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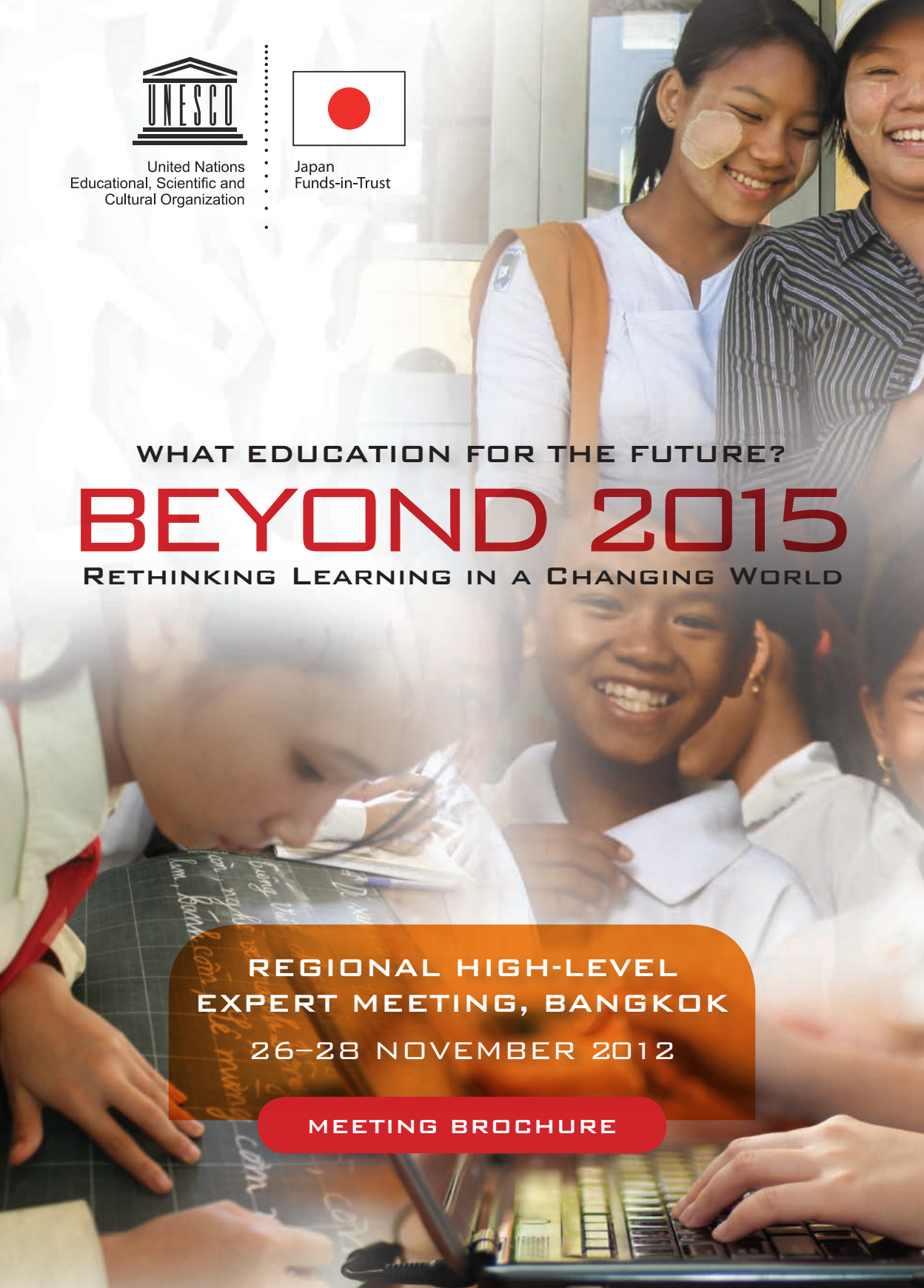

WHAT EDUCATION FOR THE FUTURE?

BEYOND 2015

RETHINKING LEARNING IN A CHANGING WORLD

REGIONAL HIGH-LEVEL
EXPERT MEETING, BANGKOK

26–28 NOVEMBER 2012

MEETING BROCHURE

What Education for the Future?
Beyond 2015 – Rethinking Learning in a Changing World

Regional High-Level Expert Meeting,
Bangkok, November 26 – 28, 2012

AGENDA

Day 1 26 November The Terrace (9th Floor)

TIME	SESSION
08.30 – 09.00	**Registration**
09.00 – 09.05	**Voices of Youth: Learning for the Future – Video presentation**
09.05 – 09.15	**Introduction to the Meeting** ***Margarete Sachs-Israel,*** Team Leader, Education Research and Foresight Programme, UNESCO Bangkok
09.15 – 09.30	**Welcome Remarks** ***Gwang-Jo Kim***, Director, UNESCO Bangkok, Asia and Pacific Regional Bureau for Education ***Takashi Asai,*** Deputy Secretary General, Japanese National Commission for UNESCO
09.30 – 09.50	**Keynote Speech** ***Masuo Aizawa,*** Executive Member, Council for Science and Technology Policy Cabinet Office, Government of Japan
09.50 – 10.00	**Presentation** ***Qian Tang***, Assistant Director-General for Education, UNESCO
10.00 – 10.15	**Questions and Answers Session**
10.15 – 10.20	**Photo Session**
10.20 – 10.45	**BREAK**
10.45 – 12.00	**Panel 1: From Learning Process to Learning Outcomes** Moderator: ***Barry McGaw*****,** Chair, Australian Curriculum Assessment and Reporting Authority Panelists: ***Martin Westwell,*** Professor, Flinders University, Australia ***Soo-siang Lim (Ms),*** Director, Science of Learning Centre, National Science Foundation ***Kathleen McCartney (Ms),*** Dean, Harvard Graduate School of Education
12.00 – 12.30	**Plenary discussion**
12.30 – 13.30	**LUNCH**

13.30 – 15.00 **Panel 2: ICTs and Learning**

Moderator:
Michelle Selinger, Director, Education Practice, Internet Business Solutions, Cisco Systems
Panelists:
Shinobu Yume Yamaguchi (Ms), Professor, Tokyo Institute of Technology
Ashutosh Chadha, Intel Corporate Affairs Director – South Asia
Christopher Hoadley, Associate Professor and Co-Director, Digital Media Design for Learning and Educational Communication and Technology, New York University
Michelle Selinger (Ms), Director, Education Practice, Internet Business Solutions, Cisco Systems

15.00 – 15.30 **Plenary discussion**

15.30 – 16.00 **BREAK**

16.00 – 17.15 **Panel 3: Learning and Economic Development**

Moderator:
Lars Sondergaard, Country Sector Coordinator for Human Development, World Bank (Laos, Cambodia, Myanmar, Malaysia and Thailand)
Panelists:
Mae Chu Chang (Ms), Head of Education, World Bank, Indonesia
Cheonsik Woo, Vice President, Department of Industry and Competition Policy, KDI
G.K. Chadha, President, South Asian University, New Delhi

17.15 – 17.45 **Plenary Discussion**

19.00 – 21.00 **Dinner Reception** hosted by UNESCO and the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT)
Venue: Imperial Queens Park Hotel, 4th Floor, Swimming Poolside

Day 2 27 November

The Imperial China 11 (4th Floor)

TIME	SESSION
09.00 – 10.15	**Panel 4: What Education and Learning for the Future?** Moderator: ***Cliff Meyers***, Regional Advisor, UNICEF EAPRO Panelists: ***Dirk van Damme***, Head, Centre for Education Research and Innovation (CERI), OECD ***Akira Ninomiya,*** Executive Vice-President, Open University of Japan ***Ilkka Tuomi***, Founder and Chief Scientist, Oy Meaning Processing Ltd.
10.15 – 10.45	**Plenary Discussion**
10.45 – 11.15	**BREAK**
11.15 – 12.30	**Panel 5A: Rethinking Learning in the Context of the Asia Pacific Region** Moderators: ***A. Singh,*** Director, UNESCO Beijing ***S. Aoyagi,*** Director, UNESCO New Delhi Panelists: ***Kerry J Kennedy,*** Professor, Hong Kong Institute of Education ***Ashish Rajpal***, CEO, iDiscoveri Education/XSEED, India ***Thomas Menkhoff,*** Professor, Singapore Management University
12.30 – 14.00	**LUNCH**
14.00 – 15.45	**Panel 5B: Rethinking Learning in the Context of the Asia Pacific Region – Country Perspectives** Moderators: ***A. Singh,*** Director, UNESCO Beijing ***S. Aoyagi,*** Director, UNESCO New Delhi Panelists: ***Aruna Biswas (Ms)***, Joint Secretary, Ministry of Education, Bangladesh ***Nguyen Thi Hoang Yen (Ms)***, Vice-Director, The Vietnam National Institute of Educational Sciences ***Barry McGaw***, Chair, Australian Curriculum Assessment and Reporting Authority Co-presentation: ***Josh Sung-Chang Ryoo,*** Research Fellow, Korean Education Development Institute ***Hyun-Kyung Kim (Ms),*** Research Fellow, Korea Institute for Curriculum and Evaluation
15.45 – 16.30	**Plenary Discussion**
16.30 – 17.00	**BREAK**
17.00 – 17.30	**Discussion and Development of Recommendations:** Establishment of life-long learning systems in the light of 21st century requirements Moderator: ***Mark Bray,*** Professor, Hong Kong University

Day 3 28 November — The Imperial China 11 (4th Floor)

TIME	SESSION
	Discussion and Development of Recommendations: Linking regional and global perspectives
09.00 – 09.45	**Session 1:** The role of learning in future policy orientations of post-2015 EFA and MDG Moderator: ***Sobhi Tawil,*** *Senior Programme Specialist, Education Research and Foresight, UNESCO*
09.45 – 10.30	**Session 2**: Developing recommendations for a research agenda on rethinking learning in a changed world Moderator: ***Gwang-Chol Chang,*** *Chief, Education Policy and Reform Unit, UNESCO Bangkok*
10.30 – 11.00	**BREAK**
11.00 – 11.15	**Summary of Key Findings of the Discussions** ***Margarete Sachs-Israel,*** Team Leader, Education Research and Foresight Programme, UNESCO Bangkok
11.15 – 11.45	**Plenary discussion**
11.45 – 12.00	**Next Steps and Closing Remarks** ***Gwang-Jo Kim***, Director, UNESCO Bangkok
12.00 – 13.30	**LUNCH**

What Education for the Future?
Beyond 2015 – Rethinking Learning in a Changing World

Background and Rationale

Learning is increasingly recognized as one of the core themes for future education as well as in the global discussions on the role of education in post-2015 agendas. The Asia and Pacific regional high-level expert meeting on *Towards EFA 2015 and Beyond: Shaping a New Vision for Education*, held in Bangkok in May 2012, also highlighted the fact that learning should be one of the areas of emphasis in shaping future education goals and strategies.

