In January 2013, the OECD Centre for Educational Research and Innovation (CERI), Creativity, Culture and Education (CCE) and the Ministry of Education, Singapore organised an international workshop on the theme of educating for innovation, with a focus on Asia-Pacific education systems.

The objectives of the workshop were to (1) outline the most significant policy, practice and initiatives that can lead to better equip students with skills in thinking and creativity in education systems; (2) identify the most significant barriers to implementation as well as the conditions that hamper and facilitate this kind of education, notably in Asia; (3) develop specific recommendations and action steps to address these barriers; and (4) provide participants with a space for feedback on their practices and international peer learning.

This report summarises the key points of the presentations and discussions.
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**EDUCATING FOR INNOVATION IN ASIA: THE THEORY, THE EVIDENCE AND THE PRACTICE**

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Box 1. Highlights of the discussions

Asian initiatives and policies

- Innovation is high on the agenda of educational systems across the Asia-pacific region. This is a response to economic changes worldwide and to the growing importance of knowledge and technology management. Education policies are increasingly aligned with a broad understanding of the competences that prepare students for future challenges in social and economic life. Most countries across the region are incorporating skills in thinking and creativity as well as character as core components of their curriculum.

- A useful notion of creativity in schools is rooted in core habits of the creative mind (e.g. being inquisitive) and in its applicability to practical problems in real-life contexts, as opposed to the view that equates creativity to artistic genius and originality. It is also useful to distinguish between the technical, conceptual, and emotional dimensions of creativity.

- Cultural differences are visible in policy approaches to promoting innovation in education. Asian countries are generally more comfortable with government-led and teacher-centred approaches than Western countries. At the same time, NGOs and the private sector are also playing an important role in some countries. Cultural variation also exists around the status of teachers as authority figures.

- Commonalities to the innovation process exist, though, over and above cultural differences. Innovation in education can be studied with the tools of cognitive science, organisational behaviour and pedagogy to develop general principles to be applied cross-culturally

Barriers to implementation and suggestions to overcome them

- Key barriers to the implementation of policies and initiatives that aim to better equip students with skills in thinking and creativity relate to the weaknesses of existing evidence, to traditional mindsets among the actors that ought to participate in the innovation process (most notably teachers), and to the absence of a shared terminology and understanding of creativity that would give greater visibility to these learning outcomes.

- To promote the creativity agenda in schools, teachers’ need to overcome professional identities rooted in traditional academic subjects. Further, teachers need autonomy to exercise their own creativity and test innovative practices if they are to instil skills in thinking and creativity into their students.

- There is a pressing need to generate more and better quality evidence about the effectiveness of the instruments (i.e. curricula, pedagogies, assessment) used to foster students’ creativity as well as on educational innovation processes and outcomes. The current lack of evidence is mainly linked to limitations of existing assessment tools and time lags before the results of interventions can emerge. While the importance of evidence cannot be overstated, a variety of methods must be employed.

- With regard to skills in thinking and creativity, learning processes and outcomes should be made more visible to all stakeholders, most importantly to teachers and students. Clear conceptual frameworks and terminology are a critical step in this direction. Those designing curricula assessments should share a language and understanding of creativity with teachers and, ultimately, parents and students themselves.
EDUCATING FOR INNOVATION IN ASIA:  
THE THEORY, THE EVIDENCE AND THE PRACTICE

OECD-CCE-Singapore International Workshop  
Singapore, 15-16 January 2013  
Summary Report

1. The workshop discussed the relevance of international evidence and theories on education for innovation to the Asian educational context and to present Asian promising practice which either supports or challenges approaches that have been successfully introduced in non-Asian economies. Invited participants were a mix of senior officials, education innovators (including teachers) and researchers, all of whom had significant experience implementing innovation-driven approaches in Asia-Pacific education systems. The number of participants was restricted to 30 experts and the format of the workshop was intended to promote in depth discussion and reflection. Participants came from Australia, China, India, Indonesia, Japan, Korea, Singapore, Thailand, and Vietnam as well as from the United States and the United Kingdom.

2. The objectives of the workshop were to (1) outline the most significant policy, practice and initiatives that can lead to better equip students with skills in thinking and creativity in education systems; (2) identify the most significant barriers to implementation as well as the conditions that hamper and facilitate this kind of education, notably in Asia; (3) develop specific recommendations and action steps to address these barriers; and (4) provide participants with a space for feedback on their practices and international peer learning.

3. The workshop was organised by the Centre for Educational Research and Innovation (CERI) at the Organisation for Economic Co-operation and Development (OECD), Creativity, Culture and Education (CCE), and the Ministry of Education, Singapore, within the framework of CERI’s Innovation Strategy for Education and Training.

Day 1

Session 1: Opening remarks

4. Tony MacKay (Centre for Strategic Education, Australia) opened the meeting by noting the ubiquitous presence of the term innovation in current debates about education and its direct connections to the question of how schooling systems ought to change in order to foster 21st century skills. Many experts (e.g. IPPR report: Oceans of Innovation) believe that the Asia-Pacific region will lead developments in this direction in the coming decades.

5. Siew Hoong Wong (Ministry of Education, Singapore) welcomed participants on behalf of the Ministry and stressed Singapore’s commitment to the educating for innovation agenda. Singapore is a city-state with limited natural resources and it needs to strengthen its human capital policies to prepare for changes in the economy and society worldwide. New strategies in education are seen as necessary to maximize the potential of Singapore’s work force. Developing the capacity for innovation is therefore perceived as a very important subject and other countries’ experiences are given a great deal of attention to draw lessons for improvement.

6. Paul Collard (CCE) thanked the hosts and introduced CCE to the workshop participants. CCE is a not-for-profit organisation whose main aim is to unlock creativity in young people through innovative education interventions. CCE’s flagship programme, Creative Partnerships, involved at its peak more than...
2,000 schools in the United Kingdom. This programme of work was the object of extensive research and has resulted in a substantial body of evidence (available on its website) which informs the organisation’s current activities.

7. CCE advocates a move away from high-stakes testing to a richer assessment of children’s competencies. There is broad consensus on this issue at the rhetoric level, but on the ground the evidence points to very uneven levels of implementation. Does this indicate a problem of credibility of approaches that focus on multiple aspects of child development? Have we not generated enough evidence to support the revision of assessment policies? Is it the problem that the consumers of education (i.e. pupils) are not the constituency of decision-makers (i.e. voters)? Moreover, many questions remain unresolved about the importance of cultural differences and their impact on the assessment of competencies other than those captured by traditional learning outcomes. CCE experience suggests that these cultural differences are actually smaller than what is generally predicated.

