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21st Century Skills and Competences for New Millennium Learners in OECD Countries

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Abstract

This paper discusses issues related to the teaching and assessment of 21st century skills and competencies in OECD countries drawing on the findings of a questionnaire study and other relevant background material such as white papers or curriculum documents. Although all OECD countries were invited to participate in the questionnaire survey, responses were received from seventeen countries or regions, and the paper focuses primarily on this group. The paper presents a short discussion of the importance and relevance of 21st century skills and competencies in the current policy debate and the definitions and conceptual frameworks that have been used in the literature, and proposes a new three-dimensional framework, consisting of the dimensions of *information*, *communication* and *ethics* and *social impact*.

The findings of the questionnaire survey show that most countries or regions cover 21st century skills and competencies in their regulations, guidelines or recommendations for compulsory education. However, there are few specific definitions of these skills and competencies at national or regional level and virtually no clear formative or summative assessment policies for these skills. The only evaluation regarding their teaching is often left to external inspectors as part of their whole school audits. Similarly there are few teacher training programmes that target the teaching or development of 21st century skills, although there exist several teacher training initiatives that focus on developing teachers' ICT pedagogical skills, most of them optional. The paper discusses the implications of these findings especially with regard to the particular role of ICT in the development of these skills and competencies, and issues related to assessment practices and teacher training.

Résumé

Ce document examine les problèmes liés à l'enseignement et à l'évaluation des qualifications et des compétences nécessaires au 21ème siècle dans les pays de l'OCDE en s'appuyant sur les conclusions d'une enquête et d'autres documents de référence comme des livres blancs et des documents relatifs aux programmes d'étude. Bien que l'ensemble des pays de l'OCDE ait été invité à répondre au questionnaire, 17 pays ou régions ont communiqué leurs réponses de sorte que c'est essentiellement sur ce groupe que la présente note se concentre. On y trouve une brève analyse de l'importance et de la pertinence des qualifications et compétences nécessaires au 21ème siècle dans le débat actuel et les définitions et cadres conceptuels utilisés dans la littérature, et l'on propose un nouveau cadre tridimensionnel intégrant les aspects de l'*information*, de la *communication* ainsi que de l'*éthique* et de *l'impact social*.

Les réponses au questionnaire montrent que la plupart des pays ou régions tiennent compte des qualifications et compétences requises au 21ème siècle dans leurs textes réglementaires, principes directeurs ou recommandations visant la scolarité obligatoire. Cependant, il existe peu de définitions spécifiques de ces qualifications et compétences aux niveaux national ou régional et pratiquement aucune politique d'évaluation formative ou sommative. La seule évaluation concernant la transmission de ces compétences est souvent confiée à des inspecteurs extérieurs, dans le cadre de l'audit qu'ils mènent sur l'ensemble du système scolaire. De même, il existe peu de programmes de formation des maitres qui ciblent l'enseignement ou le développement des compétences nécessaires au 21ème siècle, mais il y a des programmes de formation des enseignants centrées sur le développement des compétences pédagogiques en matière de TIC, dont la plupart sont optionnels. Le document examine les conséquences de ces conclusions en particulier pour le rôle des TIC dans l'acquisition de ces qualifications et compétences, ainsi que les problèmes liés aux pratiques d'évaluation et à la formation des maitres.

21ST CENTURY SKILLS AND COMPETENCES FOR NEW MILLENNIUM LEARNERS IN OECD COUNTRIES

Katerina Ananiadou & Magdalena Claro

1. Introduction

The research reported in this paper was carried out in the context of the OECD/CERI project on New Millennium Learners (NML), and in particular the international conference on 21st century competencies taking place in Brussels in September 2009[1]. The overall objectives of the NML project are, on the one hand, to conceptualise and analyse from a comparative perspective the effects of new digital technologies on young people's cognitive development, values, lifestyles and educational expectations; and, on the other hand, to examine the responses to the emergence of this new phenomenon in terms of educational policy and practice. The aim is to provide policy makers, researchers and educators with orientations and guidelines for the design of educational policies and practices that tackle the new generation of learners in the light of the requirements of the knowledge society[2].

Developments in society and economy require that educational systems equip young people with new skills and competencies, which allow them to benefit from the emerging new forms of socialisation and to contribute actively to economic development under a system where the main asset is knowledge. These skills and competencies are often referred to as 21st century skills and competencies, to indicate that they are more related to the needs of the emerging models of economic and social development than with those of the past century, which were suited to an industrial mode of production.

Young people are already experiencing the new forms of socialisation and social capital acquisition that ICT developments are contributing to. Their education, both at school and at home, needs to provide them with the social values and attitudes as well as with the constructive experiences that will allow them to benefit from these opportunities and contribute actively to these new spaces of social life.

On the other hand, today's labour force has to be equipped with the set of skills and competencies which are suited to the knowledge economies. Most of them are related to knowledge management, which includes processes related to information selection, acquisition, integration, analysis and sharing in socially networked environments. Not surprisingly, most, if not all, of these competencies, are either supported or enhanced by ICT. For many young people, schools are the only place where such competencies and skills can be learned.

Accordingly, governments should make an effort to properly identify and conceptualise the set of skills and competencies required so as to incorporate them into the educational standards that every student should be able reach by the end of compulsory schooling. Governments should realise that to be successful in this process there are two requirements to be met. On the one hand, participation of both economic and social institutions, ranging from companies to higher education institutions, is critical. On the other hand,

[1] http://www.nml-conference.be/

[2] For more information on the NML project see www.oecd.org/edu/nml

all this process risks being irrelevant to schools unless this set of skills and competencies becomes the very core of what teachers and schools should care about, and this can only be done by incorporating them into the national education standards that are enforced and assessed by governments.

This paper discusses issues related to the teaching and assessment of 21st century skills and competencies in OECD countries drawing on the findings from a questionnaire study and other relevant background material such as white papers or curriculum documents. Specifically, section 2 gives a brief overview of definitions and frameworks for these skills and competences as well as the debates concerning their importance. Partly based on this, section 3 proposes a new framework for thinking about 21st century skills. The questionnaire study carried out by the CERI Secretariat and its main findings are presented in section 4. Section 5 provides the main messages and conclusions that arise from the analysis of the questionnaires while section 6 presents issues for debate, discussion and further research.

