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on

Innovation Strategy: Education and Competences

WORKSHOP REPORT

MONDAY 7 DECEMBER

The OECD/France workshop entitled "Innovation Strategy: Education and Competences" aimed at (1) discussing the main findings related to skills for innovation and their implications for education, (2) discussing the role of information systems and assessment for fostering innovation in education, and (3) providing a forum for countries to share experiences on their explicit or implicit innovation strategies in education. The workshop followed the international OECD/Germany workshop that took place in Bad Honnef in November 2008.

Welcome

Mr. Michel Quéré (French Ministry of Education) welcomed the participants and highlighted the importance of interlinks between education, innovation and the economy. While, traditionally, the concept of innovation has been marked by its technological character, it has gradually expanded to play a key role in industrial change and competition in general. In this context, education policy has become central for fostering innovation. At the same time, innovation should not drive policy to too large an extent: in addition to the highly skilled, the labour market also needs low and medium-skilled people. Innovation and education policy need to maintain a broad perspective that takes into account the big picture of the labour market.

Mr. Bernard Hugonnier (OECD Directorate for Education) thanked France for hosting the workshop and reminded the participants that the work on innovation and education takes place in the context of the horizontal OECD Innovation Strategy. Education is crucial for innovation because it provides needed skills through initial education and lifelong learning, and carries out research in the higher education sector. The work of the OECD Directorate for Education focuses on quality, effectiveness and efficiency as well as equity in education – all essential in providing skills and competences for innovation. Indeed, education systems themselves also need to become more innovative in order to better respond to the needs of societies. In addition to the skills needed for innovation and their implications for education, the workshop focused, therefore, on innovation in education.

Ms. Miriam Koreen (OECD Directorate for Science, Technology and Industry) provided the participants with a quick overview of the horizontal OECD Innovation Strategy. The Strategy was launched at the Ministerial meeting in 2007 to highlight the central role of innovation in promoting

sustainable growth and addressing global challenges. The deadline for the final report is 2010, with appreciated contribution from the education sector. The Innovation Strategy work assembles several OECD directorates and includes such deliverables as policy principles, an analytical report, indicators and an operation handbook.

The OECD Innovation Strategy comprises five broad policy principles: (1) empowering people to innovate, (2) anchoring the foundations of innovation, (3) investing in innovation and reaping its returns, (4) applying innovation to address global challenges, and (5) improving the governance of policies for innovation. The first principle focuses on education and training, skills for innovation, global talent, workplace practices, consumers and the public sector. The second principle considers linkages between different economic policies such as the macro-economic framework, and taxation and trade, while the third principle highlights the role of knowledge creation, adaptation, dissemination and diffusion in, as well as of, financial investment in innovation. The fourth principle emphasises the potential of technological innovation in particular to address, for example, global environmental and development challenges. The fifth and final principle highlights the need for policy coherence across the governance levels and decision-making processes as well as for better measurement and evaluation to support those policies.

Skills for innovation

This session briefly presented the work on human resources and skills for innovation, focusing then on the use of skills in firm and learning organisation level innovation processes.

Mr. Stéphan Vincent-Lancrin, (OECD Centre for Educational Research and Innovation) provided the participants with a quick update on the work on human capital for innovation undertaken together with the Directorate for Science, Technology and Industry. While much has been done in the past on higher education, research and mobility of the highly skilled in relation to innovation, the work on skills and qualifications for innovation is more recent. In this respect, although the lack of skills hinders innovation, diversity of skills and qualifications, including for example technical skills, is needed in the labour market as opposed to only traditional science and engineering skills. A larger approach to skills for innovation calls also for the transferability of competences, as the future needs of the labour market are difficult to predict. Skills-biased technical change has taken place over the past decades with polarisation of jobs – for example, with an increase in creativity-oriented jobs in the United States and Canada and those requiring cognitive skills in Europe. This might imply increasing demand for higher education and possibly difficult employment prospects for those not holding at least upper secondary education qualifications.

Focusing on the use of skills within firms, Ms. Nathalie Greenan, (*Centre d'Etude de l'Emploi*) presented the conceptual and empirical results of the work on learning organisations. The learning organisation can be characterised as an organisation that adapts and competes with low cost through learning. From the management literature, a multilevel concept of learning organisation emerges, comprising both leaning culture – including beliefs and norms – and human resource policies. Organisational literature highlights potential trade-offs between stability and dynamic properties in organisational structure as well as between low-cost standardisation and innovative adjustment.