8. Stéphan Vincent-Lancrin (OECD) thanked the Ministry of Education of Singapore for hosting the workshop and CCE for their fruitful collaboration. Singapore is a case that OECD countries want to learn from and a cornerstone for Asia as a region. The OECD held a successful meeting on Educating for Innovative Societies in April 2012 in Paris, and there is strong interest in knowing how the issues discussed at that meeting resonate in the Asian context.

Session 2: Skills requirements and the education challenges of tomorrow

9. The first set of presentations were devoted to the skills that young people require to meet the social and economic needs of innovative societies, with a twofold focus on the definitions of “skills for innovation” by the OECD and the relevance of such skills in the Asian context.

10. Stéphan Vincent-Lancrin (OECD) opened the discussion by presenting the OECD framework. The Innovation Strategy launched by the OECD Secretariat in 2008 places a strong emphasis on empowering people to innovate as part of a broader economic agenda. In a variety of economic sectors, the lack of qualified personnel is a major barrier to innovation. Research also suggests that certain types of work organisation are strongly associated with innovation; the latter point in particular can provide critical insights for how to reorganise schools.

11. OECD research on innovation in the economy indicates that a diversity of qualifications are associated with innovation across economic sectors. For example, graduates in science and engineering often have jobs where innovation plays an important role, but many art graduates get also innovative jobs and participate in product innovation. Overall, a broad mix of skills is needed and we cannot answer the question of what fields of study are more important for innovation a priori.

12. The OECD identifies three broad categories of skills: technical (i.e. know-what and know-how), behavioural and social (e.g. collaboration, leadership), and thinking and creativity (e.g. dealing with uncertainty, problem finding). There is some degree of overlap between these groups as skills tend to reinforce each other, but the categories are distinct and should not be reduced to a single measure. A common mistake is to categorise skills in opposition, for instance when we use labels such as ‘soft’ and ‘hard’ skills. It is also important to note that skills are, by and large, domain-specific and most usefully developed in specific contexts. Nonetheless, skills can be said to be domain-generic when individuals acquire certain skills in several areas and their application becomes a habit of mind.

13. The example of science education illustrates the complex relationships between the various dispositions for innovation that can be developed in schools. Data from PISA 2006 reveal a negative correlation between tests scores and interest in science which holds at the school level in half of OECD
countries. In other words, it is not because countries succeed in fostering students’ interest in science that they are effective in making them acquire scientific knowledge, and the other way round. On the other hand, the difference between within and between school correlations suggests that something important occurs at the school level.

14. What pedagogies are more effective in fostering the desired skills? Teaching indicators from PISA 2006 allow us to identify four clusters of teaching and learning activities. The analysis suggests that these four pedagogies are weakly correlated with scores. However, activities in school bear a much stronger association with students’ levels of interest and self-efficacy. Hence, pedagogies do have a differentiated impact on the different set of skills for innovation. A forthcoming OECD report on the impact of arts education on different set of skills, *Art for Art’s Sake?*, also points to the crucial importance of pedagogy. While there is some evidence that arts education can foster creativity and other skills sets, it probably happens when this is done very deliberately.

15. The assessment of skills for innovation is another key area of work for the OECD. By nature, no single test can assess all relevant skills, and most forms of assessment have pros and cons. One possibility to change the dominant high-stakes assessment approach and to measure a broader set of skills is to make assessments less predictable to teachers and students, for instance by using a wider range of assessment forms or by switching between them at random. An overarching recommendation is to make goals explicit to students and to develop a richer language and criteria to monitor their progression.

16. What is the relevance of these questions to different Asian countries? How are the different sets of skills for innovation fostered in Asia through curricula, pedagogical and assessment policies? Is this agenda taken seriously throughout the schooling process, or only after the (basic) technical skills have been acquired?

17. Wei Li Liew (Ministry of Education, Singapore) stressed the alignment of the OECD framework with the policies that have been implemented in Singapore for over a decade. Globalisation and new technologies are eroding the advantages associated with Singapore’s privileged location and cosmopolitan society. Over the last 15 years, the share of manufacturing in Singapore’s economy has been gradually declining, albeit still significant, and the nature of its industry has shifted towards high value-added activities. The service sector currently accounts for the largest share of jobs, and the number of white collar and managerial positions is on the rise. For these reasons, Singapore has given top priority to human capital formation policies.

18. Singapore launched its Desired Outcomes of Education framework in 1997. The framework encourages a holistic education around four key outcomes: personal confidence, self-directed learning, active contribution, and concerned citizenship. It further specifies what students should be able to do in each of these four dimensions at the end of each level of schooling. The emphasis remains on strong fundamentals – literacy and numeracy. Core disciplines such as English, mother tongue, math and science, and humanities are taught so that students learn different ways of thinking. In 2009 Singapore developed its 21st Century Competences framework. Besides values and social-emotional competencies, it comprises Critical and Inventive Thinking, Information and Communication Skills, as well as Civic Literacy, Global Awareness and Cross-cultural Skills. These competencies are learned in context within the disciplines, and through project-work and co-curricular activities. With regard to Critical and Inventive Thinking, a subject-specific perspective is adopted but project-based learning is brought in to encourage students to see the connections across disciplines. All students are provided a broad-based education. In addition, over the years Singapore has developed several ICT master plans, the current focus being on adapting pedagogies to the possibilities afforded by new technologies.
19. Jin Sook Kim (KICE, South Korea) acted as the second discussant and noted that creativity and character building are among the main directions of the National Curriculum that South Korea introduced in 2009. Current discussions about the themes of innovation and creativity in education revolve around the following issues: a) direct vs. indirect methods of teaching creativity (i.e. whether creativity is embedded in specific subjects); b) education intended for creativity vs. creative results of quality education; c) criteria of curriculum for creativity (e.g. active vs. passive methods, traditional vs. cognition-centred approaches); and d) the relationship between creativity and character building. The National Curriculum establishes that areas of creative experiential activities must be developed alongside the core subjects. In this vein, sports education is seen to serve a character building function.

Session 3: Educational programmes fostering creativity and innovation

20. The second set of presentations introduced examples of educational programmes emphasising creative mindedness and critical thinking from both a European and Asian perspective.