Current and future efforts to reshape education can benefit from a growing wealth of knowledge and scientific evidence, including the following examples of findings:

- People possess different kinds of minds and therefore learn, remember, perform, and understand in different ways (Gardener, 1991, 1993);
- ICTs have created new ways of accessing information, which in turn has produced a new generation of learners who 'think and process information fundamentally differently…'(Prensky, 2001);
- The very nature and the spaces within which learning occurs are changing (CISCO, 2010) and there is need to move beyond the classroom-centred paradigm of learning toward and open learning approach;
- Non-cognitive skills are important determinants for academic and employment outcomes (Heckman et al., 2006);
- Economic returns are determined by the fact that learning has taken place, expressed in cognitive skills (Hanushek and Woessman, 2008);
- A growing recognition of the importance of key competencies for a successful life and a well-functioning society, as documented in a rich body of studies (Rychen and Salganik (eds.), 2001, 2003; OECD 2005; European Commission, 2006) as well as of 21st century skills (e.g. P21, 2009; ATC21S, 2010);
- Learning has a direct impact on growth and development (World Bank, 2011);
- More attention should be paid to measuring social outcomes (OECD, 2010; University of London Institute for Education, 2008; Stigliz, Sen and Fitoussi, 2009).

As illustrated in the above examples, education systems need to evolve in order to equip learners with a set of skills that can enable them to be innovative and adaptive in an increasingly connected and constantly changing world. The concept of lifelong learning provides a key organizing principle for education and training systems (UNESCO, 1996). This requires the creation of a system which provides a continuum of learning opportunities (formal, non-formal and informal) for people of all ages (infants, children, adolescents and adults), made available by a wide coalition of learning providers.

Aim of the Meeting

This high-level meeting follows the abovementioned one on shaping future orientations for education and will focus on learning. As we embark on discussions on learning, it must be recognized that there are varied perspectives on learning, from different disciplines. This high-level expert meeting will therefore bring together renowned educationists, learning scientists, and economists to engage in a multi-disciplinary dialogue on learning.

A second key consideration is that while there is an abundance of research and knowledge on learning, this knowledge is not necessarily applied by policy makers. In this view, this meeting will develop recommendations on what may be required to build effective learning systems in a changing world. This approach involves looking beyond the confines of the traditional education and training sector from a life-long learning perspective.

The findings of the meeting will also support furthering regional and international work towards developing a new vision of education and the post-2015 development agenda.

Specific Objectives

- Promote dialogue among educationists, learning scientists and economists and to enrich the current global debate on learning;
- Formulate recommendations on further research; actions towards building effective learning systems; post-2015 agendas.

Participants

High-level experts in the areas of economics, learning science and education, including researchers from universities and research institutes, international organizations and the business sector.

Statement by Gwang-Jo Kim

Director, UNESCO Bangkok
Asia and Pacific Regional Bureau for Education

Through our first meeting "Towards 2015 and Beyond: Shaping a New Vision for Education" (May 2012), high-level experts reviewed progress made to achieve the Education for All (EFA) goals, reflected on economic, demographic and socio-cultural changes and their implications for education and put forward their ideas on what the future of education in the Asia-Pacific should look like. Their discussions highlighted the fact that learning should be of core focus in shaping future education goals and strategies. As such, this follow up meeting, "Beyond 2015 – Rethinking Learning in a Changing World" provides us with an opportunity to extend our reflections on learning. With the combined expertise of educationalists, neuroscientists, economists, and information communication specialists, it is our duty now to go beyond the rhetoric and identify what sort of learning will provide for productive, happy and meaningful lives for all in the 21st Century. I am most delighted by the collective wisdom and expertise of our participants from such a variety of backgrounds, and I look forward to ideas that will stem from this event, informing current discussion on the future of education here in the Asia-Pacific.

Statement by Takashi Asai

Assistant Secretary-General
Japanese National Commission for UNESCO

The Japanese National Commission for UNESCO is very pleased to collaborate with UNESCO Bangkok in organizing this important meeting on education for the future. In thinking about education beyond 2015, it is important to note that the issue of learning has come to the forefront of global discussions with its inherent links to quality of education. This meeting is thus a unique opportunity to bring together high-level experts in the fields of education, learning science, economics and ICT to discuss how cutting-edge insights from their respective areas can inform recommendations for building effective learning systems in a life-long learning perspective. I am looking forward to this meeting and hope that the discussions will not be limited to the duration of the meeting, but be the spark for further interdisciplinary thinking and research in rethinking learning for a changing world.

Keynote Speech by Masuo Aizawa

Executive Member, Council for Science and Technology Policy
Cabinet Office, Government of Japan

The world has changed. The environment surrounding Asia and the Pacific is also drastically changing. Innovation and creativity are considered key to learning in the 21st century. In the past, the countries with high Global Innovation Indicator (GII) was in proportion to its economic growth while the data of 2012 illustrates high GDP is not prerequisite for innovation. The evolution of Japanese Science and Technology Policy incorporates the importance of innovation and the 4th Basic Plan of Science and Technology Policy (2011-2015) promotes integration of science and technology and innovation performance. The public education system, however, does not necessarily reflect such rapid changes, implying a needed 'update' in the types of skills children and adults should develop. This presentation refers to the modified "Disruptive Innovation Model" which describes the five most needed skills to be innovative, namely, association thinking, questioning skills, observation skills, networking skills, and experimental skills. These skills are not specifically taught in classrooms, but rather, to be "developed". Further, the creativity aspect is added to this model. Specific examples are introduced to illustrate how such skills have produced innovative ideas, applying science and technology to localized development activities contributing to support basic human needs. This presentation hopes to lead to discussion and questions on skills and learning process that children and adults ought to acquire to live in the 21st century.

After graduation from Yokohama National University, Masuo Aizawa received his Doctorate in engineering from Tokyo Institute of Technology in 1971. He was Assistant Professor at Tokyo Institute of Technology from 1971-1980, Research Fellow at Lehigh University (USA) from 1974-1975, Associate Professor at Tsukuba University from 1980-1986 and moved to Tokyo Institute of Technology as Professor in 1986. He served as Dean of School of Bioscience and Biotechnology, Tokyo Institute of Technology in 1994-1996 and 1998-2000, as Vice President from 2000-2001, and as President from 2001-2007. He was appointed as Executive Member, Council for Science and Technology Policy, Cabinet Office, Government of Japan, in 2007 and became Professor Emeritus, Tokyo Institute of Technology in 2007.

He was President of Japan Association of National Universities, Member of Science Council of Japan, Associate Member of Science Council of Japan, Chair of Council for University Accreditation, Member of Central Council for Education (Chair of University Division), Vice President of Chemical Society of Japan, President of Electrochemical Society of Japan, President of International Society of Molecular Electronics and Biocomputing, and President of International Society for Bioluminescence and Chemiluminescence.

Presentation by Qian Tang
Assistant Director-General for Education, UNESCO

The impact of education on development is well-recognized. Since the international community adopted the Education for All goals at the 2000 World Education Forum, enrolment rates have increased considerably. However, major challenges remain. Many children, young people and adults remain unable to access formal and non-formal learning opportunities due to poverty, marginalization, cultural factors or geographical isolation, among other factors. Moreover, even for those who are enrolled, learning outcomes are often inadequate, with more than a third of all children lacking age-appropriate reading and counting skills. Worldwide, almost 800 million adults are considered illiterate.

With only three years left until the target date of 2015, we must redouble our efforts to meet the goals. In this regard, it will be critical to improve teacher numbers and quality; take a holistic and balanced approach to education sector development; increase the availability of quality higher education; and expand opportunities for skills development for the world of work. Furthermore, targeted efforts to improve the quality and relevance of education must include attention to the development of 'global citizenship' attitudes, behaviours and skills among learners. In the lead-up to the 2015 global education conference to be held in the Republic of Korea, UNESCO is developing a core set of principles that should underlie any future set of goals. These must respond to evolutions in the international development agenda, learning environments and educational theory and practices, while maintaining a strong focus on equity.

Dr Qian Tang was born in Beijing, China. He earned his bachelor's degree in education from Shanxi University, China in 1976. In 1985, he became a Doctor of Philosophy in biology from the University of Windsor, Canada.

Dr Tang joined UNESCO as Senior Programme Specialist, Section for Technical and Vocational Education, in 1993 and became Chief of the Section in 1996. In this position, he assumed the overall coordination of UNESCO's International Project of Technical and Vocational Education (UNEVOC) and organization of the Second International Congress on Technical and Vocational Education (Seoul, 1999). From 2001 to 2005, Dr Tang was Director of the Executive Office for the Education Sector. In 2005, he became Deputy Assistant Director-General for Education, responsible for overall coordination of the Education Sector's strategic planning, programme implementation, finance and budgeting as well as human resource management.

Dr Tang was appointed Assistant Director-General for Education in April 2010 by UNESCO's Director-General, Mrs Irina Bokova. Since then, he has led the efforts to revitalise the Education Sector in order to raise the visibility of education on the international development agenda and provide concrete assistance to UNESCO's Member States.

Introduction to Panel 1:

From Learning Process to Learning Outcomes

Background

While improving learning has been recognized as one of the most critical issues in discussions on the future of education and the role of education in post-2015 development agendas, there is persisting dearth of knowledge in regard to the process of learning, that is, how, when and where learning occurs. Neuroscience, defined as "the empirical study of the brain and connected nervous system," focuses on "understanding of human thought, emotion, and behaviour" (The Royal Society, 2011; Society for Neuroscience, 2009). Educational neuroscience, or neuroeducation, has been the subject of resurgent interest within the education community. Given that the brain is the principal organ in learning, it is only natural that an increased knowledge of its functioning is seen as a key factor to better understand the learning process. Yet many of the attempts made thus far to bring a neuroscience perspective into the classroom have been "of mixed quality", based "too little upon research evidence and too much on impressive-sounding but scientifically questionable formulae" (Howard-Jones, 2008b, p.2). Nonetheless there is a great deal of excitement around the potential of connecting education and neuroscience and strong indications that research in this area will continue to grow.

The latest insights in this area reveal a wealth of information in regard to the neuronal circuitries involved in the "how" aspect of learning as well as factors which may affect it, as well as the "when" or time dimension of learning. The overall message is a nuanced one: research from the OECD suggests that "there are no 'critical periods' when learning must take place but [that] there are 'sensitive periods' when the individual is particularly primed to engage in specific learning activities" (OECD, 2007, p.18). For example, the learning of many aspects of language is said to be strongest at an early age, underlining the importance of a strong foundation of early childhood education and the potential of multiple language learning in the early years.

But perhaps neuroscience's greatest contribution to learning from a temporal point of view is its affirmation of the brain's lifelong plasticity, that is, its capacity to change in response to environmental demands throughout life. The evidence provides support for the idea of lifelong learning (OECD, 2007; The Royal Society, 2011) not only for the continued productivity of the workforce in a highly volatile globalised environment but also as a means to reduce the risk of dementia at old age and the associated high costs.

It is important to acknowledge these insights from neuroscience, yet it is simultaneously important to note the lack of rigorous evidence from the discipline in support of some of the widely accepted and commonly known ideas about brain functioning in the education community. These include the concepts of "left brain versus right brain" and differentiated learning styles and programmes such as educational kinesiology (e.g. Brain Gym) and Accelerated Learning. While such ideas and interventions should not be dismissed entirely, education policymakers and practitioners should note the lack of empirical grounding behind them and use caution in their potential application in classrooms and schools.