The empirical analysis on learning organisations draws on quantitative data from the European Working Conditions Survey (EWCS) covering mainly the EU-15 countries. The empirical analysis distinguishes four types of organisations using different type of learning: (1) discretionary learning, (2) lean production, (3) Taylorism and (4) traditional organisation. The two former models include more learning than the latter ones. Compared to discretionary learning, the lean production model is characterised by less cognitive learning and more standardisation. While the spread of discretionary learning organisations is high in Nordic countries, the lean production model is common in the United Kingdom and Mediterranean countries. As for macro-level correlations, countries with

discretionary learning organisations tend to have higher in-house creative capacity. Countries where lean production or Taylorist models are common tend to be more non-innovators/technological adapters, relying on outside suppliers for new technology. Regarding human resource management practices and organisational culture, the discretionary learning model correlates with practices such as consultations of the workforce, application of one's own ideas and opportunities for learning and growing.

When examining the trend between 1995 and 2005, an average decrease in work complexity – measured through complexity of tasks, learning new things, changing the order of tasks and working methods – emerges although there are clear differences across the EU 15 countries. This complexity paradox is particularly clear in big countries such as the United Kingdom, Germany, Italy and Spain, whereas Nordic countries and the Netherlands have experienced an increase in work complexity. Mainly unaffected by structural factors, the average trend of decreasing work complexity is somewhat correlated with fixed-term contracts as well as female and youth employment. At the same time, factors that could be expected to increase work complexity – such as education level and ICT use – do not alter the overall trend. Objective explaining factors behind the decreasing work complexity trend appear to be standardisation of work practices and polarisation in the labour market, for example, along globalisation. Subjective reasons may include over-qualification and organisational changes in relation to employees' past experiences and expectations.

As for innovation implications, instead of low levels of research and development, industry structures and organisational practices may be the key bottleneck for innovation. With regard to training policy issues, further training at the individual level is positively correlated with learning and lean forms of organisation, while workforce and labour market policies matter too. There may be more need for provision of intermediate skills by vocational education and training as well as for targeting further training policies, especially for part-time and precarious workers. Regarding human resource management within firms, practices based on collective performance are positively correlated with learning and lean types of jobs. Human resource management practices can play also a role in mitigating conflicts in change situations. Finally, instead of focusing on skills and research and development inputs only, innovation measurement needs to capture more data on innovation processes, for example, by comparing employee and employer data.

Discussion

As to the paradox concerning the decreasing work complexity trend, it was suggested that it could be explained by institutional characteristics, especially by labour market policies and structures. There may be also a link between firm size and demographic structure of countries, whereas value or cultural bias is likely to explain some of the cross-country differences.

It is important to clarify exactly what kind of innovation is referred to when talking about learning organisations. As there are very different ways of using new knowledge, are we referring to the creation of new knowledge, user experience or applications of innovations? Also, what skills do we refer to exactly and where are those skills learned?

Education for innovation

This session focused on the educational implications of skills for innovation, comprising reflections on learning and skills as well as how these issues are reflected in education policy, in particular, in assessment.

Providing overview on the skills coverage in the OECD education policies, Ms. Katerina Ananiadou (OECD Centre for Educational Research and Innovation) presented the results of the recent survey on 21st

century skills and competences. The survey, conducted in the framework of the New Millennium Learners project, opted for a very large definition for skills, thus including all the skills and competences young people will be required to have in the 21st century – such as creativity, innovation, critical thinking and leadership. Based on responses from 17 OECD countries or regions, most countries cover the 21st century skills in their curricula although the definition of those skills is often unclear. The introduction of these skills and competences to the curricula has taken place in the context of a major reform in few countries or through more specific projects and studies. At the same time, while 21st century skills are already included in the curricula, targeting them in student assessments and initial teacher training does not appear to be widespread.