21. Paul Collard (CCE) presented lessons drawn from Creative Partnerships’ signature pedagogies. In the early years of the programme the focus was on the evidence that supported its initial objectives, namely to develop better academic success, better parent-school relations, better attendance. The results of the evaluation confirmed that Creative Partnerships had a strong positive impact. The second part of the programme consisted of detailed observational studies to understand what in the programme was delivering these benefits. A useful heuristic for this analysis is to characterise schools alongside the dimensions of high- and low-performance and high- and low-functioning. For example, schools with high test scores but low pupil independence and motivation would show high-performance with low-functioning. The opposite case would be represented by recreational education with little impact on learning but high student engagement.

22. CCE’s view is that schools themselves should identify the problems that prevent them from becoming high-functioning, high-performance systems. CCE believes that creativity can be nurtured but not taught as such. In CEE interventions, schools are asked to choose the context where they want to develop creativity. This tends to be high-functioning spaces where normal school operating rules do not apply and students perceive the activities as authentic. Further, these are generally challenging environments where outcomes remain highly visible and the pressure to perform well in front of one’s peers engages children and promotes risk-taking behaviour. Another characteristic of these high-functioning systems is the acknowledgement of the role of emotions.

23. When these spaces are created, teachers generally observe that students improve confidence, are more motivated, collaborate better, have greater resilience and discipline, and ultimately achieve improved learning outcomes. A positive feedback loop is created when teachers extend this pedagogy to their other classes and other teachers inquire about these innovative practices.

24. Scale up from the classroom level to the school level can be achieved by coming sideways into schools asking teachers what the issue is, as opposed to telling them what they should be doing. This facilitates buy-in from teachers. Coming back to schools to provide input and reflect on the experiences is also critical, as well as addressing the teachers directly.

25. Another key factor is the closeness between concept and delivery, bringing down the experience to the smallest and most immediate possible level. While the quality of pre-service teacher programs is important, how much do teachers retain from their training is highly dependent on the school they start working in, as pedagogies remain abstract until teachers face children. The experience shows that cutting to the pupil reality is critical.
26. Sukhchandan Samra, principal of the Apeejay School Faridabad (Apeejay Education Society, India), presented the educational programmes for creativity and innovation developed in the Apeejay school network. These programmes follow a curriculum which focuses on holistic growth, attending to the physical, intellectual, spiritual, emotional and aesthetical development of children. Apeejay does not see creativity as subject-specific but instead as a transversal skill, and therefore encourages students to exercise their imagination through enquiry-based projects and the exploration of feelings in various domains. This approach is guided by a teaching and learning pedagogy which focuses on developing fluency, flexibility, originality and elaboration in students’ thinking.

27. Each of the Apeejay schools has autonomy to develop its own route, and four cases studies were presented on the design of a leaflet about the dangers of drug abuse, on creative solutions to mathematical problems, on the making of a movie about water management, and on the integration of theatre into education. In all these cases, teachers were encouraged to become reflective practitioners, so that a self-sustainable and continuous professional development cycle is created. The Apeejay Education Society also gives great importance to the role of leadership in promoting innovation in education.

28. Silaporn Buasai (The Thailand Research Fund, Thailand) discussed the efforts of the Fund to extend to schools the skills acquired in the research process through its Young Researcher programme. The programme is motivated by the shortage of researchers in Thailand and inspired by a similar initiative in the rubber industry. The topics covered by the programme range from local history to tourism or local economic challenges.

29. The premise of the Young Researcher programme is that valuable skills can be acquired in the process of formulating new research questions, shifting the focus from the accuracy of the answers to the actual process of doing research. These skills include, among others, problem identification, planning, data collection, verification, presentation and reporting. Students learn best when intrigued and motivated by a topic they perceive as relevant. With the assistance of coaches, this intrigue is translated into specific research questions, which are then formulated into a proposal. Other key steps of the process involve interviewing local informants and analysing data in an active learning experience. Lastly, students make presentations in which they conceptualise the steps taken in the process as well as their findings.

30. The open discussion following the morning presentations reflected on various topics. Despite differences in the degree to which systems have moved from rhetoric to implementation, there was a shared perception that the innovation agenda enjoys greater prominence at present than ever before. On the topic of cultural differences, several participants highlighted the centrality of values and personal relationships in the creation of environments conducive to creativity. Whether these values facilitate or constrain creativity depends on their higher-order nature and alignment with the characteristics of high-functioning systems. The discussion also touched on the differences between teacher-centred approaches to innovation, which appear to dominate in the Asian context, and student-centred approaches more prevalent in Western systems where the status of teachers as authority figures has blurred. The adoption of new teacher roles largely determines whether they are seen as enablers rather than barriers to innovation. In this regard, it was argued that the key issue at stake was the lack of autonomy and resources for teachers, and not their lack of ability to implement change.

Session 4: Pedagogies for thinking and creativity

31. The afternoon presentations focused on examples of pedagogies used in Asia in order to foster different sets of skills simultaneously and reflected on facilitating and hampering factors in specific Asian contexts.
32. Ramji Raghavan (Agastya Foundation, India) presented the initiatives undertaken by Agastya, whose mission is to spark curiosity and nurture creativity in children from disadvantaged backgrounds in India. The foundation currently reaches up to one million children a year and has gained a countrywide perspective thanks to its participation in India’s National Knowledge Commission and partnership with state governments. Agastya pursues its mission through seventy mobile science labs, twenty-nine science centres and school visits to a 172-acre creativity campus in Andhra Pradesh. Mobile labs travel to rural schools and villages to present examples of basic scientific concepts in engaging and interactive ways. The presentations in villages often take place in the evening, allowing all family members to attend and thereby buying support from parents. The success of these initiatives is exemplified by several INTEL science prizes awarded to children from rural areas who have participated in and led science projects with Agastya. Another achievement has been the Knowledge Commission’s recommendation that Agastya’s Young Instructor programme – in which children teach other children – is scaled up.

33. Agastya aims to bring about behavioural shifts, namely yes to why, looking to observing, passive to learning to explore, textbook-bound to hands-on and (as a consequence) fear to confidence. Agastya’s activities are motivated by the belief that children can develop creativity and problem-solving skills by being exposed to simple hands-on scientific experiments. This stems from the pattern that most creative people are good observers: they see much more to a situation than most others. The key disposition is curiosity, which is something everybody can make progress on. But observation must be learned. Thus, the interventions aim at developing awareness about scientific phenomena, and at suggesting practical applications. In line with India’s philosophical tradition, attempts are made to link this curiosity for the natural world with curiosity about one’s own psyche and a holistic conception of the human being. The transformations observed in children are not limited to their scientific knowledge but pertain as well, and more importantly, to their curiosity, motivation, confidence and sense of empowerment. Another objective of Agastya’s programmes is to attract attention and agitate minds to motivate government to replicate and scale up the interventions.