While it is impossible to summarize all of the neuroscience research which could be considered, the highlights given above merit consideration, given their potential implications. The affirmation of the importance of environmental factors for proper brain functioning, though seemingly obvious, suggests that the future discourse around learning should not ignore these factors (e.g. nutrition, sleep, exercise) and should consider a more holistic and interdisciplinary perspective. In looking toward the future, Howard-Jones (2008a) suggests that teacher training generally will and should increasingly consider elements of psychology and brain research. The Society for Neuroscience also affirms "the importance of teachers being informed, critical consumers of science…particularly pertaining to student learning" (Society for Neuroscience, 2009, p.4).

In addition, the "when" dimension of neuroscience research on learning has important implications. The insights in this area can be used to inform the curriculum and orientation of education at different phases and levels. The revelation of the greater potential for language learning at an early stage suggests that this must be an important feature of schooling in the first few years of the cycle, while the general insights on brain development in the early years of life affirm the general importance of early childhood education (OECD, 2007).

The insights regarding the brain's potential for lifelong learning also has key implications, as it suggests that provisions must be made for providing opportunities for learning for all, regardless of age. This is very much in keeping with UNESCO's position on the great importance of lifelong learning.

As The Royal Society (2011) argues, "the emerging field of educational neuroscience presents opportunities as well as challenges for education. It provides means to develop a common language and bridge the gulf between educators, psychologists and neuroscientists." (p.v). The implications for learning for the future are many, suggesting the need for a reciprocal relationship and dialogue between education policymakers and practitioners and those who conduct research on learning sciences, similar to the relationship between medicine and biology.

Proposed topics for discussion

Based on the above, the panel will consider the implications of neuroscience for the learning debate and will specifically discuss the following topics:

- What are the implications of the emerging insights for pedagogical approaches and methods to effectively enable learners to acquire particular knowledge, competencies and skills and to be prepared for lifelong learning?
- What are the applications of neuroscience and cognition to enhance learning and implications for policy making, particularly in addressing educational, technological and workforce challenges?

References

Howard-Jones, P. 2008a. *Potential educational developments involving neuroscience that may arrive by 2025. Beyond Current Horizons.* http://www.beyondcurrenthorizons.org.uk/potential-educational-developments-involving-neuroscience-that-may-arrive-by-2025/ (Accessed 12 October, 2012)

_____. 2008b. *Neuroscience and education: Issues and opportunities: A commentary by the Teaching and Learning Research Programme*. TLRP-ESRC. http://www.tlrp.org/pub/documents/Neuroscience%20Commentary%20FINAL.pdf (Accessed 15 October, 2012)

OECD. 2007. *Understanding the brain: The birth of a learning science*. Centre for Educational Research and Innovation, OECD. http://www.oecd.org/site/educeri21st/40554190.pdf (Accessed 9 October, 2012)

Society for Neuroscience. 2009. *Neuroscience Research in Education Summit: The promise of interdisciplinary partnerships between brain sciences and education*. http://www.sfn.org/siteobjects/published/0000BDF20016F63800FD712C30FA42DD/D0E7F2B692E1853CC31DDB5D80E4AE69/file/education%20Summit%20Report.pdf (Accessed 15 October, 2012)

The Royal Society. 2011. *Brain waves module 2: Neuroscience: Implications for education and lifelong learning.* http://royalsociety.org/uploadedFiles/Royal_Society/Policy_and_Influence/Module_2_Neuroscience_Education_Full_Report_Printer_Friendly.pdf (Accessed 8 October, 2012)

UNESCO Bangkok. 2012. *Summary Outcomes Document: Towards EFA 2015 and Beyond – Shaping a New Vision of Education*. http://www.unescobkk.org/fileadmin/user_upload/epr/Images/Summary_Outcomes-Post_2015_FINAL.pdf (Accessed 16 October, 2012)

Abstracts

1. Martin Westwell

Cognitive Sciences and Evidence-Informed Policy Making

Increasingly, neuroscience shares common ground with education creating opportunities for the interpretation (and misinterpretation) of research findings in each field to influence decision-making and practice in the other. Scientific innovations and evidence can never supplant our educational values. However, as the world changes and the purpose of education evolves in response, the evidence about student and teacher cognition can inform how those values might be best reflected in policy and practice. Indeed it may be the case that as we learn more about the way in which the development of students' thinking and learning can be influenced by external factors, it will influence our views on the purpose of education. Understandably, policy-makers need certainty, or at least confidence, to make changes to existing approaches and practices. However, the research evidence from the cognitive sciences can often only offer indications and suggestions. The interpretation of the findings is a crucial step in the translation of science into policy and practice. There are many pitfalls along these pathways such as over-interpretation of results or the use of neuroscience to give a post hoc rationalisation of a predetermined policy position. Addressing the challenges to using neuroscience evidence to inform policy and practice in education in a sophisticated way is worth the effort. The nascent scientific approach to medicine overcame similar issues a hundred years ago and the subsequent translation of research findings into medical practice has produced untold benefits. Our challenge is to emulate that success in neuroscience and education.

2. Soo-Siang Lim (Ms)

Building an Interdisciplinary Science of Learning – People, Ideas and Tools to Connect Research and Education Innovations

There is increasing recognition that research on how people learn should be an important driver of innovation in learning and education. However, major challenges stand in the way of achieving this ideal. These include: 1) Any study of learning brings with it many deep complexities of scope and scale that cannot be solved by any one discipline alone, or by individuals or small groups working in isolation. How can we harness expertise from all relevant disciplines to achieve a more comprehensive and deeper understanding of learning? 2) There is a general disconnect between researchers and practitioners, such that relevant research findings are often not used to inform educational practice and policy. How can we better use our understanding of how people learn to inform educational practice and policy and conversely, how can we use knowledge and experience gained from educational practice to raise questions that test and refine our research priorities on how people learn? Examples of efforts at the US National Science Foundation's Science of Learning Centers to address these challenges will be provided. These include: 1) research on dynamics of brain states, brain plasticity and their implications for learning and educational practice, and the design of interventions. Highlighted projects draw on and integrate knowledge from multiple disciplines, including biology, education, neuroscience, social and psychological sciences, engineering, computational science and informational sciences, mathematical and physical

sciences, music and the arts; and 2) translational efforts – both “outreach” and “inreach” to bridge the gaps between researcher and practitioner communities.

3. Kathleen McCartney (Ms)

Rationale for Quality Early Childhood Interventions

New data from neuroscience, genetics, and the social sciences indicate that high-quality early enriched environments can mitigate the effects of disadvantage on cognitive outcomes, mental health, and executive functioning. In her talk, Dean Kathleen McCartney will summarize the economic, social, and biological arguments for investment in early childhood, with an emphasis on the specific developmental challenges faced by very young children who have prolonged exposure to toxic stress. Using evidence from the early care literature, McCartney will discuss factors that have been shown to contribute to enduring positive effects, particularly for children who suffer disadvantage. She will conclude with policy recommendations to support effective interventions with parents and families, high quality early care and education, and the development of skilled early childhood professionals.

Biographies

Martin Westwell is the first Director of the Flinders Centre for Science Education in the 21st Century and brings a scientist's evidence-informed approach to teaching and learning. After completing his degree and PhD at Cambridge University, Martin moved to Oxford University as a Research Fellow in Biological and Medical Sciences at Lincoln College. In 2005 as the Deputy Director of the Institute for the Future of the Mind at Oxford, he ran the research program on the influence of modern lifestyles and technologies on the minds of the young and the old. Throughout all of the work at the Institute for the Future of the Mind, Martin worked with the UK government, parliament, teachers, parents and others to provide access to scientific evidence to help inform their decision-making about learning. Martin moved to Flinders University, South Australia in 2007 where he continues to work with educators and decision-makers to support evidence-informed policy and practice. Martin moved to Flinders University, South Australia in 2007 where he continues to work with educators and decision-makers to support evidence-informed policy and practice.

Martin Westwell

Soo-Siang Lim

Soo-Siang Lim (Ms) is Lead Program Director and Chair of the Coordinating Committee for the Science of Learning Centers (SLC) Program at the US National Science Foundation (NSF). She has led this Program since 2004, when the first SLCs were established to provide intellectual, organizational and physical infrastructure for addressing large-scale, complex problems about learning in humans, other animals and in machines. Prior to her leadership of the SLC Program, Dr. Lim served as the Cluster Leader for the six Neuroscience programs in the Biological Sciences Directorate at NSF. Other previous and present responsibilities include active roles in a number of large-scale, cross-disciplinary efforts such as the Engineering Research Centers Program, the Science and Technology Centers Program, Integrative Graduate Education and Research Traineeship Program, Nanoscience and Engineering Initiative, and the Research Coordination Networks Program (RCN). Before joining the National Science Foundation (NSF) in 1999, Dr. Lim was an Associate Professor at Indiana University.

Kathleen McCartney

Kathleen McCartney (Ms), the Gerald S. Lesser Professor in Early Childhood Development, was named Dean of the Harvard Graduate School of Education in 2006. In collaboration with a dedicated faculty and administrative team, she has implemented a strategic plan that has resulted in the creation of two new degree programs, the doctorate in education leadership (Ed.L.D.), and a new interfaculty Ph.D. in education; a 25 percent growth in core faculty; a doubling of financial aid for Ed.M. students; a dramatic increase in fellowship support for doctoral students; and the establishment of a partner network with over 30 districts and non-profit organizations. McCartney's research program concerns early experience and development, and she has published more than 150 articles and chapters on child care, early childhood education, and poverty. She is a member of the NICHD Early Child Care Research Network, which summarized the results of their longitudinal study in Child Care and Child Development. She also co-edited Experience and Development, The Blackwell Handbook of Early Childhood Development, and Best Practices in Developmental Research Methods. Prof McCartney received her B.S. in psychology summa cum laude from Tufts University, where she now serves as a trustee, and her M.S. and Ph.D. in developmental psychology from Yale University. In 2012 she was inducted as a member of the American Academy of Arts & Sciences, and in 2009 she received the Distinguished Contribution Award from the Society for Research in Child Development. McCartney is also a Fellow of the American Education Research Association, the American Psychological Association, and the American Psychological Society.

Introduction to Panel 2:

ICTs and Learning

Background

The rapid advancement of Information and Communication Technologies (ICTs) impacts the way people learn. Indeed, the World Wide Web has made it possible for learners to learn well beyond formal school settings. ICTs have thus expanded opportunities for access to quality education for all, not only for reaching the unreached but for enhancing lifelong and life wide learning.

However, a true paradigm shift in learning did not occur until further advancements were made, including the development of Web 2.0[1] applications and cloud computing[2], allowing anyone with access to ICTs to be a knowledge creator. It has now become a well-accepted norm for those interested in any given topic to search for user-created knowledge, make instant comments and/or enrich the existing knowledge base, and thereby collectively participate in building a knowledge community. In this context, ICTs have been transforming the role of learners from passive recipients of information in the century-old traditional school model to change agents, capable of generating and shaping their own knowledge construction.