Under the theme of pedagogies fostering skills for innovation, Mr. David Istance (OECD Centre for Educational Research and Innovation) focused on presenting key principles for learning. A mixed approach to learning may be more appropriate than simply comparing one pedagogy to another. In the framework of the Innovative Learning Environments project, six key principles for learning have been identified: 1) the importance of learner centeredness, 2) sensitivity to individual differences, 3) the central role of emotions and motivations, 4) clarity of expectations, 5) the social nature of learning, and 6) horizontal connectedness. In educational terms, a good learning environment is learner-centred with a key role for learning professionals; mixes different activities in a structured manner; is demanding but not excessively so; and builds on personalisation while being social and inclusive. The key challenge continues to be the implementation of these principles at the classroom level.

From the education policy perspective, Ms. Janet Looney (Vital Insight) focused on the role of high-stakes assessments regarding both skills for innovation and innovation in education. While raising the achievement levels of all students counts, recent educational focus in OECD countries has been put on the so-called key competences, student-centred learning – including formative assessment – as well as on ICT use. As Assessments are used both as improvement and accountability tools, few OECD countries use high-stakes assessments. These assessments can represent high stakes for students through university entrance procedures as well as for schools and teachers through publication of school results and tying them to rewards and sanctions. At the same time, high-stakes assessment are beneficial for keeping the focus on centrally developed standards and curriculum, serve as a decision-making tool and can provide incentives to improve teaching.

The underlying tensions in high-stakes assessments concern differing views on the fundamental question of "what education is for" as well as potential conflict between high-stakes assessments for improvement and their role in hampering the risk taking inherent to innovation by schools and teachers. In practice, it can be difficult to tightly align curriculum and assessment since a test cannot cover every aspect of the curriculum while poorly aligned assessments can lead to teaching to the test at the expense of other aspects of learning. High-stake assessments can also lead to shadow curriculum, and test anxiety can affect the quality of learning, especially for low-achieving students although mid-stakes assessments tend to be associated with a positive impact. In this context, in order to reconcile assessment and innovation, one could promote innovative approaches to assessment, for example, through the use of technology and simulations. Alignment could be re-thought to reflect a broader scope of skills such as the 21st century skills. To alleviate teaching to the test, randomised assessments and/or multiple measures of student and school performance could be used. There is a need to create a better balance between high stakes and school empowerment, including support for teachers to take the risks inherent in the innovation process.

Discussion

The Secretariat reminded the participants that there is a big gap between what kinds of skills exist in the labour market and how these skills are produced at the individual level. Although developing and assessing individual skills can be very difficult, assessments can act as an incentive to foster these skills.

Regarding the discussion on 21st century skills, it was suggested that the supply of skills may currently outweigh and/or miss-match the demand of skills. There is a need for the efficient use of skills, especially as the labour market appears to be affected by a greater polarisation of skills. Skilling and education policies ought to be linked with labour market policies – for example, what will happen if employers cut back on their investments in training? Should there also be more training focus on the low skilled, when taking into account that inward training often focuses on the highly skilled?

As for assessment, it was underlined that one must be careful to measure what one wants because that is what one usually gets and is seen as implicitly valuing. For example, does the Programme of International Student Assessment (PISA) take into account enough competences or the correct competences such as soft skills? Could PISA tests even hinder innovation, creativity and curiosity to a certain extent? For creativity and curiosity, believed to be relevant especially at a young age, there should be also room for playfulness and flexibility in education – assessments can often be created to solve a problem for the next step in the education systems, for example, when they are used as a selection tool. At the same time, in some countries, smart use of assessments has yielded positive results in terms of innovation and improvement, highlighting the need also for schools to become learning organisations.

Innovation in education – framework and issues

This session provided a comprehensive framework for understanding innovation within the education sector.

At the start of the second part of the workshop, Mr. Stéphan Vincent-Lancrin (OECD Centre for Educational Research and Innovation) set the framework for innovation in education. The OECD Innovation Strategy for Education and Training uses the Oslo Manual definition of innovation, which includes the concepts of both radical innovation and significant improvement. Among other things, OECD work looks into seeing how to make better use of science and research for innovation in education, asks what is the role of practitioners and participants in creating an innovation culture or what kind of specific financing is used to promote innovation in education. In this respect, fostering innovation in education is approached both through traditional innovation instruments and traditional education policy instruments. At the same time, a strong emphasis is put on the potential role of measurement in opening the innovation bottleneck in education.