34. Hideyuki Horii (The University of Tokyo, Japan) presented the i.school initiative at the University of Tokyo, whose goal is that graduate and undergraduate students gain ability to design workshop processes for creative work. Japan is very often characterised as an innovative country but this usually refers to technology-driven innovation. Instead, the i.school pursues a broader notion of human-centred innovation with a focus on processes (e.g. understanding, creating, realising) rather than outcomes. For instance, in some workshops students are invited to dismantle artefacts, display their components and create original products by exploring new combinations of these elements and ideas. Throughout the process, pieces of technical knowledge are provided to support students’ creative thinking and innovation. More than twenty workshops have been organised since the i.school started its activity in 2009, and collaborations have been established with leading design schools across the world.

35. The innovation workshops themselves are then a subject of study using the tools of cognitive science, organisational behaviour, knowledge engineering and pedagogy. We believe that this “innovation science” could become a new field of study and that its principles should be applied to innovation in education. There are commonalities to most innovation process over and above cultural differences.

36. The next presentation was delivered by Kim Ho Sin (Ministry of Education, Singapore) and Ridzuan Abd Rahim (Ministry of Education, Singapore). It detailed pedagogies for thinking and creativity as developed in the Singapore context by the Ministry of Education’s Curriculum Office. In 2000, all subject syllabuses and textbooks were revised to explicitly incorporate thinking skills. Project work was introduced to help students develop creative and critical thinking skills. These creative and critical thinking skills are key components of the 21st Century Competencies framework that the Singapore Ministry of Education developed in 2010.
37. In the case of mathematics, the focus of Singapore’s curriculum is mathematical problem solving which is supported by five interlinked components: concepts, skills, processes, metacognition and attitudes. Its processes component which supports mathematical thinking comprises a) reasoning, communication, and connections, b) thinking skills and heuristics, and c) applications and modelling, all of which can be seen as higher-order processes (as opposed, for instance, to plugging in algebraic formulae in routine problems). The aim of this approach is to make students acquire not just the strong fundamentals of mathematics but also to develop an adaptive reasoning proficiency for them to solve unfamiliar and unstructured problems, deal with ambiguity and be able to learn independently. In science and humanities, the curriculum puts strong emphasis on the inquiry process by sparking curiosity and requiring students to gather data and exercise reflective thinking. These are iterative processes that students are taught to exercise. Across subjects, pedagogies are adapted to the ability level of the students, with more project-based work for the more cognitive students and more hands-on work for more kinaesthetic learners.

38. In terms of teacher training, the Ministry of Education encourages multiple pathways for professional learning, such as workshops, school visits and collaboration with curriculum officers. Master teachers facilitate learning through professional learning communities, teacher networks and focus groups. There are concerted efforts for curriculum policy to be filtered down from the curriculum planning at the ministry to teacher practice in classrooms.

39. Questions to presenters throughout the afternoon addressed a variety of topics. Firstly, some participants challenged the convenience of thinking only about ‘scaling up’ interventions and proposed instead a ‘scale down’ approach that focuses on the space where learning takes place. Thinking about how to diffuse practices was suggested as another alternative to the traditional preoccupation with widening scope. Secondly, many voices stressed the need for greater research efforts. It was suggested that innovation in education could become a field of study in itself, and eventually part of a more general “innovation science” with general principles applicable in different cultural contexts. Thirdly, questions were raised about the influence of the relative appetite for innovation of developed and developing economies. Have the former become complacent and satisfied with incremental, non-disruptive innovation? Is necessity the mother of invention in the latter? Are developing countries mature to accommodate workers and citizens equipped with the skill profiles we are trying to promote? Are richer countries really prepared for it? Lastly, different views were expressed about whether the pedagogies for students and instructors should be aligned. Can we instil creative and critical thinking into students without giving teachers more autonomy to exercise their own creativity and test innovative practices, or can centrally planned efforts cascade down successfully and have the desired results in students?

Sessions 5 and 6: Discussion groups and sharing

40. At the end of the afternoon, workshop participants split into groups to reflect on the day’s presentations and discussions. Individual groups were then invited to share their conclusions. The points below summarise recurrent themes as well as unique positions.

41. An important message was the importance to initiate change at the point of delivery and the power of working together with teachers. This may indicate the fact that, in order to nurture skills in thinking and creativity, systems should apply the same pedagogy with teachers as the latter apply with students. It is difficult to work creatively with students without getting teachers’ buy-in and engaging them as creative partners. Among other things, this involves freeing some of teachers’ time so that they can spend it on planning and putting into practice creativity-related activities.

42. Conceptual frameworks for the development of education for innovation should move away from binary categorisations (e.g. soft vs. hard skills, individual vs. group). These tend to be overly simplistic and valuable information is missed as we move from one category to another.
43. Innovation can either be left to flourish at the margins of the system or embraced as a mainstream policy. This choice is consequential for the point of entry of interventions.

44. New stakeholders need to be incorporated to the educational innovation ecosystem. In some countries, NGOs and foundations are filling important gaps and promoting skills among underserved populations. New arenas for change need to be created.

45. Considerations about student and teacher heterogeneity are largely absent in most interventions. Variation in terms of competences and motivation condition the success and equity outcomes of these initiatives. With regard to students, families play a central role in shaping children’s skills and character in early childhood, and neuroscience suggest that creativity can be nurtured and cultivated more than taught. As for teachers, age and ICT competences tend to be correlated with receptiveness to innovative practices.

46. Existing cultural and professional identities may need to be modified if we want creativity to flourish in the education system. How we perceive ourselves very often determines what we do, and if we promote a vision of ourselves as innovative and creative individuals, we will be so. Is that identity what is transmitted in our curriculum and implemented in our schools? In the case of teachers, it may be necessary to revise professional identities rooted in traditional subjects and promote more transversal definitions based, instead, on the competences that teachers help children to acquire. However, teachers should not be expected to radically redefine their identity and to act, for instance, as artists or researchers. Instead, they may mainly need to be supported with specific guidelines for routines that replicate skills in thinking and creativity as developed in other fields, or by artists or researchers acting as such (rather than as teachers).