These developments are challenging the limitations of conventional learning and the space and time within which learning occurs. While traditionally largely confined to educational buildings, technology has now, proverbially speaking, broken down the walls of schools and universities, opening up uncountable possibilities regarding where and how learning can take place. Learners are now presented with a plethora of choice as to what they can learn, where they can learn, when and how they would like to learn and with whom.

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[1] The term Web 2.0 is used to refer to the "new era of Web-enabled applications that are built around user-generated or user-manipulated content, such as wikis, blogs, podcasts, and social networking sites" (PEW Internet, 2009a). Web 2.0 includes online photography sites (such as Flick), Wikipedia (the 'free encyclopaedia'), online video library (such as YouTube), web logs (such as Blogger, Live Journal and Technorati) and social networking sites (including Friendster, LinkedIn, Tribe.net and Orkut as well as Bebo, MySpace, and Facebook). In contrast to Web 1.0, a retronym for the internet and internet content exchanged via one-way communications, Web 2.0 focuses on connections and communications between people.

[2] Cloud computing refers to both hardware and software used as part of a service over a common network (or "cloud") such as the internet.

At the same time, the transformative potential of ICTs has yet to be fully realised in our education systems, despite the tremendous potential for ICT-enhanced student-centred teaching and learning to create a new culture of learning in not just formal, but also non-formal and informal education settings.

To facilitate the greater advancement of ICTs in education systems, the following key questions need to be asked:

- What kind of new skills and competencies are required to live and perform in today's digital world?
- How can educators become better prepared to promote and facilitate such skills and competencies?
- Have the instantaneity, fluidity and multi-tasking of new learning really affected the way the mind works, especially in young learners or "digital natives" born into a world of ICTs? If yes, how?
- Are we ready to scale up the findings from learning science research on learners' motivation, metacognition, self-regulation and emotion towards building a technology-enhanced knowledge society? If yes, how can this be achieved?
- How can we harness the new potential of ICTs to create a new culture of learning – beyond the decade-old role of ICTs to enhance the equal access to education and learning?

Proposed topics for discussion

- What are recent developments in research and evaluation into the role and implications of ICTs for learners and learning?
- How have ICTs changed learning, both in terms of learning outcomes for development of 21st century skills and competencies and learning processes (e.g. ICTs as cognitive tools, ICTs to support self-regulated learning and metacognition, etc.)?
- To really harness the great potential of ICTS in education transformation, what are the policy implications for education systems (i.e. not merely improving access to learning, but promoting the paradigm shift for learning)?

References

Bransford, J. D., Brown, A. L., and Cocking, R. R. 2000. *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academy Press.

Kim, B. and Reeves, T. 2007. Reframing research on learning with technology: In search of the meaning of cognitive tools. *Instructional Science*, Vol. 35, No. 3, pp. 207-256.

Lajoie, S. P. 2000. *Computers as cognitive tools: No more walls, Vol. 2*. Mahwah NJ: Lawrence Erlbaum Associates.

PEW Research Centre. 2009a. *Web 2.0: Featured Research*. http://www.pewinternet.org/topics/Web-20.aspx (Accessed 20 June, 2009)

Prensky, M. 2001. Digital natives, digital immigrants. *On the Horizon*, Vol. 9, No. 5 and 6.

_____. 2010. *Teaching Digital Natives – Partnering for Real Learning*. Corwin.

Scardamalia, M. and Bereiter, C. 2006. Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences.* New York, Cambridge University Press, pp. 97-118.

Abstracts

1. Shinobu Yume Yamaguchi (Ms)

ICTs and Learning

Use of ICT in education has been gaining more and more attention in recent years. Governments have taken initiatives to increase the use of ICT in education and have been investing to equip schools with ICT infrastructure. Various innovative schemes of applying ICT in school settings have also been introduced, ranging from PPP-based low cost computer in rural schools to teacher development programs utilizing on-line/off-line teacher training materials. While diverse experiment and implementation programs are taking place, the impact of ICT in learning and skill development are still being debated. This presentation overviews selected experiences and factors leading to successful introduction of ICT in schools and discusses issues to be considered for appropriate use of ICT to accommodate to develop the skills of children. This will be illustrated by means of two country examples, one in a developing and the other in a developed country. The presentation will look at on-going study of one-laptop-per-child (OPLC) program in Mongolia, identifying skills learned/not learned and what is required for making the use of ICT effective. Further, it will touch upon development of ICT infrastructure environment in schools as well as teachers' perception on using ICT in classroom teaching in primary schools in Japan, based on a workshop attended by 2,500 teachers to share innovative cases in 2010.

2. Ashutosh Chadha

Future Classrooms – Learning in a Changing World

As we look at the goals of Education for All, we also need to take into consideration the changing environment, the opportunities and challenges which face our education system today. How is the global workforce changing and as a result what is the impact on the education system. The world economy today is moving from a primarily agrarian mode to one which is more service oriented. This requires a ‘sea change’ in the way students are educated not because the concepts have changed but more critically because the way those concepts are applied have changed. Additionally, our interdependence has grown

significantly. All this demands a change in not just what we teach but how we teach, how our teachers interacts with students and how the classroom looks. At the center of this is also how technology can now be used and how it cannot be the end of learning but a useful tool to promote learning and ensure that education can become Available , Affordable and Applicable for all.

3. Christopher Hoadley

Appropriate Technology for Learning: Not How, But Why and For What End?

On the one hand, rhetoric around technology in education stresses the transformative possibilities of technology to produce learning that solves current problems with current educational systems and goals. On the other hand, most examples of "transformative" educational technologies simply reproduce the status quo exceptionally well. In this talk, I discuss some of how research in the learning sciences is helping us understand the limitations of traditional models of education, and how ICTs might be reconceived as 'appropriate technologies' to support more impactful learning models. I propose indigenous design as a process to help develop these technologies.

4. Michelle Selinger (Ms)

ICTs for a Relevant Education

Education for All may not be enough: perhaps it ought to be a *relevant* education for all. All learning should start with local relevance in order to engage the learner, enabling them to live, work and play within their own community and encouraging them to be an active and engaged citizen as a first step to becoming a global citizen. Those that have the wherewithal can then go on to develop broader global skills and understanding. ICTs have a significant role to play in both these areas *if* they are harnessed in the right way and made available on appropriate devices. Mobile learning and OERs offer solutions to achieving the MDGs for education, but to do so, there needs to be significant work done to ensure the resources are set within a negotiated curriculum framework and developed to agreed resource development guidelines. Moving from face to face pedagogy to an online pedagogy is neither obvious nor easy so training in instructional design is of great importance, as is making content available on mobile devices in ways that make it easy and economical for learners to access and review their learning. But content is not the only challenge; it is the way that learners engage with that content that promotes effective learning. Here again, technology has a role to play in connecting learners with remote teachers, peers and the wider community providing authentic opportunities to discuss and debate their learning in order to make it robust, relevant and applicable.

Biographies

Shinobu Yume Yamaguchi

Shinobu Yume Yamaguchi (Ms) is Professor at Global Scientific Information and Computing Center, Tokyo Institute of Technology. During 15 years of experience overseas, she received her Ph.D. from Columbia University, New York. Before taking up her appointment at Tokyo Institute of Technology, she worked for UNESCO as a Programme Expert. She was mainly involved in development of education systems in China, Mongolia, Indonesia and Pakistan, with particular interest in distance education to promote human resources development. She is currently active in conducting research in the areas of ICT and education, as well as the application of ICT for management of the World Heritage Sites. She is currently also teaching graduate courses at the Department of International Development Engineering at Tokyo Institute of Technology, and has also served as an invited lecturer at the Foundation of Advanced Studies on International Development. With her international background, she works with external agencies as a committee member to promote the international activities of Japanese higher educational institutions.

Ashutosh Chadha

Ashutosh Chadha is currently responsible for the Education, Government relations, CSR and Environment Mandates for South Asia, as Director of the Corporate Affairs Group, Intel South Asia. Additionally he drives key new strategic initiatives at Intel spanning Digital inclusion and Entrepreneurship for the Asia-Pacific region. In his role, he works closely with key audiences in government, academia, industry and the community to align and manage initiatives to support Intel's long term agenda in South Asia. Ashutosh has been with Intel for 7 years and prior to this role, was Director, Strategic Education Initiatives at Intel Asia-Pacific. He was responsible for the strategic support for the implementation of Intel Education Programs across 14 countries in the Asia-Pacific region as well as working closely with multilateral bodies across the Asia-Pacific to support the development of appropriate policies and processes for Educational Transformation. In his career spanning nearly 24 years, Ashutosh has worked at Microsoft Corporation, Shell India Pvt Ltd, NIIT and the National Dairy Development Board. He has had extensive experience in New Business Development, Channel Management, Strategic Planning and Policy Advocacy as well as Sales and Marketing. Ashutosh is a regular speaker at National and International fora on topics ranging from education to ICT for development, public private partnerships, skill development as well as policy.

Christopher Hoadley

Christopher Hoadley is associate professor in the Educational Communication and Technology Program and the Program in Digital Media Design for Learning. He has over 35 years of experience designing and building educational technology, and has conducted research on technology, learning, and collaboration for over 20 years. His current research focuses on collaborative technologies and computer support for cooperative learning (CSCL). Hoadley is the director of dolcelab, the Laboratory for Design Of Learning, Collaboration & Experience. He is an affiliate scholar for the National Academy of Engineering's Center for the Advancement of Scholarship in Engineering Education (CASEE) and was awarded a Fulbright Scholarship for 2008-2009 in the South Asia Regional program to study educational technologies for sustainability and empowerment in rural Himalayan villages. Other interests include research on and through design, systems for supporting social capital and distributed intelligence, the role of informatics and digital libraries in education, and science and engineering education. Hoadley previously chaired the American Educational Research Association's Special Interest Group for Education in Science and Technology (now SIG: Learning Sciences), and served as the first president of the International Society for the Learning Sciences. Hoadley earned his baccalaureate in cognitive science from MIT, and his masters in computer science and doctorate in education from UC Berkeley. He previously taught at Stanford University, Mills College, and Penn State University in education, computer science, and information sciences.

Michelle Selinger

Michelle Selinger (Ms) is the Director of Education Practice for the Global Public Sector practice of the Cisco System's Internet Business Solutions Group (IBSG). Dr Selinger's focus is on aspects of education transformation in all areas of formal learning and skills development. Before joining Cisco, Dr Selinger worked in schools and universities leading technology enhanced teaching and learning initiatives. Prior to joining IBSG, Dr Selinger was the education strategist for Cisco's social investments in education, including the World Economic Forum's Global Education Initiative. She has extensive experience in supporting governments and education bodies around the world in developing, developed and emerging economies on strategies for technology-enabled education reform. She has worked with UNESCO on the ICT Competency Framework for Teachers and the European Commission as an advisor on aspects of e-learning, and is currently advising the South African Government on aspects of eSkills development. Dr Selinger sits on steering committees for various ICT and education initiatives. She is regularly invited to speak at conferences and meetings internationally, and has led evaluation projects on technology-enabled learning and learning environments, as well as authoring professional and scholarly articles on many aspects of ICTs in education.