Building on general innovation theory, Mr. Dominique Foray (*École polytechnique fédérale de Lausanne*) in Lausanne sketched a broad innovation ecosystem for education. Incentives and the motivation to innovate can be seen as key driving forces behind innovation, to be taken into account in structural conditions for innovation. This implies both pecuniary incentives – for example bonuses – and non-pecuniary incentives, such as stimulating individual curiosity. While there is a need for innovation incentives, some challenges may also arise since extrinsic rewards may crowd out intrinsic motives and so reduce the overall level of innovation effort. Although innovation has traditionally been driven by market survival and competition; in the case of education accountability systems can act also as an important driver to engage in systematic continuous improvements. Since an isolated individual is not likely to engage in innovation activities for a very long time, there would need to be a large enough volume of incentives to innovate and improve.

As for the innovation ecosystem in the education sector, incentives for and motivations of teachers are not necessarily targeted towards innovation. At the same time, the effect of incentives is dependent on the capacity of schools and individuals to make use of the message of the incentives, while attitude and culture in schools need to be supportive for innovation and inherent risk taking. Access of schools and teachers to knowledge and research is also needed to accompany incentives for innovation, together with the help of applied technologies and specialised enough educational industries. Finally, diffusion of innovation and

operational efficiency can be seen as important as the innovation itself. This translates to the identification of best practices so that they could be scaled-up across the education system with the support of adequate institutions and structures, according to the specific country contexts.

Discussion

While the concept of ecosystem provides a very coherent model for innovation in education, it was stressed that there may be differences in terms of the importance of specific components and according to different phases of innovation. For example, what kind of strategy would allow shifting from low to high innovation intensity in the education system? What are the implications for education governance and past reforms? Moreover, it would also be important to consider the role of clients and users in innovation in education. In this respect, who could be seen as the main clients and users of education? In some countries, for example, parents have acted as drivers and initiators of some educational innovations.

It was pointed out that in some countries the role of the private sector for innovation in education can be limited as there is very little incentive ,for example, for private publishing houses to change and improve the *status quo*. At the same time, there is specific public, but also private, financing for innovative educational experiments available in few countries.

Information systems for innovation in education – advances and promises

This session focused on the particular role information and knowledge management can play in fostering innovation in education.

Ms. Barbara Ischinger(OECD Directorate for Education) opened the session by highlighting the importance of knowledge management and evaluation for innovation and improvement in education. Several evaluation and assessment systems are already in place across OECD countries. In addition to the work on new types of educational information and feedback systems, the OECD Directorate for Education is currently conducting a broad thematic review on evaluation and assessment in education.

Reflecting on the role of information in innovation with a concrete case in point, Mr. Larry Berger (Wireless Generation) demonstrated how New York City aims for school improvement through the use of Achievement, Reporting and Innovation Systems (ARIS) software. Increasing concerns in the United States on inequity and inefficiency in education called for better data. In the context of an "educational crisis", testing has increased for research, evaluation and improvement, for accountability, equity and completion as well as for teacher effectiveness.

New York City, characterised by both wealth and poverty, responded to the inequity concerns and the need for evidence with ARIS that allows one to combine multiple measures, accountability, improvement and innovation by schools. The system has been seen as a teacher empowerment tool in the context of increased curriculum freedom. ARIS provides a set of data for schools and teachers as well as information for parents, while also forming a knowledge management and social networking tool for teachers and schools. It is designed to provide direct help for teachers and administrators by gathering and processing data on student learning in a real-time and easy-to-access form, allowing comparison of the students' progress with that of their peers as well as by providing suggestions for teacher action. ARIS contains formative assessment, allowing individualisation of student needs and taking into account a set of demographic and socio-economic factors in a time-efficient manner. It allows teachers to learn from each other through social networking tool containing suggestions for good practices in specific cases – thus facilitating in principle a horizontal spread of innovations. ARIS also supports parents' choices by allowing them to obtain information on schools that may be doing better than their local school.

A specific case in point is a hand-held electronic device that has transferred the former pen and paper form of documentation to a more accessible and transferable format. This device allows teachers to document, monitor and compare student learning in classrooms in real-time, while also providing a tool for knowledge management by creating a database on student learning.

Discussion

It was pointed out that the introduction of ARIS in some countries could be very difficult due to anticipated opposition by teachers and a general concern regarding privacy issues. While being helpful for teachers' work, such an information system could hardly replace the real world classroom survival skills teachers are required to poses. At the same time, similar kinds of attempts have been taking place in some OECD countries with varying success.

