice. www.curriculumforexcellencescotland.gov.uk

European Journal of Education, vol. 46, no. 2 June 2010 Education, poverty and inclusion, guest editor Marta Soler

Articles consulted:

- P. Melgar, R. Larena, L. Ruiz & S. Rammel, "How to Move from Power-based to Dialogic Relations? Lessons from Roma Women" (2011).
- R. Valls & M. Padrós, "Using Dialogic Research to Overcome Poverty: from principles to action"
- J. Diez, S. Gatt & S. Racionero, "Placing Immigrant and Minority Family and Community Members at the Scholl's centre: the role of community participation"
- Green, "Lifelong Learning, Equality and Social Cohesion"
- Flecha, R. Garcia & R. Rudd, "Using Health Literacy in School to overcome inequalities" (2010).

European Journal of Education, vol. 46, no. 3, September 2011, Key Competences in Europe, Guest editors A. Michel & A. Tiana

Articles consulted:

- G. Halasz & A. Michel, "Key Competences in Europe: interpretation, policy formulation and implementation"
- Tiana, J. Moya & F. Luengo, "Implementing key competences in basic education: reflections on curriculum design and development in Spain" (2011)
- M. Dabrowski & J. Wisniewski, "Translating key competences into the school curriculum: lessons from the Polish experience" (2011)
- G. ten Dam, F. Geijsel, R. Reumerman & G. Ledoux, "Measuring Young People's Citizenship Competences"
- J.F. C  risier & A. Popuri, "Computers and School: Indian and French students' discourse"

Farrington, C.A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T.S., Johnson, D.W., & Beechum, N.O. (2012). *Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical literature review*. Chicago: University of Chicago Consortium on Chicago School Research.

Fattore, T., Mason, J., and Watson, E. (2009) 'When Children are Asked About Their Well-Being: Towards a Framework for Guiding Policy', *Child Indicators Research*, 2, No.1, pp. 57-77.

Fredriksson, U. and Hoskins, B. (2008) *Learning to Learn: What is it and can it be measured?* (Ispra, European Commission Centre for Research on Lifelong Learning)

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) study undertaken for the Directorate General Education and Culture of the European Commission, (2009)

Gordon J., Arjomand G. & O'Toole L., *The well-being of children and youth - a stocktaking report on data sets and indicators, Work-in-Progress Report 2010*, drafted for the 'Learning for Well-being' Consortium of Foundations in Europe, 2009-2010. <http://www.eiesp.org/site/pages/view/69-plan-of-the-consortium.html>

Hargreaves, D. (2004) *Personalising learning – Student voice and assessment for learning*, iNet

Hoskins, B & Deakin Crick R., (2010) Competences for Learning to Learn and Active Citizenship: different currencies or two sides of the same coin? *European Journal of Education*, Vol. 45, Number 1, March.

Hinton, C., Miyamoto, K& Della-Chiesa, B. (2008) Brain 'Research, Learning and Emotions: implications for education research, policy and practice', *European Journal of Education*, 43, No.1, pp. 87-103.

Hoskins, B., Fredricksson, (2008) *Learning to learn: what is it and can it be measured?*, EUR23432 – CRELL, Joint Research Centre – Institute of the Protection and Security of the Citizen, Ispra.

Immordino-Yang, M.H., Damasio, A. (2007) 'We Feel Therefore We Learn: The Relevance of Affective and Social Neuroscience to Education', *Mind Brain and Education*.

Sirkku Kupiainen, Jarkko Hautamäki, Pekka Rantanen, (2008) *EU PRE-PILOT on LEARNING TO LEARN. Report on the compiled data*, 2008-1190/001-001 TRA-TRINDC, University of Helsinki, Centre for Educational Assessment

C. Lelièvre, "La difficile (et chaotique) histoire de la mise en place du socle", *Administration et Education, L'Ecole du Socle*, 2/2012).

T. Leney, J. Gordon & S. Adam, *The Shift to Learning Outcomes; Policies and Practices in Europe*, Cedefop, 2008



http://www.cedefop.europa.eu/etv/Information_resources/Bookshop/publication_details.asp?pub_id=525

McLellan, R., Galton, M., Steward, S. and Page, C. (2012). *The Impact of Creative Partnerships on the Wellbeing of Children and Young People*. Newcastle: CCE

<http://www.creativitycultureeducation.org/the-impact-of-creative-initiatives-on-wellbeing-a-literature-review>

New Skills for New Jobs. Action Now, European Union 2010

My Transition Guide, <http://www.highland.gov.uk/NR/rdonlyres/C4A1C8E0-577A-431E-8C63-500DFDC4BF32/0/transitionguideppp.pdf>

Sims E., *Deep learning – A new shape for schooling?* iNet and Specialist School Trust, October 2006

Step by Step Association, *Competent Educators of the 21st Century; Principles of Quality Pedagogy*, International Step by Step Association, 2010..

Section 3: Key competences in France

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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."¹¹ (Perrenoud, 2008).

¹¹ 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.

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).

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 (Grosperin, 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 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 attention 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 considered 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 *scole 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).

References

Audigier François & Tutiaux-Guillon Nicole (dir.) (2008). *Compétences et contenus : Les curriculums en questions*. Brussels : De Boeck.

Ayotte- Beaudet Jean-Philippe & Jonnaert Philippe (2010). « Recensions des textes francophones traitant de la notion de compétences ». *Dossiers of the UNESCO Chair in Curriculum Development*, n° 3.