Introduction to Panel 3:

Learning and Economic Development

Background

For the last half century, there has been a rise in interest in assessing the optimality of investment in education. Human capital theory has become the most influential force guiding the thinking and practice in this area. The essence of the theory is that investments made in human resources increase the employment prospects and earning power of the individual, thereby improving the productivity of the economy. After decades of extensive research, it is now widely acknowledged that investing in education has a positive impact on economic growth and generation of a knowledge economy (de la Fuente and Ciccone, 2003; OECD, 2001; 2002; 2004; Stiglitz, 1998; Temple, 2001; UNIDO, 2003a; 2003b; World Bank, 2003). This has been proven in both microeconomic and macroeconomic analyses which look at the impact at the individual level and the benefit of educational investment to the economy as a whole.

Existing studies indicate that relative to the duration of education (e.g. years of educational attainment), the quality of education (especially *learning*) is more meaningful and important for economic development (e.g., Jamison, Jamison and Hanushek, 2007). Studies show that knowledge and cognitive skills such as literacy, numeracy and computing skills are rewarded by the labour markets and are correlated to economic development. At the same time, economists recognize that these cognitive skills can only explain a relatively small percentage of the income variances among individuals and nations. In response, recent studies have begun shed light on the positive effect of non-cognitive skills and competencies (e.g., enthusiasm, motivation, and resilience) on individual earnings and productivity. Ensuring the acquisition of such cognitive and non-cognitive skills through effective learning is therefore crucial for economic development.

Beyond individual earnings and national economic development, education is increasingly being seen as having a more powerful influence in addressing a wider range of challenges. In the face of concern over social exclusion and equal participation in development, demographic changes and pressures, environmental degradation and foreseeable scarcity in natural resources, education for inclusive and sustainable development is gathering momentum around the world. Furthermore, in light of greater transformation and integration of economies and labour markets, training for a pre-established job-profile and for a specific job market is no longer possible. Education must therefore serve to equip

young people with the skills required to adapt to fast changing economic situations and, ultimately, an ever-changing world.

Based on the latest developments and advances in knowledge of economics of education, this panel will discuss the following topics:

- What are the newest insights on learning for economic development in terms of economic returns to cognitive and non-cognitive skills and competencies?
- How can new insights from learning sciences be applied to educational policy and pedagogy for inclusive and sustainable development?
- How can education play a proactive role in shaping the future by developing the necessary skills and competencies for rapidly changing labour markets and creating new profiles which will spur new economic sectors in a knowledge-based economy?

References

de la Fuente, A. and Ciccone, A. 2003. *Human capital in a global and knowledge-based economy.* European Commission: DG Employment and Social Affairs.

Jamison, E., Jamison, D. T. and Hanushek, E. A. 2007. The effect of education quality on income growth and mortality decline. *Economics of Education Review*, Vol. 26, No. 6, pp. 772-789.

Organization for Economic Co-operation and Development (OECD). 2001. *The well-being of nations: The role of human and social capital*. Paris: OECD.

_____. 2002. *Education policy analysis*. Paris: OECD.

_____.2004. *Innovation in the knowledge economy: Implications for education and learning.* Paris: OECD.

Stiglitz, J. 1998. *Towards a new paradigm for development: Strategies, policies, and processes.* Washington, DC: World Bank.

Temple, J. 2001. Growth effects of education and social capital in the OECD countries. *OECD Economic Studies*, Vol. 33, pp. 57-92.

United Nations Industrial Development Organization (UNIDO). 2003a. *The role of industrial development in the achievement of the Millennium Development Goals*. New York: UNIDO.

_____. 2003b. *Industrial development report 2002/2003: Competing through innovation and learning*. New York: UNIDO.

World Bank. 2003. *Lifelong learning in the global knowledge economy: Challenges for developing countries*. Washington, DC: World Bank.

Abstracts

1. Mae Chu Chang (Ms)

The Millennium Development Goals (MDGs) constitute global agreement on the fundamental values of freedom, equality, solidarity, tolerance, respect for nature, and shared responsibility. There has been tangible progress across multiple areas of poverty reduction and human development since these values were translated into a set of 8 goals that could be acted on and measured in concrete ways. However, learning remains a concern. Research shows that the pace of progress on learning is low yet learning is key for economic development. In order to confront the changing global landscape, future development paradigms will need to be multi-sectoral. Early childhood interventions represent an important multi-sectoral option for improving learning outcomes and fostering economic development.

2. Cheonsik Woo

Not that Globally Talented, but Globally Competitive Enough - A New Korean Model Unfolding?

Amid globalization of the talent market, countries around the world are scrambling to attract and retain global top talents, and the so called "global war for talents" has begun in earnest. As Korea moves closer to a global industrial competitiveness frontier, Korea need commensurately more and better global talents to her avail, not only in the S&T field, but also in the highest value-added professional service areas. Given its limited domestic capacity to nurture a top echelon of global talents within, it is critical to establish a new strategy to secure global talents from a truly global perspective for Korea to keep moving forward and shoring up globally competitive business fronts. The future of Korea in the 21st century hinges on how well and quickly Korea establishes the so-called "global Korean brain network". A new leadership is called for to set the vision and strategy of nurturing and utilizing talents that includes all Koreans at home and abroad, lay forth the detailed plans, and systematically implement the measures at the national level.

3. G. K. Chadha

Education for Sustaining Future Economic Growth

Education has always played an important role in speeding up economic growth. Undoubtedly, future growth, in each sector, would be propelled, all the more by education-knowledge and skills. The changing composition of output, and the rising bio-tech and genetic complexities of future production in agriculture, increasing scientific precision and product standardization in industry, and the changing consumer tastes and exacting choices for services, will put great premium on workers' education, knowledge and skills. Many developing economies are close to becoming knowledge societies. Others have to follow suit. Understandably, a typical worker of tomorrow has to be markedly different from his predecessor of yesterday. Future growth without education would be a costly delusion. It is

time the developing economies re-orient their educational policies to ensure that, in the days ahead, labour productivity and cost-competitiveness increase across the board, and their growth trajectory steadily moves up. Lifelong learning and re-training would inescapably become a core element of educational policy, and job switchovers more regular features of labour market. Many policy reforms would have to be effected. For example, supply gaps in secondary and higher education must be bridged. Unmitigated rural-urban, male-female, and inter-regional gaps in access to higher education, will seriously jeopardize the overall growth performance. Quality improvement demands, inter alia, a shift from memorization to electronic learning. Horizontal and vertical expansion of ICT should build a close rapport between academics and industry, economy and society. Global perspectives and educational networking would be inescapable. Education for 'left-overs'/'laggards', lifelong learning and retraining, distances education, and mid-career job switch-overs, would be new strategies. Technology vision, R&D investment, PPP in R&D would be critical areas of public policy. In federal policies, roles of central and state governments would need to be demarcated. India's case shows that increasing privatization is exclusionary, and produces grossly under-realized demographic dividend.

Biographies

Mae Chu Chang

Mae Chu Chang (Ms) is the Head of Human Development in Indonesia and Lead General Educator for the East Asia and Pacific Region of the World Bank. She leads a comprehensive program of support to Indonesian education from early childhood to higher education, with a focus on school based management and teacher policy reform. Ms. Chang has worked with development partners in the region to lead key research in emerging issues in education as well as spearheaded policy change as a result of the research. The program in Indonesia amounts to about US$1.5 billion.

She was the Lead General Educator for Middle East and North Africa (MENA) Region. She has worked intensively in countries such as Iran, Egypt, Yemen, Jordan to help the governments develop comprehensive education reform strategies aimed at all levels of education. These government strategies are supported by the Bank's technical advice and financial support through projects and programs in partnership with other donors. Before her work in the MENA region, she served in South Asia for six years and won a Human Development Award for Excellence for her work on girls' education in Pakistan. Before South Asia, she worked in education in a diverse set of countries in East Asia, including China, Malaysia, Thailand and Laos.

Cheonsik Woo

Cheonsik Woo is the Vice-President of Korea Development Institute (KDI), currently leading the Department of Industry and Competition Policy. Since joining KDI in 1995, he has worked on many issues pertaining to Korea's development strategy and policies such as enhancing industrial competitiveness, upgrading education and HRD system, and transition strategy to the knowledge-based economy. During his tenure at KDI, Mr. Woo led the Knowledge Economy Division as the division head (2002-04) and then the Department of Industrial and Corporate Affairs as the Vice President of KDI (2004-06). More recently, he served as the Senior Counselor to the Deputy Prime Minister of the Ministry of the Finance and Economy of the Korean Government (2006-08). Before joining KDI, he taught at Clemson University in the US in 1991-95. For about two years, Mr. Woo has worked as a senior analyst at the Office of the OECD Secretary-General for the OECD horizontal project "Making Reform Happen" and contributed to the OECD's latest publication Making Reform Happen: Lesson's from OECD Countries (2010) both as the project coordinator and the 2nd editor. Mr. Woo has also been extensively engaged in government advisory services, participating in various committees such as Performance Management Committee, Educational Policy Advisory Committee, and FDI Committee of the Presidential Commission for the North-east Asian Business Hub. Mr. Woo has been the project leader and principal author of a number of special horizontal projects of the Korean government, including Vision 2030 of Korea: A Hopeful Nation in Harmony (2006) and Dynamic Korea: A Nation on the Move (2004). His latest main research works at KDI include Long-term National Vision and Strategy for the 21st Century (2008) and Social Capital in Korea (2007). Mr. Woo holds a BA in economics from Seoul National University, and MA & PhD in Economics from Columbia University, US.

G.K. Chadha

G.K. Chadha, Professor Emeritus at Jawaharlal Nehru University, New Delhi, is President of the South Asian University, recently started in New Delhi under the auspices of the eight South Asian Association for Regional Cooperation (SAARC) countries. During 2004-09, he was a Member of the Prime Minister's Economic Advisory Council. Prof Chadha has been engaged in teaching and research in economics for more than 40 years. He has written 16 books and 101 research papers in national and international research journals on various development issues relating to India and other developing countries of Asia. He was a Visiting Fellow/Professor at IDS-Sussex (England), IDE-Tokyo (Japan), and University of Mauritius. He is currently an Honorary Professor at Shenzhen University, China and Nihon Fukushi University, Nagoya-Japan besides being a consultant to several international

educational institutions and development organizations. He has been honoured with numerous awards and distinctions for his academic contributions including D.Litt Degree (honoris causa) from many Indian universities. He has been the President of Indian Economic Association, Indian Society of Agricultural Economics, and of Labour Economics, besides being adviser to numerous educational institutions in India.

Introduction to Panel 4:

What Education and Learning for the Future?