While ARIS would provide an enormous data bank for research and analysis, there may be risks related to too much accountability that is also too direct, especially when it comes to providing information directly to parents. What are finally the reasons on which parents base their choice of schools?

TUESDAY, 8 DECEMBER

Strategies for improvement and innovation: three country examples

In this session, three countries presented their policies and strategies for creating a climate of innovation and improvement in education: France, Finland and the Netherlands.

The first presentation on the French Innovation Strategy for Education was given by Ms. Françoise Cros (*Conservatoire National des Arts et Métiers)*. Enacted in April 2005, article 34 of the French educational law gives schools and education institutions in France the opportunity to set up "pedagogical experiments" for a period of between three and five years. These projects are developed through co-operation among educators within each institution, and they need approval from school authorities (*academies*). They can cover a range of topics: certain school subjects, interdisciplinary themes, pedagogical organisation of the class, school organisation or co-operation with external partners. The experiments are evaluated annually, and every year the High Council of Education, assembling high authorities of the State, draws up a national overview of the experiments. Monitoring is done and support provided by the academic authorities at regional or local level. Innovations are disseminated through specific websites of the Ministry of Education and the local academic communities, coupled with publications by the *Centre National de Documentation Pédagogique*.

An advantage of France's innovation strategy is the high level of visibility at national and local levels. The connection of the projects with local school plans, the regular reviews by academics and recognition modalities ensure the high quality of the projects. While reflecting implicitly on political priorities, Article 34 provides possibilities for schools, training institutions and researchers to collaborate. On the other hand, there are some inconveniences such as heavy administrative procedures – for example, it can be difficult for a teacher to start an innovation project due to the authorisation procedures. The shift in the use of the notion of "experimentation" to "innovation" has been accompanied by increased control regarding the innovation process. The projects are now restricted to set policy priorities and institutions may have limited autonomy because of funding mechanisms. Assessments are conducted by the

inspectorate, which is simultaneously the custodian of the institutional norm. Overall, small-scale innovations or improvements at classroom level appear feasible and common, but implementing them system-wide and innovating at a structural level tend to be difficult to accomplish.

In the second presentation, Mr. Jari Koivisto (National Board of Education of Finland) explained how the implicit Finnish strategy for innovation in education operates. In Finland, schools are seen as the driving force behind innovation. The strategy is to foster the innovative power of schools through enabling national curriculum framework, selective pre-service and in-service teacher training as well as by promoting teamwork among teachers and innovation-friendly school leadership. The national curriculum of Finland, drawing on expertise and evaluation, is a framework that gives much freedom to municipalities and schools. Initial teacher training includes research activities in the form of a master's degree focusing on subject areas. While an innovative attitude is encouraged, teachers also learn how to cope with the high level of freedom within the curriculum, and how to develop their own teaching methods and style. In-service training for teachers aims at developing the same skills. Complementary to this is the in-service training for school leaders. It is seen as important that school leaders have an open innovative attitude and that they adequately support and supervise the initiatives of teachers. Finally, focus is put also on interaction in schools and with communities as well as on an adequate physical learning environment.

As for practice, the quality of locally developed curricula seem to have increased over time in Finland after some initial implementation challenges following the decentralisation of curriculum decision making in the early 1990s. Whereas a reliable assessment of innovation in education is difficult, it appears that teachers often work in teams, while schools seem to co-operate through regional networks. Networking and dissemination of best practices tends to take place through conferences while ideas and experiences can be shared through school websites. The National Board of Education helps in this dissemination function. At national level, there is also funding available to test and implement innovations.