47. New technologies can either enable or hinder pedagogical innovation, but there was agreement that the power of technology should be leveraged to support the development of 21st century skills in schools. Partnerships between educators and industry should be strengthened.

48. More evidence is needed on the results of the proposed methodologies in order to move in the right direction. An adequate time frame should be allowed for results to emerge in cases where an ‘innovation dip’ is likely to occur before new practices are integrated in the functioning of schools and systems at large.

Day 2

Sessions 7 and 8: Assessing progression in creativity, critical thinking and other skills for innovation

49. In this session, a new tool to assess formatively creative mindedness developed as a result of a joint research project of CCE and the OECD was presented and discussed. Examples of how Singapore national assessments have changed to give a greater importance to process and reasoning were introduced next.

50. Paul Collard (CCE) based his presentation on the research project “Progression in Student Creativity” commissioned by CCE and the OECD from Bill Lucas, Guy Claxton and Ellen Spenser of the Centre for Real-World Learning (CRL) at the University of Winchester. This was motivated by the concern that the lack of emphasis on creativity in schools is largely due to the absence of instruments to assess creativity in the school setting. The findings of this research are summarised in an OECD working paper.

51. The development of creativity assessment tools must rely on a clear definition of creativity. In order to arrive to such a definition, the following choices were made. First, creativity refers to creative behaviour rather than to divergent thinking. That is, the definition assumes that there are patterns of creativity beyond originality or eccentricity. Second, the definition prioritises process over product
creativity. This is because the tool must be used with children, who lack a record of production. Third, the definition pertains to ‘small c’ creativity as opposed to ‘big C’ creativity. That is, it does not aim to capture outstanding creative genius or the qualities of gifted and talented individuals, but rather the practicalities of the innovation process. Further, the interest remains in skills that can be developed as opposed to innate. Fourth, the definition had to adopt a language that is simple and accessible to teachers—and that they perceive as meaningful and applicable to their work. Fifth, the definition should allow for creativity to be assessed in terms of frequency and variety (i.e. more often and in more areas) rather than a scale (i.e. more or less creative).

52. Following these choices, CCE’s prototype tool for assessing pupils’ creativity in schools is based on a five creative dispositions model. These can be understood as core dispositions of the creative mind: inquisitive, persistent, imaginative, collaborative and disciplined. In turn, each of these habits of mind can be divided into three sub-dispositions which could be tracked along three dimensions: strength, breadth and depth. This theoretically-informed tool was successfully validated by both teachers and pupils in two field trials in English schools.

53. A critical insight that emerged from the field trials is teachers’ concern that the way lessons are generally structured leaves little opportunity to display the creative habits of mind. Another conclusion was that teachers need training in order to be able to articulate and produce evidence that points towards these habits. This is not to question teachers’ capacity to assess creativity, but rather to acknowledge that the articulation of these subjective judgements requires a shared conceptual and terminological framework which is not yet established in schools.

54. Eugenia Tan (Ministry of Education, Singapore) began her intervention by noting that many of the issues raised by the previous presentations resonated in the Singaporean context, despite cultural and institutional differences. As assessment is seen as an integral part of the learning process and provides information to inform practice, schools in Singapore have implemented various school-based assessments that provide opportunities for students to develop and demonstrate 21st Century Competencies.

55. One example is Project Work, which is seen as an opportunity for students to synthesize knowledge from various areas and critically and creatively apply it to real life problems. Further, these processes enable students to acquire skills such as collaboration, communication and independent learning. Primary and secondary schools are encouraged to design their own project tasks, such as to identify specific problem in the community, gather data, and generate possible solutions. Many schools use the problem-based learning or creative problem solving approaches to structure their project task. Another form of assessment is Performance Tasks. Examples presented related to students deciding the type and quantity of items to donate to tsunami survivors, or proposing Singapore’s stand on global climate change, among other topics. Results of project work and performance tasks often contribute towards part of a student’s academic record.

56. Singapore also acknowledges the importance of the language about creativity. The framework proposed by the Ministry of Education is communicated to teachers, most notably through the ‘Standards and Benchmarks’ for 21st Century Competences. These standards are aspirational statements that define developmentally appropriate targets for students and provide common points of reference for teachers to design lessons, assess skills, as well as guidelines for systematic evaluation.

57. Singapore’s National Examination system has incorporated these considerations in the form of a greater variety of assessment formats and a greater attention to students’ thinking skills. Examples presented included questions requiring analysis of unfamiliar texts, questions requiring students to design experiments, and coursework requiring students to not only create an artefact but also to explain how the design was conceptualised.
The group discussions that ensued addressed issues related to the actual use of these tools and approaches in a variety of contexts. Questions were raised about the content knowledge demands implicit in some of the tasks and project-based work that can be used to assess children’s creative mindedness. To what extent are these activities linked to pupils’ prior knowledge of specific subjects and technical skills? Are tools context-specific or can they be used across multiple cultural contexts?

Another point of discussion was whether the assessment of creativity is at odds with the traditional rewarding of “passive” learning. How will students who respond well to traditional, highly-structured tasks respond to new forms of assessment? Should different areas or subjects reward different forms of students’ engagement and learning?

Different views were also expressed with regards to the design of assessment tools. Should this be left in the hands of non-practitioners (e.g. academics, experts) or should the key inputs come mainly from teachers? How can collaboration between the two sides be organised best?

Lastly, the discussion centred on how the proposed dimensions of creativity interplay. On the one hand, it was argued that activities promoting creativity should ideally bring all dispositions alive instead of focusing on a particular one. On the other hand, the developmental progression of some of these dispositions may not run in parallel (e.g. discipline improving as children mature, while imagination declines), thus suggesting that the focus of creativity assessment may shift depending on children’s ages.

**Sessions 9 and 10: Innovation in education systems: what possible changes for the future?**

The presentations then shifted to both promising practices and barriers to innovation in the Asian context, with a focus on teachers’ beliefs and practices.

Zhiyong Zhu (Beijing Normal University, China) presented a case study from China on teachers’ conceptions of teaching. The motivating question for this study was the following: how much have elementary and secondary teachers’ practices and conceptions changed over the last 20 years? The traditional view sees teachers as monopolisers and transmitters of knowledge. This runs in partial contradiction with the goals stipulated in new curriculum reforms of fostering students’ creativity and ability to exchange and collaborate. Since 2009, and after having implemented curriculum reforms, China has placed more emphasis on changing teaching models.