2. 21st century skills: definitions and debates

Initiatives on the teaching and assessment of 21st century skills originate in the widely-held belief shared by several interested groups - teachers, educational researchers, policy makers, politicians, employers - that the current century will demand a very different set of skills and competencies from people in order for them to function effectively at work, as citizens and in their leisure time (e.g. Dede, 2007; Kalantzis and Cope, 2008). Initiatives such as the Partnership for 21st skills (www.21stcenturyskills.org) and the Cisco/Intel/Microsoft assessment and teaching of 21st century skills project (www.atc21s.org) also point to the importance currently attached to this area not only by researchers, practitioners and policy makers but also the private sector. Supporters and advocates of the 21st century skills movement argue for the need for reforms in schools and education to respond to the social and economic needs of students and society in the 21st century.

It is of course beyond the scope of this paper to provide an in-depth analysis of evidence for or against these different points of view; however, it may be valuable to examine some of the policy challenges presented below in terms of these debates. To begin with, some critical voices, such as that of the Common Core group (www.commoncore.org), argue for more emphasis on content and a broad liberal arts curriculum rather than the teaching of skills such as critical thinking or learning how to learn. The main argument advanced by this approach to teaching is that, although such skills are very important, they cannot be taught independently, i.e. outside a particular knowledge domain such as those designated by traditional academic subjects, nor will students be able to apply such skills if they lack the appropriate factual knowledge on a particular domain. From a quite different perspective, some claim that although the concept of competency is extremely valuable for guiding how teaching and learning should unfold in the classroom; it usually represents the voices of businesses and firms. In many ways, the rhetoric of 21st century competencies is seen as yet another facet of an economist approach to education according to which its main goal is to prepare workers for knowledge-intensive economies or even in some cases for particular firms. Instead of putting the emphasis on a harmonious development of all human abilities, the discourse on competencies overstates the relevance of work-related competencies. Moreover, some argue that, as they are commonly defined, 21st century competencies are not within reach of all young people, firstly because not all today's students are going to become knowledge-intensive workers even in developed countries, and secondly because this rhetoric forgets the needs of the vast majority of the world's population in developing countries. The discourse on 21st century competencies is therefore hardly relevant in all contexts and there is a risk of enlarging socio-economic disparities when promoting such competencies among the world's elite.

i) The OECD approach

The OECD's approach to new competencies and skills has been elaborated through two important initiatives: the Definition and Selection of Competencies (DeSeCo) Programme and the Programme for International Student Assessment (PISA). The DeSeCo project aimed to provide a framework that could guide the longer-term extension of assessments into new competency domains. DeSeCo uses three clusters of key competencies: i) using tools interactively, ii) interacting in heterogeneous groups, and iii) acting autonomously. The ability of individuals to think for themselves and to take responsibility for their learning and for their actions lies at the centre of the DeSeCo's framework.[3]

The outcomes of DeSeCo formed the theoretical underpinnings of PISA, a programme launched in 1997, with the aim of monitoring the extent to which students near the end of compulsory schooling –at age 15- have acquired the knowledge and skills necessary for full participation in society. It focuses on young people's ability to use their knowledge and skills to meet real-life challenges, rather than on the extent to which they have mastered a specific school curriculum. This study has two important features:

- an innovative literacy concept related to the capacity of students to apply knowledge and skills in key subject areas and to analyze, reason and communicate effectively as they raise, solve and interpret problems in a variety of situations[4], and

- its relevance to lifelong learning, which does not limit PISA to assessing students' curricular and cross-curricular competencies, but also asks them to report on their own motivation to learn, their beliefs about themselves, and their learning strategies. (OECD, 2004) Although this test is not directly related to ICT, as previously mentioned, it includes a computer questionnaire that allows the study of the relationship between students' access to and use of ICT and their performance in PISA (OECD, 2005 and OECD, forthcoming (a) PISA assessments of student performance in selected school subjects have taken place with the understanding that students' success in life depends on a much wider range of competencies.

We propose here a typology that we found useful when thinking about the different types of skills in question, and potentially for distinguishing between those that are more strongly related to ICT from those that are not. It groups skills and competencies into three different categories as follows:

- *ICT functional skills*, that includes skills relevant to mastering the use of different ICT applications;

- *ICT skills for learning*, which include skills that combine both cognitive abilities or higher-order thinking skills with functional skills for the use and management of ICT applications; and

[3] For more details see: www.oecd.org/edu/statistics/deseco, or www.deseco.admin.ch

[4] PISA works with three types of literacies: (1) reading literacy, defined as the capacity to understand, use and reflect on written texts, in order to achieve one's goals, develop one's knowledge and potential, and participate in society; (2) mathematical literacy defined as the capacity to identify and understand the role that mathematics plays in the world, make well-founded judgments, and use and engage with mathematics in ways that meet the needs of one's life as a constructive, concerned and reflective citizen; and (3) scientific literacy, defined as the capacity to use scientific knowledge, identify scientific questions and draw evidence-based conclusions, in order to understand and help make decisions about the natural world and the changes made to it through human activity.

- *21st century skills* which bring together skills considered necessary in the knowledge society but where the use of ICT is not a necessary condition. This report therefore deals with this last type of skills, although it is interesting to keep in mind the typology above when considering the policy evidence presented below.

ii) Defining skills and competencies

An important consideration relates to the definition of the terms 'skills' and 'competence' and how they relate to each other. One useful distinction between the two is provided by the OECD's DeSeCo project:

> *A competence is more than just knowledge or skills. It involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context. For example, the ability to communicate effectively is a competence that may draw on an individual's knowledge of language, practical IT skills and attitudes towards those with whom he or she is communicating* (Rychen & Salganik, 2003).

The European Commission's Cedefop glossary (Cedefop, 2008) defines a skill as follows: t*he ability to perform tasks and solve problems*, while a competence is the ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development. A competence is not limited to cognitive elements (involving the use of theory, concepts or tacit knowledge); it also encompasses functional aspects (involving technical skills) as well as interpersonal attributes (e.g. social or organizational skills) and ethical values.

A competence is therefore a broader concept that may actually comprise skills (as well as attitudes, knowledge, etc) and 21st century competencies were in fact the primary focus of this study. However, given that the terms are sometimes used interchangeably or with slightly different definitions in different countries and languages, it was decided to include both in the questionnaire sent to national representatives. This was also in line with the intention to cover as broad an area as possible in collecting the relevant information.

Based on the above, our working definition of 21st century skills and competencies for the purpose of this study is: those skills and competencies young people will be required to have in order to be effective workers and citizens in the knowledge society of the 21st century. This was a deliberately open-ended definition for two reasons: i) despite the prominence of the issue in educational debates by policy makers and researchers there is no agreement on a specific set of such skills and competencies or on their definition; and ii) one of the purposes of the study was to find out how countries (or regions) define these skills as well as to obtain information on guidelines and regulations regarding their teaching and assessment. Although in the remainder of this paper we try as much as possible to use both terms ('skills and competencies'), in practice one of the two is sometimes used depending on the particular context being discussed.