Beckers Jacqueline & Voos Catherine (2008). « Savoirs scolaires et compétences, les difficultés de cadrage d'une réforme en Communauté française de Belgique ». In Audigier François & Tutiaux-Guillon Nicole (dir.) *Compétences et contenus : Les curriculums en questions*. Brussels : De Boeck, p. 51–64.

Boutin Gérald (2004). « L'approche par compétences en éducation : un amalgame paradigmatique ». *Connexions*, vol. 84, n° 1.

CAFOC (2012). *Développer les compétences clés*. Lyon : Chronique Sociale.

Carette Vincent (2008). « Les caractéristiques des enseignants efficaces en question ». *Revue française de pédagogie*, n° 162, January-March, p. 81–93.

Carette Vincent (2009). « Et si on évaluait des compétences en classe ? A la recherche du "cadrage instruit" ». In Mottier Lopez Lucie & Crahay Marcel (dir.). *Évaluations en tension*. Brussels : De Boeck, p. 147-163.

Cerisier Jean-François, Devauchelle Bruno, Rizza Caroline & Nguyen Aurélien (2008). « Former des jeunes à l'usage des médias numériques : heurs et malheurs du brevet informatique et internet (B2i) en France ». *Distances et savoirs*, vol. Out of print. Online: <<http://www.distanceetdroiteducation.net/contents/DS2008-HS-Cerisier-Rizza2.pdf>>.

Colsaët Françoise & Mevel Yannick (2011). « Évaluer à l'heure des compétences ». *Cahiers pédagogiques*, n° 491, September-October, p. 15–61.

Crahay Marcel (2006). « Dangers, incertitudes et incomplétude de la logique de la compétence en éducation ». *Revue française de pédagogie*, n° 154, March.

Dauvisis Marie-Claire (2007). « L'évaluation des compétences au risque des barèmes et des notes scolaires ». In Hatano Maude & Lemaître Denis (dir.). *Usages de la notion de compétence en éducation et formation*. Paris : L'Harmattan, p. 75–92.

De Ketele Jean-Marie (2009). « Les compétences dans les curricula du monde francophone et leurs effets attendus sur l'orientation au long de la vie ». *During the 32nd International AFEC convention: orientation and globalisation*, Dijon, 25-27 June 2009. Online: <http://www.afec-info.org/colloque09/new_programme.html>.

Del Rey Angélique (2009). *A l'école des compétences : De l'éducation à la fabrique de l'élève performant*. Paris : La Découverte.

- Delatouche Aude (2012). « La difficile appropriation du livret d'attestation ». In Villeneuve Jean-Luc (dir.). *Le socle commun en France et ailleurs*. Paris : Le Manuscrit.
- Di Martino Annie & Sanchez Anne-Marie (2011). *Socle commun et compétences : Pratiques pour le collège*. Issy-les-Moulineaux : ESF.
- Dubet François (2002). *Le déclin de l'institution*. Paris : Le Seuil.
- Duffez Anne-Cécile (2012). « Démarche permettant la mise en oeuvre des compétences du socle à l'école élémentaire et dans le second degré, ». In Villeneuve Jean-Luc (dir.). *Le socle commun en France et ailleurs*. Paris : Le Manuscrit.
- Gauthier, R.-F., & Le Gouvello, M. (2010). The french curricular exception and the troubles of education and internationalisation: Will it be enough to 'rearrange the deckchairs'? *European Journal of Education*, 45(1), 74–88.
- Gauthier Roger-François (2006). *Les contenus de l'enseignement secondaire dans le monde : état des lieux et choix stratégiques*. Paris : UNESCO. Online: <<http://unesdoc.unesco.org/images/0014/001475/147570f.pdf>>.
- Gérard François-Marie (2008). « La complexité d'une évaluation des compétences à travers des situations complexes ». In Ettayebi Moussadak, Operti Renato & Jonnaert Philippe (dir.). *Logique de compétences et développement curriculaire*. Paris: L'Harmattan.
- Grosperin Jacques (dir.) (2010). *La mise en œuvre du socle commun de connaissances et de compétences au collège : Rapport d'information parlementaire*. Paris: Assemblée nationale. Online: <<http://www.assemblee-nationale.fr/13/rap-info/i2446.asp>>.
- Haut Conseil de l'Éducation (2011). *Mise en oeuvre du socle commun*. Paris : National Education Ministry Online: <http://www.hce.education.fr/gallery_files/site/21/116.pdf>.
- Haut conseil de l'évaluation de l'école (2006). *Recommandations pour le socle commun*. Paris: Haut Conseil de l'Éducation (HCE). Online: <http://www.hce.education.fr/gallery_files/site/19/26.pdf>.
- Hirtt Nico (2010). « En Europe, les compétences contre le savoir ». *Le Monde diplomatique*, October, p. 22–23.
- Houchot Alain & Robine Florence (2007). *Les livrets de compétences : Nouveaux outils pour l'évaluation des acquis*. Paris: Ministère de l'Éducation nationale, n° 2007- 048. Online: <<http://media.education.gouv.fr/file/50/0/6500.pdf>>.
- Jonnaert Philippe, Ettayebi Moussadak & Defise Rosette (2009). *Curriculum et compétences : Un cadre opérationnel*. Brussels: De Boeck.
- Jonnaert Philippe (2011). « Sur quels objets évaluer des compétences ? ». *Education et formation*, n° e-296, December. Online: <<http://ute3.umh.ac.be/revues/>>.