The analyses of the distribution of teacher-student interaction time and the forms these interactions adopted in the Beijing elementary school under study suggest that teachers’ views of knowledge largely adhere to the traditional model. Exchanges between teachers and students are still predominantly one-sided, and disparities exist between teachers’ ideal conceptions of education and their actual teaching practices. For instance, one of the observed teachers taught about a creative text evoking emotions but left little freedom to students to express their individual feelings. Students were not seen as co-constructors of knowledge, neither in horizontal collaboration nor in relation to teachers. This mismatch between conceptions and practices raises doubts about whether students’ thinking, creativity and imagination can be promoted with current teaching models. It seems that the objectives of the curriculum are ahead of teachers’ practices.

The topic of teachers’ belief systems with regards to innovation was also addressed in the next presentation by Tatang Suratno (Indonesia University of Education, Indonesia). The practice of lesson study in Indonesia illustrates the complexity of the application of ministerial reform initiatives. Lesson study was introduced in several regions of Indonesia through cooperation with the Japanese International Cooperation Agency (JICA) and consultation with local teacher education institutions. It has recently become a nationwide policy for pre-service teacher education. One of the main goals of lesson study is to
promote teacher professional learning. The approach is based on inquiry-based learning and seeks to engage teachers in reflecting about their teaching practice and aligning their expectations with those of students, for instance through workshops where teachers are asked to act and think as if they were their own students, and to analyse their students’ learning.

66. An evaluation study in several pilot schools identified multiple challenges to the implementation of the lesson study model. Most notably, it revealed substantial inconsistencies between teachers’ knowledge and beliefs about, for instance, students’ enjoyment of classroom activities or collaborative learning. The evaluation suggested that reform efforts should adopt a systemic approach that takes into account these inconsistencies and promotes professional learning communities at the school level.

67. Yukata Hatanaka and Masakatsu Kobayashi (Okama Junior High School, Japan) presented the case of the OECD Tohoku School in Japan and its project-based learning approach. The school is a joint initiative by the OECD and several national and regional stakeholders to foster “creative recovery” in the Tohoku region which was dramatically affected by Great East Japan Earthquake in March 2011. The school brings together groups of students from different prefectures affected by the earthquake. The students’ mission is to organize an international event in Paris in 2014 to present the attractiveness and resilience of the region. This project is also an opportunity to experiment with innovations in education which foster diversity and creativity in multiple dimensions. The curriculum is based on the DeSeCo project and aims to develop 21st century skills. By promoting these approaches, the students and teachers of Tohoku School want to serve as grassroots ambassadors of change in the Japanese education system.

68. Project-based work developed in the Tohoku School involves fundraising and media campaigns to support the trip to Paris, proposals for public-private partnership at the school level, and other creative and problem-solving tasks for students. Examples of the latter include designing a campaign to dismiss baseless rumours about radiation-contaminated agricultural products, or coming up with creative menus for local restaurants that use produce from the regional fishing industry.

69. The ensuing debate elaborated on some of the issues raised by the morning presentations. The three cases provided on-the-ground examples and refocused the discussion on the realities of transforming ideas into action. There was a general agreement on the importance of addressing teachers’ beliefs as these critically mediate teaching practices. It was argued that even in low-accountability, low-pressure contexts, teachers may not dare to be innovative. Different ways of tackling this issue were proposed. One relates to shaping the expectations of families by giving greater importance to students’ creative and original thinking in public examinations. Another approach is to provide teachers with guidelines that detail concrete steps towards behavioural change, as opposed to exposing them to abstract models of teaching and creativity.

70. Moreover, arguments were put forward in favour of giving children more responsibility in implementing innovation. This is a powerful first step in many contexts, albeit the critical question is not whether to choose between top-down and bottom-up approaches, but how to find the space where both can more effectively collaborate.

71. A second topic of discussion was the need to keep a scientific record of these unique small-scale interventions so that a research base can be established. This also involved engaging researchers external to the intervention teams to study the dynamics and change and provide feedback in order to increase effectiveness.
Session 11: Reflection

72. Barbara Schneider (Michigan State University, United States) was invited to reflect on the workshop’s conversations based on her extensive research and practical experience in educational innovation. Her intervention comprised a brief presentation about three ongoing interventions in the United States and some reflections on the connections with the Asian context.

73. A powerful message stemmed from these three programmes (College Ambition Programme; Innovation Lab Network; and Centre for Advancing Research and Communication): there is a global push for evidence-based policy and interventions. The support of scientific evidence is needed to understand the impact and sustainability of innovative education initiatives and gain support from decision-makers.

74. In the view of Prof. Schneider, the discussions throughout the workshop also distilled a series of messages and implications for future work:

- Education sits in a political environment. Whatever we propose for education has to connect to this macro political environment.

- Student performance and achievement continue to be the key outcomes of interest and should be used as benchmarks to assess the impact of any innovation. The defence of traditional forms of education is generally based on the argument that it improves student performance, and innovative initiatives must be defensible on these grounds too. Further, outcomes and instruments used to achieve them must be kept separate.

- The concept of creativity needs further clarification. An alternative view defended by some prominent scholars emphasises engagement and motivation as the drivers of creative work and sees creativity as part of a psychic state, an embellishment of behavioural dispositions (‘flow’). An advantage of this approach is that engagement and interest are easy to define and measure.

- There is also a tension between creativity in a general sense and creativity customised to specific situations and students. Time on task during classroom interactions differs if teachers are dealing, for instance, with underperforming and minority students. This heterogeneity should be acknowledged.

- Innovative work is multidisciplinary, often charting new technologies. Partnerships can be formed to put together teams of researchers in interdisciplinary communities.

- Assessment has to begin at the onset of innovations. Baseline measurements are crucial.

- Teachers and students need to adhere to the idea of lifelong learning. We need to foster the right skills for adaptability to multiple careers and contexts.

- Innovative initiatives must consider potential spill-over effects –including those unexpected.

- The issue of sustainability is critical to the work on innovation and creativity. Much innovation is the work of pioneers, but we must consider who will take over.

Final discussion

75. An overarching point of agreement was that innovation is high on the agenda of educational systems across the Asia-Pacific region. This can largely be seen as a response to economic changes worldwide and to the growing importance of knowledge and technology management. In this respect, there
is a shared understanding of the need to promote a 21st century skills framework that combines technical skills, social and behavioural skills, and skills in thinking and creativity. Nonetheless, the ways in which this agenda is promoted vary across Asian countries, ranging from official policies to pioneering initiatives with a strong academic or entrepreneurial flavour.