3. A framework for 21st century skills and competencies

In this section we present a framework for conceptualising the competences discussed in this study; they can be thought of in terms of three dimensions: *information*, *communication* and *ethics and social impact*. In what follows we briefly discuss each one in turn while at the same time providing examples of how the skills and competencies used in the questionnaire study (see section 4 and Annex 2) relate to each dimension and sub-dimension. This exercise is only preliminary and open to discussion at this point; in

addition, this was not intended as a one-to-one mapping, as some skills may relate to more than one dimension.

i) Information dimension

The information explosion triggered by ICT requires new skills for accessing, evaluating, and organising information in digital environments. At the same time, in societies where knowledge has a central value it is not enough to be able to process and organize information, but also to be able to model and transform it to create new knowledge or to use it as a source for new ideas.

Typical skills in this dimension are research and problem solving skills as they both involve at some point defining, searching for, evaluating, selecting, organising, analysing, and interpreting information.

Further, research evidence suggests that ICT applications make up a particularly appropriate environment for higher order abilities such as management, organization, critical analysis, problem resolution and the creation of information (Balanksat et.al., 2006; Kirriemur & McFarlane, 2004; Sefton-Green, 2002; Rosas et.al.2002; Cox, 1997; Bonnet *et.al*, 1999). In fact, evidence associated with what has been called the Flynn effect (Flynn, 2007) indicates that changes that are the product of modernity – such as activities with greater intellectual demand, greater use of technology, and smaller families – show that people today are much more used to thinking in terms of abstract concepts, such as hypothesis and categories, than they were a century ago. This is expressed by the progressive increase in new generation's performance in intelligence tests, creating a phenomena of 'massification' of intellectual abilities that were previously limited to the top section of the population.

Consistent with the processes of information and knowledge, this dimension includes two sub-dimensions:

Information as source: searching, selecting, evaluating and organising information

The great bulk of available information on the internet, as well as the proliferation of databases, make the ability to find and organize information quickly and efficiently a critical skill. In fact, the concept of *information literacy* focuses on this process (Anderson, 2008). It presupposes that the student first understands and then clearly defines the information needs on the basis of a question, issue or task; knows how to identify digitally pertinent information sources; and knows how to look up for and select the digital information required in an effective and efficient way considering the problem to be solved. Once the information has been found, it is fundamental that the student be capable of evaluating how valuable and useful the source and its contents are for the task at hand, as well as being able to store and organize the data or digital information efficiently so that it can be used again. Examples of skills and competencies belonging to this sub-dimension are information literacy, research and inquiry and media literacy

Information as product: the restructuring and modelling of information and the development of own ideas (knowledge)

This sub-dimension consists of what a student can do with digital information once it has been collected and organized. He or she can transform and develop information in a variety of ways to understand it better, communicate it more effectively to others, and develop interpretations or one's own ideas on the basis of a question, issue or task to be solved. ICT provides useful tools to deal with many of the processes involved in these activities; such as integrating and summarising information; analysing and interpreting information; modelling information, observing how a model works and the relations between its elements; and, finally, generating new information to develop new ideas. The process of developing one's own ideas is key, as it encourages students to develop their own thinking. Skills that belong mostly to this sub-dimension are creativity and innovation, problem solving and decision making.

ii) Communication dimension

Communication plays an important role in the preparation of students to be not only lifelong learners, but also members of a larger community with voice and a sense of responsibility to others. Young people need to have the ability to communicate exchange, criticise, and present information and ideas, including the use of ICT applications to participate in and make positive contributions to the digital culture.

Research in this field suggests that ICT applications strengthen and increase the possibilities of communication and reinforce the development of skills of coordination and collaboration between peers. For example, it has been observed that videogames encourage young people to interact strongly with their peers, to create meeting spaces, exchange experiences and reinforce skills of communication and collaboration (see for example Dede, 2009). Game theory uses the term "meta-gaming" to refer to the conversations about strategies that occur around videogames as players share what they know, ask more expert players questions and join efforts to solve complex challenges. This type of involvement with a game is similar to what education psychologists call 'meta-understanding", the process of reflecting about one's own learning (Squire and Jenkins, 2003).

This dimension also has two sub-dimensions:

Effective communication

Once the early stages of work with information and knowledge are complete, sharing and transmitting the results or outputs of information is very important for the impact of this work. In fact, this is a critical stage in the process that requires analytical work in itself, including processing, transforming, and formatting information and reflecting about the best way to present an idea to a particular audience. On the other hand, practical skills are needed to communicate effectively; these are linked to the use of the adequate available tools, use of correct language, and all other aspects that take the context into account to achieve an effective communication. Information and media literacy, critical thinking and communication are skills that belong to this sub-dimension.

Collaboration and virtual interaction

ICT supplies tools to support collaborative work among peers inside and outside school - for example providing constructive feedback through critical reflection on others' work or through the creation of spontaneous learning communities where some take the role of students and others of teachers. Today, participation in the digital culture depends on the ability to interact in virtual groups of friends and groups of interest, where young people are capable of using applications fluently and on a daily basis. Collaboration/team working and flexibility and adaptability are examples of skills that belong to this sub-dimension.

Ethics and social impact dimension

Globalisation, multiculturalism and the rise in use of ICT also bring ethical challenges, so skills and competencies related to ethics and social impact are also important for the workers and citizens of the 21st century.

As with the previous dimensions, there are two ethical sub-dimensions:

Social responsibility

Social responsibility implies that individuals' actions may have an impact on society at large, both in a positive sense (i.e. there is a responsibility to act), but also in a negative one (i.e. responsibility to refrain

from certain actions). In terms of ICT for example, this refers to the ability to apply criteria for its responsible use at personal and social levels, acknowledging potential risks as well as the use of rules of behaviour that promote an adequate social exchange on the web. Critical thinking, responsibility and decision making are skills that are related to this sub-dimension.

Social impact

This dimension refers to the development of a consciousness about the challenges in the new digital age. For example, there is consensus that the huge impact of ICT on social life is a matter that young people should reflect upon, considering the social, economic, and cultural implications for the individual and the society. These skills and competencies are often referred to as digital citizenship. The impact of young people actions' on the environment is another area that requires reflection and skills and competencies related to this also belong to this sub-dimension.