Le Bortef Guy (2010). Construire les compétences individuelles et collectives. Paris: Editions d'organisation, 5e éd.

Legendre Marie-Françoise (2008). « La notion de compétence au coeur des réformes curriculaires : Effet de mode ou moteur de changements en profondeur ? ». In Audigier François & Tutiaux-Guillon Nicole (dir.). Compétences et contenus : les curriculums en questions. Brussels: De Boeck, p. 27-50.

Lelièvre Claude (2009). « Culture humaniste et « socle » de l'école obligatoire (tout le reste est littérature) ». Le français aujourd'hui, vol. 4, n° 167, p. 11–17.

Lemaître Denis & Hatano Maude (dir.) (2007). Usages de la notion de compétence en éducation et formation. Paris : L'Harmattan. ISBN 2296039022.

Meuret Denis (2009). « Contenu du socle commun et justice de l'école ». Online: <<http://halshs.archives-ouvertes.fr/docs/00/64/95/47/PDF/09090.pdf>>.

Morlaix Sophie (2009). Compétences des élèves et dynamique des apprentissages. Rennes : Presses universitaires de Rennes.

Perrenoud Philippe (2004). Construire des compétences dès l'école. Issy-les-Moulineaux : ESF, 4e éd. (1re éd. 1997).

Perrenoud Philippe (2011). Quand l'école prétend préparer à la vie... Développer des compétences ou enseigner d'autres savoirs ? Issy-les-Moulineaux : ESF.

Raulin Dominique (2006). Les programmes scolaires : Des disciplines souveraines au socle commun. Paris : Retz.

Raulin Dominique (2008). Le socle commun de connaissances et de compétences. Paris: Hachette éducation. ISBN 2011711002.

Reuter Yves (dir.) (2007). Une école Freinet : Fonctionnements et effets d'une pédagogie alternative en milieu populaire. Paris : L'Harmattan.

Rey Bernard, Carette Vincent, Defrance Anne & Kahn Sabine (2006). Les compétences à l'école. Apprentissage et évaluation. Brussels: De Boeck.

Rey Olivier (2008). « De la transmission des savoirs à l'approche par compétences ». Dossier d'actualité de la VST, n° 34, April. Lyon : Institut national de recherche pédagogique (INRP). Online: < <http://ife.ens-lyon.fr/vst/DA-Veille/34-avril-2008.pdf>>

Rey Olivier (2010). « Contenus et programmes scolaires : comment lire les réformes curriculaires ? ». Dossier d'actualité de la VST n° 53, avril. Lyon : Institut national de recherche pédagogique (INRP). Online: < <http://ife.ens-lyon.fr/vst/DA-Veille/53-avril-2010-integrale.pdf>>

Rey Olivier (2012). « Le défi de l'évaluation des compétences ». Dossier d'actualité Veille & Analyses, n° 76, June. Lyon : École Normale Supérieure de Lyon. Online: < <http://ife.ens-lyon.fr/vst/DA-Veille/76-juin-2012.pdf>>

Reuter Yves (dir.) (2011). Rapport sur les expérimentations liées à l'article 34 de la loi d'orientation et de programme pour l'école de 2005. Paris: Haut Conseil de l'Éducation (HCE). Online: <http://www.hce.education.fr/gallery_files/site/21/117.pdf>.

Roegiers Xavier (2004). Une pédagogie de l'intégration : Compétences et intégration des acquis dans l'enseignement. Brussels: De Boeck.

Ropé Françoise & Tanguy Lucie (dir.) (1994). Savoirs et compétences. De l'usage de ces notions dans l'école et l'entreprise. Paris : L'Harmattan.

Scallon Gérard (2007). L'évaluation des apprentissages dans une approche par compétences. Brussels: De Boeck, 2e éd. (1re éd. 2004).

Schneider-Gilot Maggy (2006). « Quand le courant pédagogique «des compétences» empêche une structuration des enseignements autour de l'étude et de la classification de questions parentes ». Revue française de pédagogie, n° 154, March.

Tardif Maurice (2006). L'évaluation des compétences : Documenter le parcours de développement. Montréal : Chenelière Education.

Van der Maren Jean-Marie & Loye Nathalie (2011). « A propos de quelques difficultés de l'évaluation des compétences. Réflexions critiques ». Education Sciences & Society, n° 2, p. 40–53.

Vergne Francis, Laval Christian, Clément Pierre & Dreux Guy (2011). La nouvelle école capitaliste. Paris : La Découverte.

Key Reading

CAFOC (2012). Développer les compétences clés. Lyon : Chronique Sociale.

Ettayebi Moussadak, Opertti Renato et Jonnaert Philippe (dir.) (2008) Logique de compétences et développement curriculaire. Paris : L'Harmattan.

Jonnaert Philippe, Ettayebi Moussadak & Defise Rosette (2009). Curriculum et compétences : Un cadre opérationnel. Brussels: De Boeck.

Perrenoud Philippe (2004). Construire des compétences dès l'école. Issy-les-Moulineaux : ESF, 4e éd. (1re éd. 1997).

Rey Bernard, Carette Vincent, Defrance Anne & Kahn Sabine (2006). Les compétences à l'école. Apprentissage et évaluation. Brussels: De Boeck.

Roegiers Xavier (2004). Une pédagogie de l'intégration : Compétences et intégration des acquis dans l'enseignement. Brussels: De Boeck.