The third presentation by Ms. Daisy Satijn (Ministry of Education in the Netherlands) focused on the explicit Dutch Social Innovation Agenda for Education, which is part of a larger governmental programme. This agenda, the implementation of which started in September 2009, was developed in consultation with different ministries, stakeholder organisations and education scientists. Since a lot of knowledge about possible improvements is believed to be "hidden" in the education field, the rationale behind the agenda is to enable better use of existing expertise and opportunities, and to cope with forthcoming challenges in an innovative way. While strong schools with loose central direction are seen to be central for innovation in education, sustainable improvement is expected to come about at (1) learning environment and teaching level, (2) school level, and (3) the system level through steering and incentives. Currently schools may not be as innovative as they could be due to resistance to change, lack of time for innovation, little feeling of urgency to find solutions to future challenges, lack of professional leadership, risk aversion, and insufficient knowledge about what works. The Dutch policy for innovation in education aims at reducing the impact of these factors (1) through the autonomy of schools to innovate in the framework of centrally set goals (2) by providing the schools with the possibility to obtain financial and research support to explore innovations on a small scale, and (3) by disseminating information on the proven-to-be-good innovations on a larger scale. In these three complementary processes, the Ministry of Education encourages evidence-based policy and practice.

The novelty of the Dutch Social Innovation Agenda for Education is that it puts explicit emphasis on the dissemination of good practices, the alleviation of innovation barriers, evaluation, sustainability and empowerment. Some programmes have already been developed based on the principles of the innovation strategy. Within a EUR 20 million programme for tackling the shortage of teachers, schools and education researchers work together on experiments and building evidence for cost/time efficiency and higher productivity in education. A digital platform has been put in place for open source development of school books. The results of a programme to stimulate experimental research in education will be gathered to a

"what works" database. In addition, parental demands have also resulted in some innovation in education such as public financing of school books.

Finally, Ms. Anneke Boot (Dutch Ministry of Education) presented an initiative – educational innovation in the Netherlands. The Ministry of Education organised a brainstorming session with educational practitioners instead of looking at measurements of innovation in other sectors. This brainstorming session resulted in a first mapping of possible innovation inputs, processes and outputs at classroom, school, sector and national levels.

Discussion

The innovation and improvement approaches of France, Finland and the Netherlands appear to be different. Finland applies policies related to innovation in education implicitly whereas both France and the Netherlands have developed explicit innovation strategies or pathways for education. From a conceptual standpoint, separating radical innovation, generally small scale and experimental, from larger scale systemic improvements was suggested. Finally, cultural differences between countries and education sectors as to what works for innovation can be great. For example, although the Finnish approach places much trust on the education field by building on the competences of teachers and school leaders, this kind of a strategy may be difficult for many other countries to implement. The Netherlands has adopted a very different approach, based on steering and incentive policies.

Overall, measuring and evaluating innovation in education and, therefore, the effectiveness of different country strategies, emerged as a key question to be further explored. Whereas it will be difficult to find a causal relationship between education outcomes and innovation, a related question is against exactly which criteria should innovation in education be measured against? For example, should the increased ability for the education systems to develop innovative behaviour within individuals be the yardstick? In many cases, evaluating innovation is a challenge as traditional assessment instruments may not capture its impact. Educational innovations need assessment instruments that are fit for purpose. The Dutch attempt to find a measurement instrument aims to help in making choices about whether or not a policy instrument is meaningful from the innovation perspective while the Finnish improvement approach sees innovation eventually coming about by maintaining continuous local and school-level processes, potentially implying a strong emphasis on process-based innovation measurement. As for differences between radical and incremental innovation, there could be a contradiction between, for example, radical innovation and its measurement with conventional evaluation tools. The timeframe for innovation to take place also merits consideration – some innovations that are visible today may, in fact, have been preceded by decades of continues innovations directed towards the same goal.

While schools still appear as similar overall, questions were raised on what else would be required for innovation to take place, apart from changes internal to the education system. What would be the positive or negative influence of parents and/or students on innovative initiatives? Would more freedom for schools and/or increased co-operation with other sectors of society help to this end?

Teachers, schools and learning environment in education

Drawing on the OECD's Teaching and Learning International Survey (TALIS), this session discussed some of the main issues related to teacher involvement in innovation processes.

Mr. Michael Davidson (OECD Directorate for Education) presented the initial findings from TALIS on innovation in learning environments. This survey consisted of questionnaires for teachers and principals in lower secondary education in 24 countries. It focused on (1) on-going professional development,

(2) teacher appraisal and feedback, (3) teaching practices and beliefs, and (4) school leadership. Although TALIS does not specifically emphasise innovation, some elements of the survey are related to it.