4. Questionnaire study

To obtain up-to-date information on whether and how OECD countries teach and assess 21st century skills a questionnaire study was conducted from June to August 2009. The questionnaire was sent to all OECD member countries via their permanent delegations to the OECD and asked for information on the following topics:

- Which 21st century skills are included in current policy guidelines or regulations
- How they are defined
- Details on the context that led to their introduction
- Details on guidelines or regulations for teaching them
- Details on guidelines or regulations for assessing or evaluating them
- Impacts on teacher training programmes.

i) Methodology

The questionnaire was developed by the CERI Secretariat in consultation with external experts, and with the support of the Flemish Ministry of Education. Given the lack of standard definitions and agreement on a specific set of 21st century skills and competencies it was decided to adopt as broad and comprehensive a definition and list of such skills as possible, based on the conceptual framework described above and ensuring that skills and competencies from all three dimensions – information, communication and ethics/social impact – were covered (see above). In addition, there was scope for countries to include any other skills or competencies they considered appropriate and to provide their own definitions, as well as comments and references to relevant documents.

The full text of the questionnaire is provided in Annex 1.

The following seventeen countries or regions completed and returned the questionnaire by the end of September 2009: Australia, Austria, Belgium (Flanders), Canada (New Brunswick), Finland, Ireland,

Italy[5], Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain and Turkey.

ii) Results

In this section the findings of the questionnaire study are summarised and discussed in a comparative way, highlighting where possible particular points through examples from individual countries. Short summaries of each country's responses are provided in Annex 2.

Context

In many countries the introduction in the curriculum or standards of 21st century skills and competencies took place in the context of a more general reform, or even more radical innovations such as the development of the first national curriculum in Australia or the introduction of the Māori language curriculum in New Zealand. In Norway, the 2006 curriculum reform, known as the Knowledge Promotion, had as its goal to '*help all pupils develop fundamental skills that will enable them to participate fully in our knowledge society'*. In Poland a new national core curriculum was introduced in 2009 partly to respond to the rapid changes in sciences, technology and culture and to the rising number of students wishing to attend tertiary education. In Mexico, one of the reasons reforms were introduced in 2006 and 2008 in secondary and primary education respectively was the need to update the curricula and pedagogical methods in light of recent educational research findings and so as to develop competencies for the better integration of students to contemporary society.

In Austria a specific initiative, the FutureLearning project, enabled the development and introduction of these skills. And several countries (e.g. Poland, the Slovak Republic, Italy, Spain) report that reports or studies from international organisations, such as the European Commission (e.g. the European Commission's Education and Training 2010 work programme) or the OECD (e.g. the DeSeCo project, results from PISA assessments) ,were the starting point for work in this area.

Finally, there are countries (e.g. the Netherlands) that do not report a special factor or stimulus for the introduction of 21st century skills and where these changes took place in a more incremental way.

21st century skills coverage

It is interesting that the overwhelming majority of countries that completed the questionnaire answer positively the first question on whether they have specific coverage of 21st century skills or competencies in their regulations or guidelines. In addition, when asked to specify which skills are covered from a fairly long and comprehensive list most countries select all of them or most of them. Australia and Canada (New Brunswick) were the only countries that responded that these skills and competencies are not currently covered in their regulations. However, in Australia there are concrete plans to introduce them both in the national teaching professional framework and standards and in the country's first national curriculum that will be implemented as of 2011. In Canada (New Brunswick) the 21st Century School Initiative has recently begun and has as objectives to define, promote and focus upon 21st century skills; create innovative learning environments; and to provide ubiquitous access to technology in classrooms. In addition, New Zealand's response referred to curricula that will be regulated in 2010 and 2011, so strictly speaking this country has currently no relevant regulations, based on the information in the questionnaire.

Considering specific skills and their definitions, those least frequently selected are: *decision making* (not selected by Finland and the Netherlands), *digital citizenship* (not selected by Finland, Portugal and the

[5] Italy did not complete the questionnaire as such but provided some relevant information in a short document.

Slovak Republic) and *productivity* (not selected by Finland, Ireland, Norway and Portugal). Most countries do not, however, provide a clear answer to how these skills and competencies are defined in their documents or simply state that such national definitions do not exist (e.g. Norway). Instead, they specify that these skills may not be referred to explicitly in documents, or not in exactly the same terms (e.g. the Netherlands). Once more, this could be evidence of a general lack of clear understanding of the concepts at hand.

Several countries refer to a smaller set of broader 'key' competencies or skills, which include many of the individual skills in the list we provided them with. For example, the New Zealand curriculum makes reference to five key competencies: thinking; using language, symbols and text; managing self; relating to others; and participating and contributing. Poland has the following set of skills and competencies that have to be acquired by the end of lower secondary education: reading; mathematical thinking; scientific thinking; communicative skills; technological skills; information usage; self-orientation; team working. Other countries that have similar overarching sets of key or basic skills or competencies include Belgium (Flanders), Italy, Korea, Mexico, New Zealand (both the English and Maori language curricula), Poland, the Slovak Republic, Spain, and Turkey.

When asked how these skills are taught, most countries report that teaching them not as separate subjects but rather integrating them across the curriculum. For example, in Ireland, '*the primary curriculum provides for the teaching of these skills across subjects. It particularly stresses the importance of developing generic skills and abilities that help the child to transfer learning to other curriculum areas, to future learning situations and to his or her life experience'*. New Zealand takes this a step further by declaring that their starting point for the reforms was that the competencies were '…capabilities for living and lifelong learning (…) They are integral to teaching and learning in the learning areas and should therefore be assessed with these'. Many other countries responded to the same effect, although some distinguished between what they sometimes called 'generic' skills from ICT-related ones, such as digital literacy or technology. The latter are sometimes taught as separate subjects, for example in the Slovak Republic and Turkey. Even in countries where ICT is not taught as a separate subject, there may well exist separate guidelines or frameworks that refer specifically to the teaching and assessment of ICT-related skills (e.g. Belgium (Flanders), Ireland, Portugal).

It can therefore be argued that ICT-related skills are sometimes considered different in nature from the rest and for this reason countries are distinguishing them in their policies. This would be in agreement with the typology provided in the previous section that distinguishes between *ICT functional skills* and *ICT for learning skills*. The former are indeed more like content-based academic subjects such as history or chemistry and could be taught as such, while the latter resemble more the rest of the skills in question. In fact, it is plausible that countries that have reached a certain level of 'ICT-maturity', i.e. where ICT has penetrated people's lives, including schools, to a large extent, such as the Nordic countries, are moving away from teaching ICT as a separate school subject, although we do not have sufficient evidence in this study to ascertain this. It would appear in any case that the term ICT skills may be too general to be useful and that the specific skills that go under this heading will differ depending on the context. In addition, it may be useful to think of ICT skills as different in nature from the other 21st skills and competencies, or as a subset of these skills, where the use of certain ICT applications particularly favours the development of skills such as critical thinking, problem solving and creativity.