Scallon Gérard (2007). L'évaluation des apprentissages dans une approche par compétences. Brussels: De Boeck, 2e éd. (1re éd. 2004).

Villeneuve Jean-Luc (dir.) (2012). Le socle commun en France et ailleurs. Actes du colloque organisé par l'IREA. Paris : Le Manuscrit.

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.

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

KC Implementation			
<i>Approaches to implementation at practice level (classroom/learning environment):</i> (UH)			
<p>Themes:</p> <ul style="list-style-type: none"> - 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 <p>To be considered at:</p> <ul style="list-style-type: none"> - School level (including networks, learning organisations) - Local/regional - National - Interaction of all levels - non formal environment (local and/or virtual) 			
<i>Approaches to implementation at system(ic) level:</i>			

Curriculum design and implementation (frameworks, etc.) (EIEPS + EUN)			
<p>Teacher training: (EUN)</p> <p>Consequences and implications for:</p> <ul style="list-style-type: none"> - Defining and acquiring their own KCs to facilitate learning of KCs - Initial and continuous Professional Development (CPD) 			
<p>Assessment of key competences</p> <p>Issues: e.g. “measuring what matters”</p> <p>New assessment methods</p>			
<p>School organisation: (EUN)</p> <ul style="list-style-type: none"> - Opening to and partnership with the surrounding community - Role of teachers (in the school) and team work at teacher level - Etc. 			
<p>Non formal learning environments: (UH + EIEPS contribution)</p> <ul style="list-style-type: none"> - Better suited/more efficient for some specific competences? - Which complementarity with formal environment? - Etc. 			
<p>Socio-economic issues: (EIEPS)</p> <ul style="list-style-type: none"> - 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)			
<p><i>Research:</i></p> <p>How countries use research or not and of what types? With what outcomes?</p>			
<p><i>Policy formulation:</i> what do we learn about different approaches to formulation in terms of outcomes?</p>			
<p><i>Policy evaluation:</i> is there any? who does it? how? What does it tell us?</p>			
<p><i>International influences on policy and research:</i></p> <p>E.g: DeSeCo, PISA, etc.</p>			

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.

Major category of terminology	Sub-categories	Countries examples
Competences		<p>(HU): "kompetencia". A frequent synonym is "kéesség" which can be translated as <i>aptitude</i> or <i>skill</i>. (see below also under key competences)</p> <p>(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 <i>Portfolio delle competenze</i> (portfolio), through the reform of 2003.</p> <p>(PT): <i>competência</i> - 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.</p> <p>(SI): <i>Kompetenza</i> tends to be used. (traditionally Slovenian term was <i>zmoznost</i>):</p> <p>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.</p> <p>Competence has three components:</p> <ul style="list-style-type: none"> - Acquisition of theoretical, conceptual and abstract knowledge;

		<ul style="list-style-type: none"> - Developing skills, expertise and procedural knowledge to solve problems; - Developing an autonomous and ethical stance towards other people, community and environment – responsibility and autonomy. <p>These are identified as cognitive, functional and socialisation perspectives.</p>
	Key competences	<p>(AT) The terms <i>Schlüsselqualifikationen</i> (key qualifications), <i>Schlüsselkompetenzen</i> (key competencies) and, in particular, <i>dynamische Fertigkeiten</i> (dynamic skills) are used when talking about subject-independent, transversal competencies. The terms <i>Grundfertigkeiten</i> (basic skills) and <i>Grundkompetenzen</i> (basic competencies) are used when trying to convey the notion in its broadest sense.</p> <p>All subject-specific competence must therefore be supported and complemented by <i>Sozialkompetenz</i> (social competence, i.e. taking on responsibility, co-operation, initiative, active participation, team spirit) and <i>Selbstkompetenz</i> (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.</p> <p>(see below basic competences)</p> <p>(BG) <i>Ключови компетентности</i> no legal existence but used by teachers and decision-makers</p> <p>(CY) Key competences as core knowledge</p> <p>(CZ) <i>Klíčové kompetence</i></p> <p>(DK) <i>Nrglekompetence</i> generally refers to the ability to apply knowledge and qualifications to differing situation 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:</p> <ul style="list-style-type: none"> - social competence,