Background

Over the past decade, the world has undergone a great number of profound transformations, including, but not limited to economic, demographic, technological and socio-cultural changes. In this context of change, education systems are arguably no longer adequate to respond to the needs (and demands) of contemporary societies and economies. Thus, the need to revamp, revitalize and perhaps reconfigure education systems of today is well recognized. But what, exactly, should education and learning for the future entail and where should our focus be placed? Traditionally, countries have tended to focus on schooling and thus may have paid insufficient attention to what is perhaps the ultimate objective of education itself: effective and relevant learning. There is increasing consensus that learning be placed at the heart of our efforts to strengthen education systems (Brookings, 2011; Burnett, 2012). Knowledge gained from learning sciences, neuroscience, economics, and information communication technologies can play an important part in our efforts to improve education systems, ensuring effective and relevant learning remains the ultimate outcome.

The most fundamental question then, is what skills and competencies are required to prepare learners to lead better and more productive lives and to be prepared for a rapidly changing world (Rychen and Salganik, 2001, 2003). Beyond the cognitive dimensions of learning, Burnett and Felsman (2012) argue that certain 'non-cognitive' life-skills or '21st century skills' appear paramount. In this context, creativity has garnered much attention as a prerequisite to facing the challenges of a complex world (Robinson, 2011) whilst also having a positive effect on individual earnings and productivity. In addition, as societies of tomorrow will continue to shift and economies will evolve rapidly, there is a need for more flexible and adaptable skills capable of addressing new and unforeseen changes in the labour market (UNESCO, 1996). Therefore, education systems should train learners to be creative as well as adaptable, able to assimilate change and able to continue learning.

In order to develop these skills, it is imperative that we also explore further the multivariate ways in which individuals learn. In this regard, neuroscience can provide us with insights on the learning process, as well as on the time dimension of learning (Spitzer, 2006) and 'sensitive periods' when the individual is particularly primed to engage in specific learning activities' (OECD, 2007, p.18). One key finding is the affirmation of the brain's lifelong plasticity, that is, its capacity to change in response to environmental demands throughout life (Howard-Jones, 2008). This fundamental premise could help inform the design of

learning environments and pedagogical approaches and could also support efforts toward a lifelong learning approach to education. This is particularly relevant given the increased interconnectivity and access to information through the World Wide Web which has conclusively altered the learning landscape and the ways in which individuals learn and which, without doubt, will necessarily inform the development of education systems in the future.

Indeed in this environment, perspectives on learning have broadened, extending well beyond the formal school setting. As central theme of UNESCO's work, there is a move towards developing an open, holistic learning system that is society-centered and built upon the concept of life-wide learning. This is particularly in line with the lifelong learning framework, which emphasizes the integration of learning and living. Operationalizing the concept of lifelong learning would necessarily require sector-wide education reform as well as the creation of learning opportunities in all settings (formal, non-formal and informal) for people of all ages (infants, children, adolescents and adults). To develop this kind of learning society, the government, business, NGO sectors and new learning providers will all play crucial roles, and through careful coordination, will complement efforts to strengthen learning for the future.

This panel will focus primarily on how countries may translate these new insights on learning into educational policies and innovative pedagogies within different social and cultural contexts. It will further discuss how education systems could promote the acquisition of relevant skills and competencies needed to confront contemporary challenges and for individuals to be responsible and engaged members of society.

Suggested topics for discussion

- What are the types of skills and key competencies required for the future and how can learning of these skills be assessed and measured?
- What is the current thinking and understanding of lifelong learning and what are the implications for education systems?
- How do we ensure better linkages between curriculum, teaching and assessment of learning outcomes to ensure relevance, quality and effectiveness of learning?

References

Brookings Institution. 2011. A Global Compact on Learning: Taking Action on Education in Developing Countries. Brookings Center on Universal Education in Washington, DC. http://www.brookings.edu/~/media/research/files/reports/2011/6/09-global-compact/0609_global_compact.pdf (Accessed 16 October 2012)

Burnett, N. 2012. *A learning goal for education? Scoping for MDG2 post-2015*. Report to Hewlett Foundation/Wellspring Advisors, Results for Development Institute.

Burnett, N. and Felsman, C. 2012. *Post-2015 Education MDGs*. ODI, Results for Development Institute.

Howard-Jones, P. 2008. *Neuroscience and education: Issues and opportunities: A commentary by the teaching and learning research programme*. TLRP-ESRC. http://www.tlrp.org/pub/documents/Neuroscience%20Commentary%20FINAL.pdf (Accessed 15 October 2012)

Robinson, K. 2011. *Out of Our Minds: Learning to be Creative*. Oxford, Capstone.

Rychen, D. S. and Salganik, L. H. 2001. *Defining and selecting key competencies*. Göttingen, Hogrefe & Huber Publishers.

_____. 2003. *Key competencies for a successful life and a well-functioning society*. Göttingen, Hogrefe & Huber Publishers.

Spitzer, M. 2006. *Brain Research and Learning over the Life Cycle: Personalising Education*. Paris, OECD.

UNESCO. 1996*. Learning: The Treasure Within: Report to UNESCO of the International Commission on Education for the Twenty-first Century*. Paris, UNESCO. http://www.unesdoc.unesco.org/images/0010/001095/109590eo.pdf (Accessed 10 September, 2012)

_____. 2012. *Education and skills for inclusive and sustainable development beyond 2015.* Thematic Think Piece by UN System Task Team on the Post-2015 UN Development Agenda, Paris, UNESCO. http://www.un.org/millenniumgoals/pdf/Think%20Pieces/4_education.pdf (Accessed 8 September, 2012)

Abstracts

1. Dirk van Damme

21st-Century Learners Demand Post-Industrial Education Systems

Education systems are slow to adapt to new social conditions. Despite having a mission to prepare learners for a lifetime into the future, they carry the weight of past histories and political struggles. One could say that in comparison with the rapidly changing environments in which learners live and the expectations 21st-century labour markets and societies hold in terms of skills, contemporary education systems seem to be 'out of tune'. Pre-industrial heritage and models from the industrial age still dominate the institutional and social arrangements in which formal learning takes place. The best performing systems around the world increasingly depart from past models and try to develop innovative approaches. Simple solutions – such as 'more technology in the classroom' – might be helpful, but do not produce better outcomes by themselves. Some design elements of future engineering of learning arrangements are: highly flexible and personalised learning; a holistic approach to human learning complementing cognitive skills development with non-cognitive and social skills and formation of character; innovative and adaptive pedagogies; less bureaucratic prescription and more professional accountability; evidence-driven improvement; highly sophisticated information systems; open education which connects formal learning to non-

and informal learning; a systemic culture oriented towards success and achievement instead of selection and failure.

2. **Akira Ninomiya**

Hybrid Schooling and Active Learning: What Education and Learning for the Future?

This presentation involves three possible (and sometimes desirable) scenarios for the future of schooling and for post-2015 EFA. The first scenario: students may learn both at school and at home, making best use of iPhones (tablets) and of the well designed the active learning tools and materials. In the future, education authorities may mainly provide the opportunities for the students to learn actively and independently at homes (anywhere), whenever the students want to learn (anytime), through the internet (iPhones). The second scenario: the future schooling emphasizes the development of cross-cultural competencies. What matters more in the globalized societies should be the development of "cross-cultural competencies". There are main questions to be asked: what are the cross-cultural competencies (definition) and how can we develop cross-cultural competencies (programs)? The third scenario: we will see some paradigm shift including the shift from education to learning, the shift from teaching to facilitating and coaching, the shift of uniformity to diversity, the shift from the average to the individual difference, etc.

3. **Ilkka Tuomi**

Transformation of Education and Learning in the Knowledge-Intensive World

From a high-level systemic sociological point of view, the current institutions of education address four important social functions; the reduction and allocation of social complexity, productivity, enculturation, and personal development. The way in which these social functions are implemented in the industrial-age system of schooling can be understood as an attempt to optimize these social functions under the conditions of Industrial Revolution and the 20th century systems of production. Educational institutions, in other words, articulate an answer to a historical problem. The underlying social functions of education remain relevant also in the future, but the ways in which they are implemented will to a great extent depend on the ongoing broader socio-economic change, where new global and networked systems of production and increasingly diversified systems of knowledge creation, learning, and communication provide new possibilities and constraints.

The presentation will characterize the different ways in which these social functions can be effectively implemented in the 20th century world and in the future. In this broad context, we will see how different models of learning resonate with the emerging requirements for education, and how two recent developments, educational neuroscience and open educational resources, could be located in a field of learning theories.

Biographies

Dirk van Damme

Dirk van Damme is currently Head of the Innovation and Measuring Progress Division (IMEP) in the Directorate for Education at the OECD in Paris. He holds a PhD in educational sciences from Ghent University and is also professor of educational sciences in the same university (since 1995). He also was part-time professor in comparative education at the Free University of Brussels (1997-2000) and visiting professor of comparative education at Seton Hall University, NJ, USA (2001-2008). He was general director of the Flemish Rectors' Conference, the main advisory body for higher education policy in the Flemish part of Belgium between 2000 and 2003. He has been professionally involved in educational policy development between 1992 and 2008, and served as chief of staff of Mr Frank Vandenbroucke, Flemish minister of education between 2004 and 2008. His current interests are evidence-based innovation in education, comparative analyses of educational systems, new developments in the learning sciences and knowledge management in education. At the OECD, he is responsible for the Innovation and Measuring Progress Division, covering both the Centre for Educational Research and Innovation (CERI) and the Indicators of Educational Systems (INES) programme.

Akira Ninomiya is the executive vice-president of the Open University of Japan (OUJ), which is the only Open and Distant Higher Education Institution with TV and Radio Broadcast Station on campus. More than 850,000 students study at 50 local study centers all over Japan. Prof Ninomiya worked at the Ministry of Education in Japan before joining the Faculty of Education at Hiroshima University and before joining OUJ. Prof Ninomiya's major research includes comparative studies on school cleaning, corporal punishment, school violence, student codes of conduct, reading textbooks in various schools, citizenship education, moral education in the world, and internationalization and globalization of higher education, international cooperation in education, etc.

Akira Ninomiya

Ilkka Tuomi

Ilkka Tuomi is Founder and Chief Scientist at Oy Meaning Processing Ltd., Finland. He has written six books, chapters in 23 books, over 40 scientific articles, numerous scientific reports, and he is author of two international mobile communications patents. His texts have been used as background material for the development of national, regional, and European research strategies and policies. In recent years, he has worked across the boundaries of innovation research, technology studies, economics, policy analysis, philosophy of cognition, learning sciences, and foresight. His recent work includes a review of educational impact of open educational resources, development of a handbook of foresight in universities, work on new models on measuring productivity in learning, and drafting the vision for the European Commission's high-level Information Society Technologies Advisory Group that advises the Commission in research priorities in the ICT/IST area. Before his current position, Mr Tuomi was with the European Commission's Joint Research Centre, Institute for Prospective Technological Studies. In 1999-2001, he conducted pioneering research on open innovation networks and new knowledge and competence creation models at the University of California, Berkeley. From 1987 to 2001 he worked at Nokia Research Center, Finland, most recently as Principal Scientist, Information Society and Knowledge Management. He has a degree in theoretical physics from the University of Helsinki, and Ph.D. in adult education from the same university.