It is also worth stressing at this point that in a number of countries (e.g. Austria, Finland, Norway, the Netherlands) there are minimal or no guidelines at national level for teaching specific subjects or competencies, as schools and teachers are independent and expected to determine this by themselves. There may, however, exist relevant guidelines or aides, such as the Finnish guidebook for teachers on cross-curricular themes or the Irish ICT framework on integrating ICT in the curriculum.

Assessment and evaluation

When it comes to the assessment of 21st century skills the first point to note is that very few countries (Austria, Finland, and the Netherlands) claim not to have any assessment policies or guidelines in place for these skills. However, a closer look at the explanations provided reveal that in fact there is no specific assessment of these skills; instead it is understood that these will be assessed as part of the general assessment policies that are in place in each country. For example, New Zealand reports: '*...each board of trustees* (i.e. the governing authority for each school) *... through a range of assessment practices* [is required] *to gather information that is sufficiently comprehensive to enable the progress and achievement of students to be evaluated*, … [about] *the breadth and depth of learning needs, abilities and interests of students, the nature of the school's curriculum and the scope of the New Zealand curriculum'*.

Other countries, e.g. Belgium (Flanders), Ireland, state that school inspectors evaluate the development of these skills as part of their whole school evaluations. In general, it appears that in most countries these skills are, if at all, assessed implicitly, through the normal assessment in the different curricular areas. This is not surprising for at least two reasons: firstly, as it was discussed earlier, 21st century skills are for the most part not taught as independent subjects but cut across the whole curriculum. In the case of the new curricula currently being implemented in New Zealand, for example, there was a decision to align assessment and evaluation of these competencies with the integrated approach that was adopted for their teaching, thereby recognising their context dependency. Secondly, given the fact that these skills and competencies are rather ill-defined, it is not surprising that they are particularly hard to assess in a standardised way. As Belgium (Flanders) states that '… *a lot of cross-curricular objectives are by nature very difficult to assess'*.

Clear and well-defined assessment policies are an important – some would argue essential – condition for these skills being taught effectively by teachers and developed by students. In other words, it is a widely held belief that (although by no means shared by all), if not endorsed by rigorous assessment policies, the teaching of such skills risks not being treated as a priority by teachers and students alike. At the same time, the rather vague discourse and conflicting messages (as evident in the views of groups such as the Common Core that characterise the field, as discussed above), make it particularly difficult for policy makers to put in place clear guidelines and regulations. Given this situation, the outcomes of initiatives such as the Cisco/Intel/Microsoft ATC21S project on the assessment and teaching of 21st century skills may prove particularly valuable.

Impact on teacher training[6]

When asked about the impact that developments in 21st century skills have had on teacher training, most countries respond positively although the type of training on offer varies considerably from country to country. A few countries or regions do mention specific programmes for training new or in-service teachers on the teaching of these skills, although many seem to focus primarily on ICT, e-learning, etc. New Zealand has, for example, numerous in-service training programmes with a focus on key competencies. Korea's Education and Research Information Service (KERIS) provides training on 21st century learners. In Belgium (Flanders) ICT training has been given high priority in all teacher training programmes, with an emphasis on the pedagogical use of new technologies and on making teachers 'self-reliant' when it comes to using computers. Austria's training institutions provide various programmes, for instance on cooperative learning (www.cooltrainers.at) or on the pedagogical uses of ICT through the European Pedagogical ICT licence (www.epict.at).

[6] CERI is currently conducting a separate project on the use of ICT in teacher training. See http://www.oecd.org/document/13/0,3343,en_2649_35845581_41676365_1_1_1_1,00.html

Trainee teachers are, of course, expected to be familiar with their country or region's curricular objectives and to use curriculum documents when planning their lessons, so if, for example, the teaching of these skills is included in curricular or cross-curricular guidelines this will evidently be included in their training. In addition, in countries with recent reforms (e.g. Belgium (Flanders), New Zealand, Spain) there are training programmes in place for familiarising teachers with the new policies. It is, however, not clear to what extent these training programmes place particular emphasis on the teaching and assessment of 21st century skills. Coupled with the fact that little emphasis appears to be placed on the assessment of these skills, it is not implausible to infer that at least some teachers have little incentive and/or knowledge to ensure their development in their students.

5. Key findings

This section presents the main findings from the questionnaire survey described above. The aim here is to provide a summary of the results drawing on as many countries as possible, although of course there are always instances of countries or regions whose policies are different from the ones presented in these statements.

- Virtually all countries that took part in the questionnaire study subscribe to the importance and policy relevance of 21st century skills and competences, although they fail to provide detailed and clear definitions for them.

- Most countries integrate the development of 21st century skills and competencies in a cross-curricular way, i.e. across subject areas. ICT-related skills are often the exception to this, i.e. they are taught in some countries as a separate subject.

- The introduction of 21st century skills has often been done in the context of a major curriculum reform.

- There are virtually no clear (formative or summative) assessment policies for these skills. The only evaluation regarding their teaching is often left to external inspectors as part of their whole school audits.

- Similarly there are few teacher training programmes, initial or in-service, that target the teaching or development of 21st century skills. There exist several teacher training initiatives that focus on developing teachers' ICT pedagogical skills, most of them optional.

6. Discussion

This section discusses in more detail the implications of some of the findings of this piece of research while at the same time raising some questions that can inform the debate in the field and provide ground for future research.

Looking at the contextual factors and processes that led to the introduction of these skills and competencies in country guidelines or regulations, it appears that in several cases these were introduced as part of a major curriculum or other reform (e.g. Australia, Mexico, New Zealand, Poland, Spain), while in others this was done in a more incremental way (e.g. the Netherlands). The economic and social challenges presented by the knowledge society were enabling factors frequently mentioned by countries for introducing such reforms. In some cases specific projects or reports have acted as specific drivers, such as the European Commission's Education and Training 2010 programme (Poland, Spain), or the OECD's DeSeCo project (New Zealand). An analysis in terms of enablers, drivers and barriers to the implementation of any new initiatives in relation to 21st century skills may therefore be valuable to policy

makers working in the area, as it appears that this is a useful framework for conceptualising this type of reform. A similar framework was used successfully in a recent CERI project on systemic innovation and reform in VET (see OECD, forthcoming).

Most of the seventeen OECD countries or regions that responded to the questionnaire have guidelines or regulations regarding the teaching and/or assessment of 21st century skills, with the exception of Australia, which has concrete plans for implementation in the future, and Canada (New Brunswick), which has recently started an initiative on this issue. In addition, New Zealand has not yet regulated the new national curricula that include coverage of these skills and competencies, but will be doing so in the near future.