		<ul style="list-style-type: none"> - literacy competence, - learning competence, - communicative competence, - self-management competence, - democratic competence, - ecological competence, - cultural competence, - health, sports and physical competence, - creative and innovative competence. <p>(FI) <i>Avaintaito</i> = key competence & <i>avaintaidot</i> = key competences (see below cross-curricula themes)</p> <p>(HU) The strategy of the ministry contained a list of specific key competences to be developed, as follows:</p> <ul style="list-style-type: none"> - 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) <p>(LT): <i>Esminė kompetencija</i> or <i>Bendrasis gebėjimas</i></p> <p>(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.</p> <p>Educational objectives are defined and explained in a competence format, under the headings knowledge/information, skills, and attitudes as follows:</p> <ul style="list-style-type: none"> - 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;
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		<ul style="list-style-type: none"> - 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 - Greater Awareness of the Role of Science and Technology in Everyday Life; - Competence in Communication; - Preparation for Change. <p>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.</p> <p><i>"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 evaluate, 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."</i></p> <p>(NL) <i>Erncompetenties</i> (meaning, literally, core competencies). (See also below under general objectives)</p> <p>(RO) <i>Competență cheie</i></p> <p>(SK) <i>Kľúčové kompetencie</i></p> <p>(SI) Key competences now described as: learning to learn; social skills; ICT; planning and developing one's career;</p>
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		entrepreneurship; environmental responsibility; safety at work.
	Cross-curricular key competences	<p>(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:</p> <ul style="list-style-type: none"> - 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	<p>(AT) <i>Grundkompetenzen</i>– used to convey the notion in its broadest sense.</p> <p>(EL) ΒΑΣΙΚΕΣ ΔΕΞΙΟΤΗΤΕΣ - referring to IT skills</p> <p>ΕΠΙΚΟΙΝΩΝΙΑΚΕΣ ΚΑΙ ΚΟΙΝΩΝΙΑΚΕΣ ΔΕΞΙΟΤΗΤΕΣ - communications and social competencies</p> <p>(ES) <i>Competencias Básicas</i>. The Spanish Royal Academy gives the following definition for <i>Competencia</i>: Skill, aptitude, suitability to do something or to take part in a subject. They are part of the <i>enseñanzas mínimas</i>, 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:</p> <ul style="list-style-type: none"> - Competence in linguistic communication - Mathematical competence - Competence in 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 <p>Tiana <i>et al</i> (2011)</p>

	Foundation of competences	<p>(BE-fr) In compulsory education there is the <i>Socles de compétences</i> (foundations of competences) and the <i>compétences terminales</i> (final competences achieved). The <i>socles de compétences</i> 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 <i>socles de compétences</i> 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 interdisciplinary and cross-curricula competencies, which, when gradually acquired, ensure the development of the pupil and his/her personality, and subject-related competencies.</p> <p>(FR) <i>Socles de connaissances et de compétences</i> :</p> <ul style="list-style-type: none"> - 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 competences - Autonomy and initiative <p>(LU) <i>Socle de compétences</i>. In German the term is: <i>Kompetenzorientierte Bildungsstandards</i>:</p> <ul style="list-style-type: none"> - 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. <p>There are transversal competences: citizenship, autonomy and personal aspirations</p>
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	Final competences (to be achieved)	(BE-fr) <i>Compétences terminales</i> (see above)
	General competences	<p>(EE) <i>üldpädevus</i> - general competence is used in the national curriculum and consists of four competences:</p> <ul style="list-style-type: none"> - 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. <p>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:</p> <ul style="list-style-type: none"> - <i>valdkonnapädevus</i> – 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. - <i>kohustuslikud läbivad teemad</i> – 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. - <i>ainealased teadmised ja oskused</i> – <i>skills and knowledge in specific subjects</i>. 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	<p>(PT) <i>Competências essenciais</i> (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.</p> <p>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:</p> <ul style="list-style-type: none"> - 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	(DK) <i>Nationalt Kompetenceregnskab</i> National Competence Account – 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		<p>(UK- Eng.) Skills:</p> <ul style="list-style-type: none"> - personal learning and thinking skills - key skills/functional skills - cross-curricular themes/whole curriculum dimensions <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> - 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) <p>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.</p>

		<p>UK (Wales): Skills Framework for 3 to 19 year olds:</p> <ul style="list-style-type: none"> - 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	(AT) <i>Grundfertigkeiten</i> – used to convey the notion in its broadest sense. (see also above under key competences)
	Dynamic skills	(AT) <i>Dynamische Fertigkeiten</i> (dynamic skills) – subject-independent transversal competencies. . (see also above under key competences)
	Skill / aptitude	(HU) “ <i>kompetencia</i> ” - a frequent synonym is “ <i>képesség</i> ” which might be translated as <i>aptitude</i> or <i>skill</i> (see also above under competences)
	Key skills	<p>(IE) Key Skills Framework:</p> <ul style="list-style-type: none"> - 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	<p>(PL) A number of cross-curricular transversal skills are mentioned:</p> <ul style="list-style-type: none"> - planning, organising and assessing pupil’s learning, taking responsibility for one’s learning process, - effective communication in various circumstances, presenting one’s viewpoint and acknowledging the views of others, proper use of language, preparation for public presentations,

		<ul style="list-style-type: none"> - effective cooperation within a group, building interpersonal relations, taking individual and collective decisions, - solving problems in a creative way, - searching for, ranging and using information from various sources, effective usage of ICT, - using the acquired knowledge in practice and creating of necessary experiences and patterns of behaviour, - developing personal interest, acquiring methods of negotiative ways of solving conflicts and social problems.
Goals and objectives	Core objectives	(NL) Core objectives (which relate to subjects) and general objectives (which are cross-curricular) are used.
	Development objectives and final objectives	<p>(BE-fl) <i>Ontwikkelingsdoelen</i> and <i>Eindtermen</i></p> <p>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</p>
	Goals to be achieved and goals to strive for	<p>(LV) The National Standard for General Secondary Education determines the goals common for all general secondary education curricula:</p> <ul style="list-style-type: none"> - 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.

		<p>(SE) The term "key competences" 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)</p>
	General Objectives	<p>(NL) General objectives are regarded as important for all learning areas in the primary curriculum are:</p> <ul style="list-style-type: none"> • 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 <p>Secondary level: the six general objectives are:</p> <ul style="list-style-type: none"> - 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. T - 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.