Introduction to Panel 5:

Rethinking Learning in the Asia Pacific Region

Background

The Asia-Pacific is far from a homogenous entity; it is a complex and exceptionally diverse region in terms of geography, population and size of countries, in terms of its history and culture including languages and socio-economic development.

Over the past decade, the Asia-Pacific region has shown dynamic economic growth, technological advancement and socio-cultural changes. Together with the emergence of a growing number of middle and higher-income countries, the region has become a considerable economic and political force. The prospect of increasing regional integration, including ASEAN economic community in 2015, could generate further developments and motivate countries to spur their economic performance and innovations. However, despite these positive general trends, there are vast disparities between and within countries in income, living standards and social and economic opportunities; economic growth has not led to equal opportunities for quality of life for all the people of this region.

While education is central to many Asia-Pacific countries' development agendas and despite noticeable achievements made so far, significant challenges remain, especially disparities between and within countries as concerns access to schooling, quality of education and learning achievements (UNESCO, 2012). As measured in terms of the results of international learning tests, some countries are among the best performers, while others show very low results. In many countries, access and completion remain a major basic concern. Peoples from war-torn zones, remote communities, ethnic minorities and women are particularly disadvantaged. Youth and adult literacy has made considerable progress, but is still inadequate to meet needs in Asia-Pacific countries. Indeed, the Asia-Pacific contains the largest number of illiterate adults of any region in the world. Concomitantly, most countries have now also become increasingly concerned with improving the quality of education, increasing access to post-basic education and to skills development.

These circumstances raise questions about the approach to education and learning in the region. As educational challenges vary, understanding of the purpose and types of learning and skills requirements differ from country to country. For economically advanced countries, for example, higher education and research will become more important as innovation will be the main source of growth (CISCO, 2010). Other countries are striving to reach a similar

level of development, thus investing more prominently in secondary education, while the low performing countries continue to struggle to provide the very basic education to all, including to a large number of out-of-school children and youth and adults. This diversity calls for diverse solutions to diverse challenges and provides a wide spectrum of perspectives for rethinking education and learning in the context of the region. However, exchange of innovative approaches to education is beneficial for mutual learning not only among countries facing similar challenges, but also across countries at various level of development.

Education in the Asia-Pacific also needs to be revisited in terms of the purpose of education and learning, not simply from an economic perspective. A model of human development for the region will necessarily incorporate a wide range of considerations, including social and cultural, such as character education, quality of life and respect for diversity. It will involve increased attention to social participation, equitable development and cultural diversity including the use of local languages, the inclusion of traditional knowledge and value systems, ethics and transparency in education policy and planning.

Rethinking learning and reorienting education is needed to respond to the new skills and competencies required in light of rapidly changing and increasingly globalized economies, technological advances and increased labour mobility and migration in the region. Education systems in the Asia-Pacific will need to train learners to be more innovative, able to adapt to and assimilate change and motivated to continue learning. Young people will be required to be competent in a connected and constantly changing world, including critical thinking, problem solving, collaboration, communication and technology literacy.

In view of the need for education systems in the region to focus their attention on quality of learning (e.g. the effectiveness of the learning process and the relevance of what is being learnt), policy makers should harness the new insights from research on learning from neuroscience and learning sciences, as well as analysis of economic returns. This must be reflected in education policy and translated into adequate pedagogical approaches. The increased focus on learning in the Asia-Pacific region will go hand in hand with furthering the work of comprehensively measuring learning outcomes, i.e. cognitive, non-cognitive and technical skills.

Furthermore, recent developments such as increased interconnectivity have radically impacted the ways in which students access information and learn in the region. The fact that learning is no longer confined to the classroom and creates new possibilities in terms of where and how learning could take place presents new opportunities for education systems to explore. As such, there is need for policy makers in the region to reflect on the opportunities provided by new technologies to transform education systems. In such a transformed and widened learning system, a strong coalition of government and other learning providers would need to be built.

In sum, the panel will discuss the specific learning requirements of the Asia-Pacific region based on its specificities and requirements. It will discuss in which way the most recent findings from research in learning sciences and ICTs can be put to use for the development of innovative and more relevant learning methodologies, backed by relevant education

policies. It will also discuss how new insights can help to better reach and ensure learning of excluded populations as well as assessment of learning outcome to ensure quality and relevance.

Proposed topics for discussion

- What learning outcomes are increasingly required for the future, in particular in countries of the region?
- Application of recent insights on learning to the building of life-long and life-wide learning systems in the region
- What are the implications for education policies and innovations in countries of the region?
- How can new research evidence help to better reach and ensure learning of excluded populations?
- How to ensure better linkages between curriculum, teaching and assessment of learning outcome to ensure relevance, quality and effectiveness of learning, also taking into consideration the great diversity in the region and different learning needs?

References

Asian Development Bank (ADB). 2012. *Asian Development Outlook Update: Services and Asia's Future Growth.* Mandaluyong, Manila: ADB.

CISCO. 2010. *The Learning Society*. CISCO Systems, Inc. http://www.cisco.com/web/about/citizenship/socio-economic/docs/LearningSociety_WhitePaper.pdf (Accessed 12 September, 2012)

UNESCAP. 2011. *2011 Statistical Yearbook for Asia and the Pacific*. Bangkok: United Nations Publication.

UNESCO. 1996*. Learning: The Treasure Within: Report to UNESCO of the International Commission on Education for the Twenty-first Century*. Paris, UNESCO. http://www.unesdoc.unesco.org/images/0010/001095/109590eo.pdf (Accessed 10 September, 2012)

UNESCO. 2012a. *EFA Global Monitoring Report*. http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/ (Accessed 12 September, 2012)

UNESCO. 2012b. *Education and skills for inclusive and sustainable development beyond 2015.* Thematic Think Piece by UN System Task Team on the Post-2015 UN Development Agenda, Paris: UNESCO. http://www.un.org/millenniumgoals/pdf/Think%20Pieces/4_education.pdf (Accessed 8 September, 2012)

UNESCO. 2012c. *Summary Outcomes of 'Towards EFA 2015 and Beyond – Shaping a new Vision of Education'.* UNESCO Bangkok.

Abstracts

1. Kerry J Kennedy

Multidisciplinary Perspective on Learning: Understanding Potential, Utilizing Contexts, Improving Outcomes

While there is agreement about the centrality of learning for economies, societies and individuals, there is little agreement about how learning can be optimized to achieve valued outcomes for all students. Cognitive scientists, neuroscientists, education psychologists, socio-culturalist researchers and educators all work on improving our understanding of learning but rarely do they learn from each other. To facilitate a conversation on learning across disciplines, this paper will identify and review approaches to learning that draw on multidisciplinary perspectives both scientific and humanistic. It will also look in some detail at learner characteristics in Asia and the Pacific and relate these to broader issues of culture and values. This conversation on research and learning needs to continue. Strategies for building evidence based research cultures in schools linked to partnerships between schools and universities will be discussed. Their purpose is to support learning cultures as enduring features of school and classroom life.

2. Ashish Rajpal

Four Orbits of Teaching

There is a huge paucity of good teachers in developing countries, especially so in India. Consequently, the dominant discourse amongst school administrators is around how to get such "good teachers". However, if the focus was to shift from "good teachers" to "good teaching" then we have the possibility of building a replicable skill/capacity across the universe of teachers. Based on our decade long experience of working with over 40,000 teachers we have identified specific patterns - and corresponding belief systems - in the teaching process. These are captured in the 4-Orbits framework which can potentially be a handy guide to building teaching capability at scale.

3. Thomas Menkhoff

Supporting Asia's Knowledge-based Development through *Mobile Learning*: Trends, 'Good' Practices and Policy Imperatives

Based on ongoing research on social media-enabled teaching and learning in Asian institutions of higher learning (micro) and knowledge governance-related studies in selected Asian countries (macro), this integrative paper addresses four important questions: 1. What is social media-enabled teaching and learning (in short: mobile learning) and how is it revolutionizing Asia's educational landscapes? 2. Why is an 'Asian perspective' of mobile

learning of ‘strategic’ importance for the region’s further development? 3. What needs to be done to further encourage ‘ASEAN’ to learn from intra-ASEAN as well as EC (good) practices with regard to mobile learning aimed at ‘building education for the future and life-long learning systems’? 4. Which specific education policy responses to Asia’s knowledge-based development issues are conducive to leverage on people’s (incl. firms’) learning capacity for national development? Mobile learning is a new mega trend which continues to shake up the regional educational landscapes due to its “continuous” character, technological leapfrogging potential and ability to empower special demographic segments such as young women. A key argument put forward is that ASEAN’s quest for better ‘connectivity’ must be embedded in a robust regional system of good knowledge governance and needs-based mobility initiatives with special emphasis on (blended) mobile learning approaches.

4. Aruna Biswas (Ms)

Education System, Future Plan and ICT in Education in Bangladesh.

Reflection on the constitutional guarantee of education at all levels helps make learners aware of the freedom, sovereignty and unity of Bangladesh. It also leads to creation of stimulation in the intellect, work, culture and practical life of the learners who can establish moral, human, cultural, scientific and social values at personal and national levels. We inspire the students with the spirit of liberation, patriotism, pride and qualities of good citizens (including sense of justice, secularism, dutifulness, awareness of human rights, discipline, friendliness and perseverance). To promote the continuity of national history, tradition and culture, special emphasis on the extension of education is also given, including priority to primary and secondary education.

To develop some uniform and basic ideas among all learners and to establish a sense of equal status amongst all citizens of the country, a uniform curriculum of certain basic subjects can be important. At the same time, to ensure a creative, favorable and joyful environment for the students at the primary and secondary levels for proper protection and development of learner, focus on subject-based use of ICTs rather than ONLY ICT literacy is important. To this end, the Ministry of Education organizes computer training program for the teachers of secondary and higher secondary level as will be discussed in this presentation. In Bangladesh, however, a number of challenges remain, including lack of electricity, lack of internet connectivity, digital divide between rural and urban area, and the big number of schools and teachers.

5. Nguyen Thi Hoang Yen (Ms)

The presentation will focus on Viet Nam’s recent efforts in renovation of its education and training as well as in building a learning society. It includes the background, the process of developing a shared vision and measures to move from vision to actions through a set of solutions, and the way forward.

6. Josh Sung-Chang Ryoo

There is a rising number of scholarly works on competence-based education, particularly geared toward developing capable economic manpower through school education. In the Korean context where education is deeply rooted in teaching for cognitive skills, it becomes then essential to develop a set of important non-cognitive competencies as additional educational contents and the proper strategies to adopt such new education into practice. These two problems, namely, one for defining a set of competences as the new curriculum and the other for implementing it, require careful approaches to them, as immature policy implementation will victimize none other than our own children. Based upon a recent survey result, educational neuroscientific findings and related international cases, the presentation discusses two respective significant notions to be taken into account in dealing with those problems: first, non-cognitive competencies should not be separated from cognitive competencies in implementing an education for it, and second, the assessment-first strategy is more effective than the curriculum-first strategy, particularly in Korea. However, several recent policy measures such as admissions officer policy, creative experience classroom policy and the most recent 2009 curriculum are in fact opposite to the directions that such notions point to. The audience of the presentation would benefit from the theoretical undertakings of competence-based curriculum and educational strategies as well as the discussion of relevant actual policy cases in Korea.