Although this is on the face of it promising, we need to keep in mind that it is just over half of the OECD countries that have responded, so it is difficult to say whether the countries that did not fill in the questionnaire are also the ones most likely to have responded negatively to this question. In addition, the fact that countries are selecting all or almost all the items out of a fairly long list is an indication of a lack of clear definitions and understanding of these skills and competencies. In other words, it is possible that these skills are so ill-defined that they end up being conceptualised in the minds of policymakers as one 'package', with little discrimination between them or understanding of the particular domain each one of them covers. If this is the case then one important task for researchers and analysts in the field may be to better define these skills and competencies and to demonstrate how their teaching and assessment can be covered in regulations, teaching guidelines, national curricula, etc. Some countries are already implicitly addressing this issue by grouping these skills into sets of broader 'key competencies'.

It appears that at least some countries distinguish between ICT-related skills and skills such as critical thinking, problem solving etc, which sometimes they refer to as 'generic' skills. This is obvious both through the fact that ICT is sometimes considered a separate subject area in the curriculum, rather than integrated into different subject areas, but also because some countries offer separate teaching guidelines or teacher training programmes specifically on ICT skills and its effective use in the classroom. The phenomenal impact of new technologies on all aspects of life in modern societies is one of the factors that led to the need for the teaching of new skills at schools. ICT therefore has a crucial role in all relevant debates, not merely because it implies a new set of skills to be learnt by teachers and students, but because of its potential impact on the development of other skills and competencies as well as on pedagogical and assessment practices. A potential area for future research in the field would therefore be to try and distinguish between all these complementary roles of ICT in the 21st century skills debate. One way to conceptualise them would be according to the framework presented in the second section of this paper (p. 3-4), i.e. thinking in terms of *ICT functional skills*, *ICT skills for learning* and *21st century skills*.

Two important issues that also need to be addressed urgently are that of assessment and teacher training. With regard to the former, initiatives such as the ATC21S project are particularly welcome and expected to fill important gaps in our knowledge. Rigorous assessment methods cannot of course be developed without clear definitions of the skills and competencies in question, so the issue of assessment is closely related to those discussed above. In addition, the potential of ICT in assessment methodologies has yet to be fully explored and research and development in this area is also very much needed.

Finally, all the research outcomes or policy initiatives in the area can only be put in practice if teachers and students regard them as valuable and relevant to their teaching and learning experience. High-quality teacher training programmes are essential for this, and once more this is an area where more work needs to be done in most countries. In particular, teachers not only need to be provided with training on how to help their students develop these skills and competencies, they also need to be convinced of the value of these skills and be provided with incentives and resources to devote sufficient time to them. Involving teachers themselves and drawing on their expertise when developing future projects or policy

initiatives in the field is a first step towards ensuring their commitment to them as well as being essential for tapping into their knowledge and experience.

We are finishing this discussion section with some open questions that will hopefully encourage reflection and discussion on this important policy topic:

- What are the key success factors for 21st century skills policies?

    1. High-quality and relevant teacher training?

    2. Curriculum integration?

    3. Clear and rigorous assessment?

- Should 21st century skills be integrated into subject-based curricula?

- Are ICT skills different from the others and should they accordingly have a different treatment in policy terms?

- How can we involve teachers in the overall debate and in the design of teacher training programmes in particular?

- What types of assessment are appropriate for the monitoring and evaluation of 21st century skills and competencies? How can they be developed?

We are aware that there are no easy answers to these questions, but we hope that an open and informed debate on them will be the first step towards designing high quality education policies for the citizens and workers of the 21st century.

REFERENCES

Anderson, R. (2008). Implications of the information and knowledge society for education. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* New York: Springer.

Balanskat, A., Blamire, R. & Kefala, S. (2006). *The ICT impact report. A review of studies of ICT impact on schools in Europe*. Brussels: European Schoolnet/European Commission.

Bonnett, M.R., McFarlane, A.E. & Williams, J. (1999) ICT in Subject Teaching – an opportunity for curriculum renewal? *The Curriculum Journal*, 10, 3, 345–359.

Cedefop (2008) *Terminology of European education and training policy. A selection of 100 key terms*. Luxembourg: Office for Official Publications of the European Communities.

Available at:

Cox, M., Abbott, C., Webb, M., Blakeley, B., Beauchamp, T. and Rhodes, V. (2004*). A review of the research literature relating to ICT and attainment.* London: Becta.

Available at: http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/ict_attainment04.pdf

Dede, C. (2007) *Transforming Education for the 21st century: new pedagogies that help all students attain sophisticated learning outcomes.* Paper available at: http://www.gse.harvard.edu/~dedech/Dede_21stC-skills_semi-final.pdf

Dede, C. (2009). Immersive interfaces for engagement and learning. *Science*, 323(5910), 66-69.

Flynn, J.R. (2007) *What is Intelligence? Beyond the Flynn Effect*. Cambridge: Cambridge University Press.

Kalantzis, M. & Cope, B. (2008) *New Learning. Elements of a Science of Education*. Cambridge: Cambridge University Press.

Kirriemur, J. & McFarlane, A. (2004). *Literature review on games and learning*. Futurlab report 8. Available at: http://hal.archives-ouvertes.fr/docs/00/19/04/53/PDF/kirriemuir-j-2004-r8.pdf

OECD (2004) *Learning for Tommorrow's World. First Results from PISA 2003*. Paris: OECD

OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us* Paris: OECD.

OECD (forthcoming). *Working Out Change. Systemic Innovation in Vocational Education and Training*. Paris: OECD.

Rosas, R., Nussbaum, M., Cumsille, P. *et.al* (2002). Beyond Nintendo: design and assessment of educational video games for first and second grade students. *Computers & Education*, 40, 71–94.

Rychen, D. S. & Hersch, S. L. (Eds) (2003). *Key Competencies for a Successful Life and a Well-Functioning Society*. Cambridge, MA: Hogrefe & Huber.