		<ul style="list-style-type: none"> - 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	<p>(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.</p> <p>In the NCC the standards are defined as <i>learning outcomes</i>, i.e. knowledge, skills, competencies, attitudes etc. To be possessed by the pupils by the end of the specific cycle.</p> <p>The NCC 2003 also contained a thesaurus which defined the notion of “competence based” and the relation between “competence” and “knowledge”. According to this. <i>“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.”</i> This was the basis for restructuring the NCC so that instead of the element of national culture (“knowledge”) it was focusing on <i>specific developmental tasks</i> that are supposed to develop <i>specific competences</i>.</p>
Cross-curricular themes		<p>(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</p> <ul style="list-style-type: none"> - observe and analyse contemporary phenomena and operating environments;

		<ul style="list-style-type: none"> - 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. <p>For the upper grades of basic education, the cross-curricular themes are:</p> <ul style="list-style-type: none"> - 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 <p>For all upper secondary pupils in both the general and vocational strands the cross-curricular themes are:</p> <ul style="list-style-type: none"> - Active citizenship and entrepreneurship - Welfare and safety - Sustainable development - Cultural identity and knowledge of cultures - Technology and society - Communication and media competence
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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>

Annex 4: Matrix of example behaviours by domain - *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* (13 October 2006). Prepared by AlphaPlus Consultancy Ltd, Netton Old Farmhouse, Bishopstone, Salisbury, Wiltshire, UK -SP5 4DD.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Knowing myself	Reflection	Has a tendency to brood about past failures. Can become depressed.	Personal reflection often leads to a somewhat negative outlook on life.	Spends more time thinking about the past than the future.	Uses personal reflection to adopt a more positive approach to life.	Reflects on past experience in order to adopt a more positive view of life.	Is mostly forward looking and knows how to learn from personal experience.	Is very forward-looking. Learns well from personal experience.
Knowing myself	awareness of own qualities and options for change	Has no significant awareness of own qualities and options for change.	Has little awareness of own qualities and options for change.	Has a limited awareness of own qualities and options for change.	Is aware of own qualities and options for change.	Shows a broad awareness of own qualities and options for change.	Is well aware of own qualities and options for change.	Is fully aware of own qualities and options for change.
Knowing myself	planning and implement changes	Does not plan ahead. Is not interested in implementing changes in personal development.	Rarely plans ahead. Has little interest in implementing changes in personal development.	Occasionally plans ahead. Makes an effort to implement changes in personal development.	Makes some effort to plan ahead but lacks organisation. Is interested in implemented changes in personal development.	Usually plans ahead. Is interested in implementing changes in some aspects of personal development.	Almost always plans ahead. Is keen to implement changes in personal development.	Always plans well ahead. Knows how to implement changes in personal development and does so.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Coping with Feelings	understanding feelings and how they influence thinking and behavior	Always displays continuous outbursts of temper. Reacts negatively to any criticism. Unable to identify and name own feelings	Nearly always displays frequent outbursts of temper, unable to take criticism, unable to name or identify own feelings and the affect on their reactions	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	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	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	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	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.
Coping with Feelings	appropriate expression in situations and linking feelings to actions	Finds considerable difficulty expressing personal feelings. Is unable to link feelings to actions.	Is largely unable to express personal feelings. Has little ability to link feelings to actions.	Can sometimes express personal feelings. Has a limited ability to link feelings to actions.	Displays some ability to express personal feelings. Can sometimes link feelings to actions.	Is usually able to express personal feelings. Is mostly able to link feelings to actions.	Is good at expressing personal feelings. Is able to link feelings to actions in most situations.	Expressed personal feelings with complete ease. Is always able to link feelings to actions.
Coping with Feelings	recognise feelings produced by prejudice and discrimination	Shows no awareness of the feelings produced by prejudice and discrimination.	Shows little awareness of the feelings produced by prejudice and discrimination.	Shows a limited awareness of the feelings produced by prejudice and discrimination.	Shows some awareness of the feelings produced by prejudice and discrimination.	Usually shows awareness of the feelings produced by prejudice and discrimination.	Almost always shows awareness of the feelings produced by prejudice and discrimination.	Is always sensitively aware of the feelings produced by prejudice and discrimination.
Coping with feelings	understand and respond to feelings of others	Shows no awareness or understanding of the feelings of others.	Shows little awareness or understanding of the feelings of others.	Shows some awareness and understanding of the feelings of others but makes little attempt to respond to them.	Shows some awareness and understanding of the feelings of others and responds to a limited degree.	Usually shows awareness and understanding of the feelings of others and is able to respond in a suitable way.	Almost always shows awareness and understanding of the feelings of others and makes an effort to respond appropriately.	Shows a sensitive awareness and understanding of the feelings of others and always responds sympathetically.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Holding Beliefs	put forward your opinion, appreciate others and recognise their influence	Never puts forward an opinion. Does not appreciate others or recognise their influence.	Rarely puts forward an opinion. Has a very limited appreciation of others and usually fails to recognise their influence.	Will put forward an opinion but with little confidence. Has some appreciation of others and can sometimes appreciate their influence.	Is willing to put forward an opinion on occasions and makes a real effort to appreciate others and recognise their influence.	Is able to put forward an opinion with some conviction. Shows some appreciation of others and can recognise their influence.	Usually puts forward an opinion confidently. Mostly appreciates others and recognises their influence.	Puts forward an opinion with confidence. Always appreciates others and recognises their influence.
Holding Beliefs	understand what beliefs are and how they affect attitudes and behavior	Shows no understanding of the beliefs of others. Is insular in outlook. Prefers not to mix with people of different beliefs.	Shows little understanding of the beliefs of others. Has little interest in how beliefs affect attitudes and behaviour.	Makes some effort to understand the beliefs of others. Limited understanding of how they affect attitudes and behaviour.	Shows some understanding of what beliefs are and how they affect attitudes and behaviour. Can be suspicious of people with different beliefs.	Usually shows understanding of the beliefs of others. Realises how they affect attitudes and behaviour.	Almost always shows understanding of the beliefs of others and how they affect attitudes and behaviour.	Shows a deep understanding of the beliefs of others. Is very open-minded and receptive to the beliefs of others.
Handling Relationships	recognise and use skills to make and keep different types of relationship	Is unable to recognise and use skills to make and keep different kinds of relationships.	Has difficulty in recognising and using skills to make and keep different kinds of relationships.	Has a limited ability to recognise and use skills to make and keep different kinds of relationships.	Shows some ability to recognise and use skills to make and keep different kinds of relationships.	Is usually able to recognise and use skills to make and keep different kinds of relationships.	Is almost always able to recognise and use skills to make and keep different kinds of relationships.	Is always able to recognise and use skills to make and keep different kinds of relationships.
Handling Relationships	understand and use approaches to difficult relationships	Has no understanding of how to use approaches to difficult relationships.	Has little understanding of how to use approaches to difficult relationships.	Has a limited understanding of how to use approaches to difficult relationships.	Shows some understanding of how to use approaches to difficult relationships.	Is usually able to understand how to use approaches to difficult relationships.	Is almost always able to understand how to use approaches to difficult relationships.	Is highly skilled at how to use approaches to difficult relationships.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Handling Relationships	recognise proper and improper use of power and control	Is unable to recognise proper and improper use of power and control.	Has little ability to recognise proper and improper use of power and control.	Has a limited ability to recognise proper and improper use of power and control.	Shows some ability to recognise proper and improper use of power and control.	Shows a broad awareness of how to recognise proper and improper use of power and control.	Is almost always able to recognise proper and improper use of power and control.	Is highly skilled at recognising proper and improper use of power and control.