76. Different institutional and cultural environments partly account for variation in policy approaches. Asian countries are generally more comfortable with a government-led approach than Western countries. At the same time, NGOs are playing an important role in introducing innovation, and in Japan the private sector is participates in many initiatives. Further, cultural differences are reflected in school governance and teaching practice. For instance, principal and teacher authority are more established in Asian countries. This can influence the effectiveness of top-down and bottom-up innovation approaches.

77. Education for innovation should be considered an innovation in itself. As such, many of the current efforts are still charting new territory. Different strategies are being tested as part of this innovation exercise. This implies that attention should be paid not only to success stories but also to failed attempts to introduce sustainable change and their underlying causes. Efforts should be aimed at increasing the success ratio of interventions, and failures seen as opportunities for learning.

78. Careful thought should be given to potential trade-offs between the skills that are developed with more traditional approaches and the “new” skills that have gained prominence in the innovation creativity agenda. Education policies aligned with a broader understanding of the competences that prepare students for future challenges in social and economic life should consider potential trade-offs given limited resources to bring this agenda forward.

79. One of the factors that hamper the promotion of creativity in schools is the lack of solid evidence about the impact of interventions. This is partly linked to the limitations of existing assessment tools and the time lags that are inherent before the results of most interventions can emerge. More and better-quality evidence about the effectiveness of the instruments (i.e. curricula, pedagogies, assessment) used to foster creativity needs to be generated. Rigorous evaluation methods must be developed and embedded into schools’ daily practices as much as possible.

80. A second implementation barrier is the traditional mindset of some of the actors that ought to participate in the innovation process. This mindset is largely rooted in the subject-based structure of academic disciplines and its connection with teachers’ professional identities. This generates a problem of ownership for the responsibility to develop creativity skills. The challenge is to implement approaches that increase the chances of getting teachers’ buy-in. One possible strategy is to adapt pre-service teacher training programmes to erode these traditional identities. Another is to give teachers more autonomy and time to design creativity-related activities for students, and to incentivise these practices. These strategies are not mutually exclusive.

81. A third obstacle is the lack of visibility and recognition of skills in higher-order thinking and creativity. It is necessary to make these outcomes more visible to all stakeholders, most importantly to teachers and students themselves. Clear conceptual frameworks and terminology are a critical step in this direction. A common-denominator understanding of creativity should be articulated and shared by those designing curricula and assessment tools, teachers and, ultimately, parents and students themselves.

Next steps

82. All workshop attendants agreed to become members of a new network to stay connected and exchange further information on activities and events as well as practice-related content. In particular, it was suggested that videos of teaching practices could be shared on a web portal.
83. The possibility of organising annual meetings to report on the progress of existing programmes and new initiatives was mentioned.

84. Representatives from the National Institute of Education (NIE) of Singapore announced that it will host a conference on “Redesigning Pedagogy” in June 2013, and invited all workshop participants to attend.

Additional Material

85. The workshop programme and the list of participants are included in the appendix to this document. Presentations and other supporting materials can be found on the OECD website\(^1\).

\(^1\) www.oecd.org/edu/ceri/educatingforinnovationinasia.htm
Background

In recent years, creativity and innovation have been identified as the key drivers of the future world economy, particularly in the developed world. While education has traditionally focussed on producing a professional class, leaving the majority of school leavers to head for low or semi-skilled employment, this is no longer viable. In most OECD countries, low skilled jobs are predicted to represent a small share of the economy by 2015. So the major challenge for the developed world's education systems is to unlock the skills that will support creative and innovative employment and work.

Innovation is not just a driver of growth. The range of skills associated with creativity also enables young people to develop into adults with a better quality of life. Imagination, curiosity, collaboration and resilience underpin success in relationships and the critical understanding and problem solving skills developed by creative individuals allow them to develop and deepen their appreciation of the world and all that it offers.

But innovation will not flourish unless adults have the skills needed to adapt to changing workplaces, workers, and consumers, the confidence and sense of agency to propose and implement improvements, and the creative minds necessary to succeed as scientists, inventors and entrepreneurs. In innovation-driven societies, education and training systems must empower people to innovate and quickly respond to the need for new skills generated by innovations in the workplace. Confronting these challenges will require policies that encourage innovation and improvements in the education system itself.

Target audience and objectives

Objectives

The workshop aims to:

- Outline the most significant policy, practice and initiatives that can lead to better equip students with skills in thinking and creativity in education systems;

- Identify the most significant barriers to their full implementation as well as the conditions that hamper and facilitate this kind of education, notably in Asia;

- Develop specific recommendations and action steps to address these barriers;

- Provide participants with a space for feedback on their practices and international peer learning.
Workshop format and target audience

This two-day, by-invitation, international workshop brings together senior policy officials, education decision makers and researchers with an interest in shaping education to meet the need to innovate in the 21st Century economy. Participants are a mix of senior officials, education innovators (including teachers) and researchers. They have between them significant experience of the issues and the implementation of innovation-driven approaches in Asia-Pacific education systems.

The format of the workshop is intended to promote discussion and debate. In particular, the event will provide space to discuss the relevance of international evidence and theories to the Asian educational context and to present Asian best or promising practice which either supports or challenges approaches that have been successfully introduced in non-Asian economies. In addition, the number of participants is restricted to about 30 participants to ensure that there is time for in depth discussion and reflection.

Participants come from Australia, China, India, Indonesia, Japan, Korea, Singapore, Thailand, and Vietnam as well as from the United States, the United Kingdom and the OECD Secretariat.

The working language of the event will be English.
Annotated Agenda

“Educating for Innovation in Asia: The theory, the evidence and the practice”

OECD-CCE-Singapore Seminar
15-16 January 2013

Day 1: 15 January 2013

Seminar chair on day 1: Tony MacKay,

8:45 onwards: Registration

9:00 - 9:15: Session 1: Opening remarks

This session will remind participants about the context and objectives of the workshop.

- Siew Hoong Wong, Deputy Director-General of Education (Curriculum), Ministry of Education, Singapore
- Paul Collard, Creativity, Culture and Education, United Kingdom
- Stéphan Vincent-Lancrin, OECD

9:15-10:30: Session 2: Skills requirements and the educational challenges of tomorrow

This session will present some research into the skills young people require to meet the social and economic needs of innovative societies. Original OECD work on skills and education for innovation societies will be presented here, notably a framework for the skills required. The focus would be twofold:

- The macro-international definitions of the skills required in the OECD area
- The relevance of such skills in the Asian context.