Sefton-Green, J. (2004). *Literature Review in Informal Learning with Technology Outside School.* Futurelab, Report 7. Available at: **www.futurelab.org.uk/research/lit_reviews.htm**

Squire, K. & Jenkins, H. (2003) Harnessing the Power of Games in Education. *Insight*,Vol.3, 5-31

ANNEX 1
COUNTRY QUESTIONNAIRE

21 Century Skills and Competencies

1. Is there specific coverage of 21st century skills or competencies in the regulations (e.g. curricula, national standards) or guidelines/recommendations for compulsory education in your country? (please delete)

Yes ☐ No ☐

If yes, go to Part A, if no go to Part B

Part A

(*to be completed only by those who answered Yes to Question 1*)

2. Are any of the following skills/competencies covered by these policies?

A	Creativity/ innovation	☐ ☐
B	Critical thinking	☐ ☐
C	Problem solving	☐ ☐
D	Decision making	☐ ☐
E	Communication	☐ ☐

○	Collaboration	☐ ☐
○	Information literacy	☐ ☐
○	Research and inquiry	☐ ☐
○	Media literacy	☐ ☐
○	Digital citizenship	☐ ☐
○	ICT operations and concepts	☐ ☐
○	Flexibility and adaptability	☐ ☐
○	Initiative and self direction	☐ ☐
○	Productivity	☐ ☐
○	Leadership and responsibility	☐ ☐
○	Other (*please specify*)	☐ ☐

3. Please provide us with brief definitions/descriptions of these skills and competencies as presented in your country's relevant official documents

4. What level(s) of education is/are covered by these policies? (*tick all that apply*)

primary (5-12) ☐

lower secondary (12-16) ☐

5. When did these regulations/guidelines come into effect?

6. Please briefly explain the policy context and rationale that led to the introduction of these regulations or guidelines regarding 21st century skills and competencies.

7. Please briefly describe the process through which the specific list of competencies and skills was established.

8. How are these skills/competencies taught (e.g. included in the curriculum as a separate subject, taught across subjects)?

9. Are there specific guidelines or regulations regarding the teaching of these competencies/skills?

Yes ☐ No ☐

10. If yes, please briefly describe them

11. Are there regulations or guidelines regarding the assessment or evaluation of these competencies/skills?

Yes ☐ No ☐

12. If yes, please briefly describe them

13. Are these skills/competencies assessed at system level (national, regional, local, please specify) at the end of compulsory education?

Yes ☐ No ☐

14. Have these regulations or guidelines had an impact on teacher training programmes?

Yes ☐ No ☐

15. If yes, briefly explain how.

Please now go to Part C

Part B

(to be completed only by those who answered No to Question 1)

16. Are there currently any discussions or plans in your country to introduce regulations or guidelines on the teaching and evaluation of 21st century skills and competencies in the near future?

Yes ☐ No ☐

17. If yes, please provide us some details on these discussions or plans

Part C

(*to be completed by all respondents*)

18. We would be grateful if you could send us copies of any relevant documents or web links. Please use the space below to indicate the titles of these documents and/or relevant web addresses

19. Please use the space below for any additional comments you may have

20. Finally, please fill in the name and contact details of the person(s) that completed this questionnaire

ANNEX 2
COUNTRY INFORMATION – BRIEF SUMMARIES

Australia

Australia will be introducing for the first time a national curriculum and a national teaching professional framework and standards within the next two to three years. These will cover 21st skills, including ICT skills and knowledge, in a consistent way. More information is available on www.acara.edu.au

Austria

The secondary school curriculum specifies professional as well as social competencies, such as self-management, self-directed learning, and ability to collaborate and to take responsibility. ICT is taught as a separate subject ('Network technologies'), although it is not compulsory and therefore not offered by all schools. Vocational schools also teach entrepreneurship.

The *Future Learning Initiative* of the Ministry of Education has driven many initiatives in the area (see www.bmukk.gv.at/schulen/futurelearning.

There are currently no assessment regulations or guidelines regarding these skills, but there are numerous teacher-training programmes, including COOL (*cooperatives offenes Lernen*) focusing on self-directed learning.

Belgium (Flanders):

In primary schools some 21st century skills are included in the core curriculum either as concrete objectives or as broader goals or underlying principles. In secondary education these skills are included in the cross-curricular themes: learning to learn, social skills, citizenship, health education, environmental education, expressive-creative education and technical/technological education. Changes to the cross-curricular part of the core curriculum, with a particular focus on key competencies, will be introduced in 2010. Schools decide themselves how to achieve the cross-curricular objectives; there are no guidelines or models from the Ministry. Similarly, there is no assessment of these skills, although the inspectorate ensures that sufficient efforts are made by the school in order to fulfil the cross-curricular objectives during school audits.

Training in ICT forms an essential part of all teacher training; it covers not only teachers' ICT competencies but also training on teaching and transferring these competencies to their students.

Canada (New Brunswick)

The 21st Century Schools initiative was recently conceptualised to begin the process of transforming New Brunswick high schools. The primary objectives of the initiative are to:

- Define, promote and focus upon 21st century skills

- Create innovative learning environments
- Provide ubiquitous access to technology in classrooms
- Manage the change process during the roll-out phase of transformative components

The advisory committee for the initiative will commence work in September 2009 and is scheduled to make recommendations to the Minister in February 2010.

Finland

The Finnish national core curriculum has the following cross-curricular themes: personal growth; cultural identity and internationalism; media skills and communication; citizenship and entrepreneurship; environmental responsibility; safety and traffic; and technology and the individual. Other skills and competencies are defined in the learning objectives and core content of education of the different subjects. The Finnish National Board of Education has published a guidebook for teachers on cross-curricular themes. Schools and teachers decide for themselves, however, how competencies are taught. There are currently no assessment regulations or guidelines on 21st century skills and competencies.

Ireland:

The primary school curriculum, introduced in 1999, seeks to foster the development of key skills in communication, problem solving, critical thinking, inquiry, investigation and analysis, and social and personal awareness and interaction. It provides for the teaching of these skills across subjects, stressing in particular the importance of developing generic skills and abilities that help the child to transfer learning to other curriculum areas, future learning situations and his/her life experience in general. These skills are taught across subjects.

The ICT framework was made available to school in November 2007; it is not a curriculum area or a syllabus, bus is intended as a guide to help teachers integrate ICT into teaching and learning.

The development of all these skills is evaluated by inspectors as part of their whole school evaluations.

In addition, a Key Skills framework is currently being developed for senior students (15-18). The five Key skills being developed are: information processing; communications; being personally effective; working with others; critical and creative thinking. More information is available on www.ncca.ie

Italy

Although pre-primary, primary and secondary curriculum documents all point to the relevance of 21st century skills and competencies – driven partly by Italy's involvement in the European Commission's consultation on 21st century schools -, these are not specified or defined concretely in any official documents.

Korea

The Korean national curriculum, revised in 2007, includes seven core skills: creativity; problem-solving; self-management; citizenship; basic literacy; preparation for future jobs; sensibility to multiculturalism.

These are taught both as separate subjects and across subjects. In addition, Korea has guidelines for the teaching of information literacy and ICT developed by KERIS. KERIS has also developed teacher training programmes on 21st century learners.