Handling Relationships	recognise difference between aggressive and assertive behaviour	Is unable to recognise the difference between aggressive and assertive behaviour.	Is rarely able to recognise the difference between aggressive and assertive behaviour.	Is only occasionally able to recognise the difference between aggressive and assertive behaviour.	Is sometimes able to recognise the difference between aggressive and assertive behaviour.	Is usually able to recognise the difference between aggressive and assertive behaviour.	Is almost always able to recognise the difference between aggressive and assertive behaviour.	Is always able to recognise the difference between aggressive and assertive behaviour.
Handling Relationships	use different approaches to giving and receiving feedback	Has no understanding of how to use different approaches to giving and receiving feedback.	Has only a minimal understanding of how to use different approaches to giving and receiving feedback.	Has a limited understanding of how to use different approaches to giving and receiving feedback.	Shows some understanding of how to use different approaches to giving and receiving feedback.	Is usually able to understand how to use different approaches to giving and receiving feedback.	Is almost always to understand how to use different approaches to giving and receiving feedback.	Is highly skilled at understanding how to use different approaches to giving and receiving feedback.
Getting and giving support	knowledge and understanding of available support	Has no knowledge or understanding that help or support is available.	Has only minimal knowledge and understanding of the help and support that is available.	Has a limited knowledge and understanding of the help and support that is available.	Is aware of some knowledge and understanding of the help and support that is available.	Shows broad awareness, knowledge and understanding of the range of help and support that is available.	Is well aware of and understands well the range of help and support that is available.	Is fully aware of the full range of help and support that is available.
Getting and giving support	understands how to get support	Never knows where or to whom to turn for appropriate help and support.	Rarely knows where or to whom to turn for appropriate help and support and only rarely follows this through.	Occasionally seems to know where or to whom to turn for appropriate help and support but often fails to follow this up.	Is likely to know where and who to contact for appropriate help and support and quite often follows this up - but not always.	Usually knows where to get help and support and, more often than not, follows things through.	Often turns to the appropriate source of help and support, and mostly follows things through.	Always turns to the appropriate source of help and support, and always follows things through.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Getting and giving support	understands how to give support to others	Has a very poor grasp of how to help others and is almost never prepared to give the help that others may need.	Has only a very limited grasp of the needs of others in terms of the support they may require or how to provide it.	Has only a limited grasp of the needs of others in terms of the support they may require or how to provide it.	Has some grasp of the needs of others in terms of the support they may require and an understanding of how to provide it.	Usually appreciates that others may need help at times and is usually willing to provide the support they need.	Almost always appreciates when others may need help and is almost always willing to provide it.	Always appreciates that others may need help at times and is always willing to provide it.
Exploring risks	personal motivation and recognising own reaction to taking risks	Shows almost no motivation, fails to see opportunities and is unable to recognise when a risk is worth taking or not.	Shows a little self-motivation and is very occasionally aware of the possible repercussions and reactions of risk taking to self.	Shows some self-motivation and is occasionally aware of the possible repercussions and reactions of risk taking to self.	Shows reasonable self-motivation and is aware of some of the possible repercussions and reactions of risk taking to self.	Shows self-motivation and is aware of many of the possible repercussions and reactions of risk taking to self.	Is well motivated and is well aware of many of the possible repercussions and reactions of risk taking to self.	Is very well motivated and is fully aware of all the possible repercussions and reactions of risk taking to self.
Exploring risks	shows awareness of situations that may present risk to self and/or others	Shows no awareness of situations and occasions that may present risks to self and/or others.	Shows minimal awareness of situations and occasions that may present risks to self and/or others.	Occasionally shows some awareness of situations and occasions that may present risks to self and/or others.	Displays some awareness of situations and occasions that may present risks to self and/or others.	Frequently shows awareness of situations and occasions that may present risks to self and/or others.	Nearly always shows awareness of situations and occasions that may present risks to self and/or others.	Always shows awareness of situations and occasions that may present risks to self and/or others.
Exploring risks	understands how to practise safe sex	Displays no awareness, interest or understanding of how to practise safe sex.	Displays little awareness and understanding of how to practise safe sex.	Displays limited awareness and understanding of how to practise safe sex.	Displays an awareness and understanding of how to practise safe sex	Displays good awareness and a sound understanding of how to practise safe sex.	Displays almost complete awareness and understanding of how to practise safe sex.	Displays complete awareness and understanding of how to practise safe sex.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Exploring risks	recognise risk of drug use and how to reduce it	Shows no recognition of the risks involved in drug use or how to reduce them.	Can only recognise a very small number of risks involved with drug use and very few ways of reducing them.	Is able to recognise a number of the risks of drug use and knows a few ways of reducing them.	Is able to recognise some of the risks of drug use and knows a number of appropriate ways of reducing them.	Has a sound knowledge and understanding of many of the risks involved in drug use and appropriate ways of reducing them.	Has a very good knowledge and understanding of most of the major risks involved in drug use and most appropriate ways of reducing them.	Shows complete knowledge and understanding of all the major risks involved in drug use and all appropriate ways of reducing them.
Managing Myself	appreciate resources required to achieve personal goals	Is unable to appreciate resources required to achieve personal goals.	Is largely unable to appreciate resources required to achieve personal goals.	Has only a limited ability to appreciate resources required to achieve personal goals.	Has some appreciation of resources required to achieve personal goals.	Has a sound appreciation of resources required to achieve personal goals.	Has a good appreciation of resources required to achieve personal goals.	If fully appreciative of resources required to achieve personal goals.
Managing Myself	ability to manage time, money and lifestyle	Shows no ability to manage time, money and lifestyle.	Is largely unable to manage time, money and lifestyle.	Shows only a limited ability to manage time, money and lifestyle.	Shows some ability to manage time, money and lifestyle.	Is usually able to manage time, money and lifestyle.	Is mostly able to manage time, money and lifestyle.	Is fully able to manage time, money and lifestyle.
Managing Myself	understand importance of diet and exercise in a healthy lifestyle	Shows no understanding of the importance of diet and exercise in a healthy lifestyle.	Shows little understanding of the importance of diet and exercise in a healthy lifestyle.	Shows only a limited understanding of the importance of diet and exercise in a healthy lifestyle.	Shows some understanding of the importance of diet and exercise in a healthy lifestyle.	Shows a sound understanding of the importance of diet and exercise in a healthy lifestyle.	Has a very good understanding and appreciation of the importance of diet and exercise in a healthy lifestyle.	Has a full understanding and appreciation of the importance of diet and exercise in a healthy lifestyle.
Using Information	understand how to get information	Does not understand how to get information.	Has a little understanding of how to get information.	Occasionally understands how to get information.	Has a reasonable understanding of how to get information.	Has a good understanding of how to get information.	Has a very good understanding of how to get information.	Fully understands how to get information.
Using Information	understand how to supply information	Does not understand how to supply information.	Has a little understanding of how to supply information.	Occasionally understands how to supply information.	Has a reasonable understanding of how to supply information.	Has a good understanding of how to supply information.	Has a very good understanding of how to supply information.	Fully understands how to supply information.