Two discussants will debate the relevance of the presentation to their educational and economic priorities:

- Wei Li Liew, Ministry of Education, Singapore
- Jin-Sook Kim, KICE, Korea

10.30-11.00: Coffee

11:00-12:00: Session 3: Educational programmes fostering creativity and innovation

This session will present examples of educational programmes or initiatives emphasising creative mindedness, critical thinking and entrepreneurial attitudes from both a European and Asian perspective. The session will be launched by brief presentations (15 minutes each) about what the different programmes change concretely to teaching practices in the classroom.

- Paul Collard, Creativity, Culture and Education, United Kingdom
- Sukhchandan Samra, Apeejay School, India
- Silaporn Buasai, The Thailand Research Fund, Thailand

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Questions and answers

12:00-13:00: Session 3 (cont.): Educational programmes fostering creativity and innovation: Plenary discussion

This session will start a discussion based on the previous presentation to identify the features of educational programmes fostering creativity and innovation, and to start thinking about the barriers that they face, and how they tried to overcome them. Participants will be asked to reflect on similarities and differences with existing programmes in their countries.

13:00-14:00: Lunch

14:00-15:30: Session 4: Presentation
Pedagogies for thinking and creativity

This session will present a few examples of pedagogies that are used in Asia in order to foster simultaneously different sets of skills: traditional learning outcomes coupled with skills in thinking and creativity and with social and behavioural skills. The session will reflect on how different pedagogies or approaches to teaching and learning could be applied to compulsory education, and reflect on the facilitating and hampering factors in specific Asian contexts. The session will allow us to continue the discussion on the relative importance of the content of the curriculum and the ways of teaching. The session will be launched by brief presentations (15 minutes each) followed by questions, answers, and comments.

- Ramji Raghavan, Agastya Foundation, India
- Hideyuki Horii, University of Tokyo, Japan
- Kim Ho Sin and Ridzuan Abd Rahim, Ministry of Education, Singapore

15:30-16.00: coffee

16:00-17:00: Session 5: Discussion
Education for thinking and creativity

Working in groups, participants will build on the day’s presentation and discussions. This session will discuss the different ways of defining and implementing an educational reform agenda to foster skills in thinking and creativity (along subject-based skills) in school settings.

Some of the questions to discuss would be:

- Are there international principles in innovation-friendly education, or do the needs of different economies require different educational structures?
- What impact do (Asian) national identities and cultures have on the design of innovation-driven education systems?
- Do the expectations of students differ from the requirements of the nation and/or the economy?
- What are the views of parents and how should they be involved in the debate?
- How will national educational assessment systems have to change to measure the outcomes of an innovation-driven educational system?
- What are the specificities of Asian models and contexts for promoting skills for innovation through education?
17:00-17:30: Session 6: Sharing

The individual groups will summarise their conclusions and the issues raised for further discussion and research.

Day 2: 16 January 2013

9:00-10.00: Session 7: Presentation
Assessing progression in creativity, critical thinking and other skills for innovation

In this session, a new tool developed by CCE in partnership with the OECD to assess formatively creative mindedness will be presented. The session will also present other assessment tools that try to focus teachers and students on higher order thinking skills.

- Paul Collard, CCE, United Kingdom
- Eugenia Tan, Ministry of Education, Singapore

10:00 – 10.30 Session 8: Discussion

Working in groups, participants will debate the relevance of the presentation to their own educational/economic priorities. They will also discuss how the presented tool would need to be adapted to the context of their country.

10:30-11.00: coffee

11:00-11:45: Session 9: Presentation
Innovation in education systems: what possible changes for the future?

This session will identify some of the systemic changes needed for education to effectively develop skills in thinking and creativity. It will present promising practices, but particularly focus on identifying some of the barriers to these innovations, notably in the Asian context. Questions such as teacher training, school organization, accountability and assessment policies and assessment, time allocation and curriculum structure, would be discussed.

- School organization and school system: drivers and barriers to creativity?
- Teacher training: are teachers well prepared for fostering creativity and critical thinking?
- Social factors that influence/impede necessary reforms

- Zhiyong Zhu, Beijing Normal University, China
- Tatang Suratno, Indonesia University of Education, Indonesia
- Yutaka Hatanaka and Masakatsu Kobayashi, Okuma Junior High School, Japan

11:45 – 12.30 Session 10: Plenary discussion

Participants will debate the relevance of the presentation to their own educational/economic priorities and reflect on the plausible levers of change in their national context.
12:30-13.30: lunch

13:30 – 14:00: Session 11: Reflection

This session will propose a first reflection on the workshop’s conversations so far. Based on her research and practical experience of educational innovation and change, Barbara Schneider will reflect on the discussions, the extent to which some of the challenges discussed are specific or not to Asia, and propose some lines of reflection.

- Barbara Schneider, Michigan State University, United States

14:00 - 15:30: Session 12: Group discussion

Working in groups, participants will build on the workshop’s presentations and discussions to propose 6 hampering factors and 6 levers of change towards innovating education for creativity, critical thinking and other skills for innovation.

Groups will:

- Identify the most significant barriers and drivers to the full implementation of policy, practice and initiatives that can lead to better equip students with skills in thinking and creativity, notably in Asia;
- Develop specific recommendations and action steps to address these barriers and activate these drivers;

Some of the questions to discuss would be:

- What tensions exist between the needs of an innovation-friendly education system and the priorities of different actors in society (students, parents, teachers, employers, politicians, policy-makers, etc.)?
- How can the arguments be refined so that the wider political system is sensitive and supportive?
- What concrete initiatives, programmes or tools could or should be developed or mainstreamed to give more space to skills for innovation in the culture of our education systems?

15:30 – 16:30: Session 13: Sharing, wrap-up, next steps and close

The individual groups will present their diagnosis and recommendations and the issues raised for further discussion and research. The group will discuss them and try to integrate them in a single document.
Participants list for
“Education for Innovation in Asia: The theory, the evidence and the practice”

Singapore
15/1/2013 - 16/1/2013

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Executive Director

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Agastya International Foundation  
Founder-Chairman

Mrs. Sukhchandan SAMRA  
Apeejay School  
Principal

Ms. Vyjayanthi SANKAR  
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