Firstly, the TALIS data on professional development show that relatively few teachers participate in the kind of professional development they believe has the largest impact on their work. On average, teachers mainly attend courses, workshops and conferences, even though they believe that individual or collaborative research and qualification programmes would be more useful to them. Secondly, keeping in mind that there are marked differences between countries, the data on appraisal and feedback show that among the criteria for teacher evaluation, innovative teaching practices were generally not perceived as having a very high importance in teacher appraisals. Teachers also reported that they would not receive increased rewards in the form of financial and/or public recognition if they were to be more innovative in their teaching. Thirdly, the data on teacher beliefs about teaching and learning demonstrate that in almost all participating countries teachers have more constructivist than "direct transmission" beliefs. This is important because innovative teaching is generally associated with constructivist beliefs. In practice, this is another story: much time in a classroom is spent on structuring practices. Finally, the data on school leadership indicate that when school leaders adopt a stronger pedagogical leadership role, there appears to be greater recognition given to teachers for innovative teaching practices, more collaboration between teachers, better student-teacher relations, and more emphasis put on developmental outcomes of teacher appraisals.

Discussion

Questions were raised about links between TALIS data and PISA data. For example, countries that have not scored very high according to some TALIS indicators have had a good overall score in PISA. This leads to a question about the relationship between innovation and learning outcomes. On the other hand, PISA is mostly about cognitive skills as opposed to soft skills such as entrepreneurship, creativity and critical thinking. Overall, caution is required when thinking about linking TALIS and PISA data or when drawing conclusions about innovation based on PISA measurements.

Another element which must be kept in mind is that TALIS is a measurement of teacher perceptions, not a measurement of real practice. These perceptions can include different interpretations on innovation across countries or lead to socially desirable answers. Therefore it may be worthwhile to look also to the possibilities for gathering national-level observation data to compare it with self-reported TALIS data.

Innovation in education: towards a strategy

The workshop ended with tentative conclusions by Mr. Dirk van Damme (OECD Centre for Education Research and Innovation) stressing that innovation will be crucial for the post economic crisis recovery, future economic growth and social progress. The new concept of innovation will depend much more on human capital and specific skills, coupled with a broader equity agenda. But what skills are needed in the future, and how should we organise our education systems to teach these skills? Do we need changes in curricula, pedagogies, learning environments and assessment systems or do pupils and students learn these kinds of skills – creativity, critical thinking or the development of an entrepreneurial perspective – more or less automatically, without adjustments in education? Since it is clear that education must innovate to meet future needs, how can we remove hesitation or even resistance against innovation and enable the education field to become more innovative?

During this two-day workshop, several aspects of these questions were discussed. Policies that can foster innovation in education include, for example, funding for experimentations, building an evidence-base, knowledge dissemination, measurement and transparency of evaluations, incentives – feedback, rewards – for innovative teaching, and the scaling up of good practices. For a better understanding of

innovation in education, however, a distinction has to be made between continuous improvement and radical innovation: both can be seen as necessary, but they require different policy strategies. Innovation by trial and error or adapting innovations in an incremental way call for different incentives in order to get started than does a big radical change. But in both types of innovation, the discussion appears to be about trust *versus* control: What should be whose responsibility? How much autonomy should be given to schools and teachers? Can we trust them to innovate enough? What role should the government take in all of this? Depending on the cultural, political and other contextual factors, different countries will provide different answers to these questions. In some countries there may even be political suspicion towards innovation in education, fostered by disillusionment with previous innovations, pedagogical conservatism among parents, little feeling of urgency for innovation or opinions that innovative learning is not demanding enough. Knowledge and knowledge management hold a central place in allowing us to find ways to bring about innovation in education.

Discussion

The final round table stressed that innovation in education is not something for after the economic crisis: we have to react now to respond to the ongoing changes and changing needs in the labour market. In this regard, lifelong learning is important, and more attention is needed also for innovation in vocational education and training and co-operation with enterprises. This requires thinking beyond formal schooling. While resistance against change is a big challenge for policy makers promoting innovation, unrealistic expectations for radical innovation can turn out to be counterproductive. In this context, transparency of indicators and outcomes can function as incentives for innovation, and measurement of innovation appears as central for "proving" the usefulness of innovation in education for society as a whole.

The OECD and the participants thanked France warmly for hosting the meeting, which was closed by the concluding remarks by Claude Sauvageot and Nadine Prost (French Ministry of education).