GC Domain	Context	Min competence Level 1	Level 2	Level 3	Mid competence Level 4	Level 5	Level 6	Max competence Level 7
Rights and responsibilities	understand personal rights and responsibilities	Never displays any understanding of personal rights and responsibilities	Only rarely displays an understanding of personal rights and responsibilities.	Occasionally displays an understanding of personal rights and responsibilities.	Usually displays some understanding of personal rights and responsibilities.	Displays a good understanding of personal rights and responsibilities on most occasions.	Displays a very sound understanding of personal rights and responsibilities on most occasions.	Fully understands his/her personal rights and responsibilities.
Rights and responsibilities	understand how your attitudes to R&R affect you and others	Has a virtually no understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Has a very limited understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Has a limited understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Has some understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Has a sound understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Has a very good understanding of how personal attitudes towards rights and responsibilities are likely to affect oneself and others.	Fully understands how personal attitudes towards rights and responsibilities are likely to affect oneself and others.
Rights and responsibilities	appreciate and act on your personal rights and responsibilities	Displays no appreciation of personal rights and responsibilities and never knows how to act on them.	Displays very limited appreciation of personal rights and responsibilities but occasionally knows how to act on them.	Displays a limited appreciation of personal rights and responsibilities but occasionally knows how to act on them.	Displays an appreciation of personal rights and responsibilities and usually knows how to act on them.	Displays a sound appreciation of personal rights and responsibilities and often knows how to act on them.	Displays a very good appreciation of personal rights and responsibilities and knows how to act on them in most instances.	Fully appreciates his/her personal rights and responsibilities and knows exactly how to act on them.