Mexico

Recent reforms in primary and secondary education (2008 and 2006 respectively) introduced the following competencies:

- Continued learning
- Use of information
- Managing situations
- Co-existence
- Social life

These competencies are taught across subjects

Netherlands

21st century skills are included both in learning area (subject)-specific objectives and in cross-curricular ones. There are no guidelines on teaching, as schools are free to choose their own methods; there are no assessment or evaluation policies regarding these skills.

New Zealand

Two new national curricula are coming into effect in 2010 and 2011 for English- and Maori-medium teaching and learning respectively. The English speaking curriculum focuses on five key competencies: thinking; using language, symbols and text; managing self; relating to others; participating and contributing. The development of these competencies is both an end in itself and the means by which other ends are achieved. They are not separate or stand-alone but are key to learning in every learning area.

The key competencies in the Māori-medium curriculum are not direct translations of the English one but are framed around the development of a Graduate Profile, and the most important qualities and characteristics of a graduate Maori-medium education. Graduates will achieve: high levels of educational and socio-cultural success, a wide range of life skills and a wide range of career choices. A website dedicated to the teaching of the key competencies (in the English-medium curriculum) is available: www.keycompetencies.tki.org.nz

Norway

Norway's latest curriculum reform (the Knowledge Promotion, 2006) defines the following basic skills of learning:

- The ability to express oneself orally
- The ability to read

- The ability to do arithmetic
- The ability to express oneself in writing
- The ability to make use of ICT

The national curriculum for the knowledge promotion applies to all levels of primary and secondary education. Although national definitions of skills and competencies do not exist, several 21st century competencies are mentioned in the core curriculum or subject curricula documents.

Teaching and assessment guidelines for a selection of subject curricula are in the process of being developed. In addition there are national tests in the basic skills of reading, mathematical literacy and reading in English.

Poland

The Polish new national core curriculum –introduced in 2009 - describes eight skills and competencies to be achieved by the end of lower secondary school: reading; mathematical thinking; scientific thinking; communicative skills; technological skills; information usage; self-orientation; and team working. These are meant to be integrated and taught across all subjects, although some subjects lend themselves better to certain skills than to others. These are assessed with national tests of knowledge and competencies taken by students at the end of primary, lower secondary and upper secondary education. In-service teacher training programmes are offered on the new curriculum, focusing on the teaching and assessment of the key competencies.

Portugal

Many 21st century skills and competencies are described in the Portuguese National Curriculum for Basic Education (NCBE) which came into effect in 2001 and covers primary and lower secondary education. The NCBE was created within the context of the compulsory curriculum reorganisation law that redefined the aims of compulsory education and established the development of competencies as the main focus of teaching and learning. These competences are taught across subjects and the NCBE defines specific ways for operationalising them within and across subjects. There is legislation supporting the principles and procedures of assessment of competencies in compulsory education, including both internal (summative and formative) and external (at national level) evaluation.

Slovak Republic

The graduate profile of the state educational programmes for primary and secondary education includes specification of the following competencies: communication; ICT competencies; problem solving; personal, social and civic competence; ability to learn how to learn.. Most of these competencies are integrated in the teaching of several subjects, although ICT, media education and media literacy are taught as separate subjects. Teaching of these skills is integrated in subjects, except for ICT/media literacy which is taught as a separate subject.

Spain

The 2006 reform (LOE) specifies the following eight basic competencies:

- Verbal communication

- Information processing and digital competence
- Cultural and artistic competence
- Learning how to learn
- Autonomy and personal initiative
- Mathematics
- Knowledge of and interaction with the physical world
- Social and civic competencies

These competencies are not taught as separate subjects, but integrated in different subject areas. In addition, they are not independent of each other, but are considered interrelated.

Turkey

The following are designated as basic skills in the Turkish primary and secondary curricula:

- Critical thinking
- Creative thinking
- Communication
- Research
- Problem solving
- Decision making
- ICT

Most of these skills are taught across curricular areas. ICT-related ones are, however, taught separately (e.g. media literacy, ICT, technology and design). There are no assessments policies or teacher training programmes specifically targeted to these skills and competencies**.**

ANNEX 3
COUNTRY INFORMATION - COMPARATIVE TABLE

This table presents a brief sumary of the survey findings across four key dimensions: the policy context and rationale for introducing 21st century skills and competencies (material mainly drawn from question 6 of the questionnaire, see Annex 1), the skills and competencies covered in regulations or guidelines (question 2), any assessment policies in place (questions 11-13) and impact on teacher training (question 14). Although every effort was made to keep the information in this table descriptive we occasionally had to make evaluative judgements so as to include it in a comparative table.

	context (Q6)	skills/competencies included (Q2)	assessment (Q11-13)	teacher training (Q14)	comments
Australia	New curriculum and teaching standards	N/K	N/K	N/K	To be introduced in 2010-2011.
Austria	New curriculum (2000) and specific initiatives	All except F, H, N	N	Y	
Belgium (Fl)	New cross-curricular objectives (2010) ICT cross-curricular competence (2007)	All except J	Y	Y	
Canada (NB)					New initiative currently being developed
Finland	Global trends, rising role of ICT	All except D, J, L, N	N	Y	
Ireland	Primary curriculum (1997)	All except N	Y but not specific to these skills/competencies	Y but not specific to these skills/competencies	
Italy	Several reform processes (1997-	N/K	N/K	N/K	

	present)				
Korea	Societal changes	All	N	Y	
Mexico	Primary and secondary education reforms (2006 and 2008)	All	Y but not specific to these skills/competencies	Y but not specific to these skills/competencies	
Netherlands	Periodical revisions	All except D, I, N	N	Y	
New Zealand	New curricula for English and Maori-speaking schools ; DeSeCo	All	Y but not specific to these skills/competencies	Y	Both English and Maori curricula to be introduced in the near future (2010 and 2011)
Norway	School reform (2006)	All except N, O	N	N	
Poland	New national curriculum (2009)	All	Y	Y	
Slovak Republic	X	All except J, N, O	Y but not specific to these skills/competencies	N	
Spain	New Educational Law (2006); DeSeCo; European Commission work	All	Y but not specific to these skills/competencies	Y	
Turkey	New primary and secondary curricula (2004 and 2005); societal changes	All	Y	Y but not specific to these skills/competencies	

EXISTING OECD EDUCATION WORKING PAPERS

No.1 Teacher Demand and Supply: Improving Teaching Quality and Addressing Teacher Shortages (2002), Paulo Santiago.

No.2 Teacher Education and the Teaching Career in an Era of Lifelong Learning (2002), John Coolahan.

No.3 Towards an Understanding of the Mechanisms That Link Qualifications and Lifelong Learning (2003), Friederike Behringer, Mike Coles.

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