7. Hyun-Kyung Kim (Ms)

Applications of Brain-Based Education (BBE) through a Neuroscientific Diagnosis of Underachieving Students with ADHD Symptoms

This study explores the applicability of Brain-Based Education (BBE) to the development of teaching-learning materials and effective programs. It analyzes learner characteristics and diagnoses the study problems of underachieving students and explores international case studies. While current educational policy in Korea focuses on reducing the rate of underachievers by developing instructional programs and applying them to schools, students with ADHD symptoms are known to be the most difficult to teach of all the types of underachievers in Korean schools. Through a neuroscientific approach, this study was designed to diagnose the brain function of underachievers with ADHD symptoms using the basic academic National Test of Basic Academic Skills, clinical examination, and fMRI imaging. It was followed by the implementation of an intervention program to discover its effectiveness. Based on the upcoming analysis, there is now plan to develop a brain-based intervention program for public schools in Korea.

8. Barry McGaw

What Education for the Future?

There is increasing attention to what are called 21st century skills in the design of curriculum, the specification of intended learning outcomes and in national and international assessment programs. Many of the skills are not new in the 21st century but

they often take new forms in the technology-rich environments in which people increasingly learn, work and play. These skills are seen as important for the future of young people in our schools now. In some cases, it seems as though they are expected to displace the more traditional forms of knowledge, understanding and skills around which curricula have been developed. In other places, 21st century skills are intended to stand alongside the more traditional forms of learning. In the new Australian Curriculum, traditional discipline-based forms of knowledge, understanding and skills and the contemporary 21st century skills are being developed as two separate dimensions with the curriculum content being mapped onto both dimensions. There does remain the question of whether this representation will work fully or whether some additional content might be needed for some of the 21st century skills but it is a serious attempt embrace the new without casting out the old.

Biographies

Kerry J Kennedy is Chair Professor of Curriculum Studies at the Hong Kong Institute of Education where he is also Dean of the Faculty of Education and Human Development and Director of the Centre for Governance and Citizenship. His main research interests are in curriculum policy and theory and citizenship education. He has written about curriculum change and reform in Hong Kong (Changing Schools for Changing Times– New Directions for the School Curriculum in Hong Kong, Chinese University Press, 2005) and in the Asia Pacific region (Changing Schools in Asia: Schools for the Knowledge Society (Routledge, 2010 coauthored with Professor John Lee). He is the Series Editor for the Routledge Series on Schools and Schooling in Asia as well as the Asia-Europe Education Dialogue Series. His research focuses on ethnic minority students in Hong Kong and student citizenship attitudes and values.

Kerry J Kennedy

Ashish Rajpal

Ashish Rajpal is the founder of iDiscoveri. Ashish left an international corporate career to pursue his passion for education. His interest include the human learning process, teacher development, innovation, and organizational leadership. Over the past decade, Ashish has led the creation and scale-up of XSEED - a path-breaking innovation that has improved learning for close to half a million children in almost 1000 schools across the country. Ashish holds an MBA from XLRI and a Master's degree in Mind, Brain & Education from Harvard Graduate School of Education, where he was a student of Prof Howard Gardner. Ashish is also a practicing teacher who teaches Grade 4 Science. In 2008 he was recognized by Education World as one of 50 top leaders changing education in India.

Thomas Menkhoff is Professor of Organizational Behaviour and Human Resources (Education) at the Singapore Management University (SMU), Curriculum Director of the iLEAP Leadership Program at SMU's Centre for Social Innovation and Academic Director of SMU's Centre for Emerging Markets. He received his Dr rer soc degree at the University of Bielefeld, Germany, and formerly taught sociology of business, management and development, organisational behaviour, knowledge management & governance etc. at the National University of Singapore (1993-1995, 1998-2001), Cologne University, Germany (1990-1993) and Bielefeld University, Germany (1989-1990). Thomas has consulted in areas such as human capital development, technical education and knowledge leadership various Asian countries over the past 20 years in cooperation with non-governmental organizations, international donors, local universities, governmental agencies and the private sector. Clients include the German Agency of Technical Cooperation (GTZ), the Government of Malaysia (1995-1998), the Commonwealth Secretariat, Arthur D. Little, the Asian Development Bank (ADB), the World Bank, and the Asia Productivity Centre (APC) etc. In recognition for his excellence in teaching, he received the university-wide 'Most Innovative Teacher Award' at the Singapore Management University (SMU) in 2009. His latest edited book is: Thomas Menkhoff, Hans-Dieter Evers, Chay Yue Wah and Pang Eng Fong eds. "Beyond the Knowledge Trap: Developing Asia's Knowledge-based Economies" (New Jersey: World Scientific Publishing 2011).

Thomas Menkhoff

Aruna Biswas

Aruna Biswas (Ms) currently works in the Government system as a member of Bangladesh Civil Service (Administration) cadre holding the post of Joint Secretary. She has previously worked in different disciplines in government and semi government sectors, including the Ministry of Education. She completed her Masters in Zoology (Bangladesh) and another Masters on Environmental Science and Technology (Netherlands). She also holds a Diploma in Software Applications from City & Guilds, U.K. She completed her PhD in Medical Waste Management in Bangladesh: the Policy and Practices from India. Alongside her official work, Dr Aruna Biswas works as a senior leader to the Bangladesh Scouts, the scout movement of Bangladesh with a population of over one million.

Nguyen Thi Hoang Yen (Ms) has been working as Vice Director of the Viet Nam National Institute of Educational Sciences since 2010. She is responsible for non-formal education, lifelong learning and building a learning society, and is a member of the National Steering Committee on Building a Learning Society and of the Advisory Committee on the National Literacy Framework 2012-2020.

Dr. Yen Nguyen has been a pioneer and leading researcher and policymaker in special needs and inclusive education in Viet Nam for 20 years. Having earned a Diploma in Special Education from the Institute of the Voor Doven of the Netherlands in 1995, she led the establishment of the first Faculty of Special Education in Viet Nam under the Ha Noi National University of Education in 2001, where she served as dean for nearly ten years. She has worked in her current position as Director of the university's Training and Development Centre for Special Education since 1998. She has been a visiting scholar under Fulbright, German Academic Exchange Service (DAAD), and Erasmus Mundus Programmes.

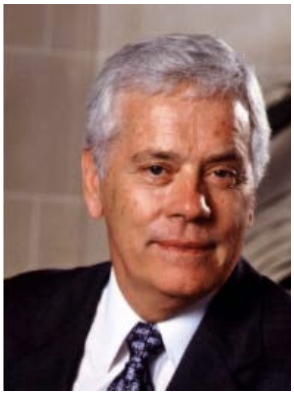
Dr. Yen Nguyen was a Consulting Editor for the Journal of the International Association of Special Education, United States from 2007 to 2011. She was recognized as Woman of the Year by the American Biographical Institute in 1997.

Josh Sung-Chang Ryoo

Josh Sung-Chang Ryoo is an associate research fellow at the Korean Educational Development Institute, a government-based research organization in educational policy in Korea. Dr. Ryoo currently participates in several research projects at KEDI, including a project for reforming the college entrance process to reflect the competences the new era would demand of our children and another project for developing policy measures, in light of the upcoming presidential election this year. He has an expertise in educational theory and policy, particularly around the issues of competence-based education. Dr. Ryoo graduated from Seoul National University with a major in education and a minor in aesthetics. Then he obtained a master's degree in religious studies at Yale University, and received a master and a doctorate in education from Harvard University, where he studied educational neuroscience and the philosophy of education.

Hyun-Kyung Kim (Ms) is a current researcher at the Korean Institute for Curriculum and Evaluation. She also participates in research on TIMSS/ICILS project of IEA and serves as a member of Education Committee, The Korean Chemical Society. She has served as a Member of the Organizing Committee for the International Year of Chemistry and as a Member of the HR Committee, The Korean Federation of Science and Technology Societies, as well as a Visiting Fellow at the National Institute for Health in the U.S.A. Some of her current projects include "Research on application of Brain-Based Learning (BBL) for underachievement students" and "Research of Brain Imaging on the Effect of Diagnosis and Program Treatment for ADHD Students' Achievement". Dr Hyun-Kyung Kim holds a PhD in Science Education from the Korea National University of Education and a PhD in Biochemistry from Seoul National University.

Hyun-Kyung Kim



Barry McGaw

Barry McGaw is a Vice-Chancellor's Fellow at The University of Melbourne and Chair of the Australian Curriculum, Assessment and Reporting Authority. He has previously been a Professorial Fellow at the University of Melbourne, Director for Education at the Organisation for Economic Co-operation and Development (OECD) and Executive Director of the Australian Council for Educational Research (ACER). He is currently President of the Academy of the Social Sciences in Australia. In 2010, he was founding Executive Director of the international Cisco, Intel, Microsoft *Assessment and Teaching of 21st Century Skills* project.

United Nations
Educational, Scientific and
Cultural Organization

The Future of Education: youth speak out!

"Success in the 21st century depends on young people's ability to be resourceful, adaptable, self-confident, creative and self-managing."
Tillak R Chandra Mohan-Malaysia, 18

"Let us start now to nurture the seeds of wisdom for it is better late than never."
Kezia Muthu-Malaysia, 15

"Learning must not aggressively attempt to provide the answers, but trigger a sense of wonder, a search for questions."
Shirley Abraham-India, 28

"We must think independently."

"Let us choose the path they choose."

"We must contribute to society in our own way."

"At its apex, youths today want to be inspired to pursue the path they choose."
Edwin Tan-Singapore, 30

"It's time for us, the youth, to step up our game and contribute to society in our own way."
Ruth Belano-Philippines, 15

"Schools should teach how to adapt to the environment, be resourceful, creative and how to think independently."
Victoria Calo-Philippines, 16

"There's a major failure in education when there's a correct 'opinionated answer'..."
Petch-Vra Thatchpon-Thailand, 20

"...change is tangible—in our classrooms, our teaching and most importantly, in our mindsets."
Bhavana Mahajan-India, 30

UNESCO BANGKOK ASKED YOUTH OF THE REGION...

What is learning of good quality? What kind of skills will be needed for the future?
What should young people be learning and how should they be learning it?

Background Paper

Beyond 2015 – Rethinking Learning in a Changing World

I. Background

The world is in the midst of profound transformations. Changes in the economy, demographics, technology and socio-cultural development create new requirements for education and learning. Rapid multiplication and diversification in sources of information, the acceleration in the production of and circulation of knowledge, the reduction of development cycles in all spheres of economy, combined with the development of new information and communication technologies and digital media, are spurring the emergence of new forms of learning. Societies are increasingly interconnected and interdependent in the wake of intensified economic globalisation. However, growing youth unemployment [1] coupled with rising vulnerable employment (ILO, 2012)[2] and increasing inequalities are exacerbating social exclusion and undermining social cohesion.

While a focus on learning is not new in the world of education[3], this renewed interest is taking on a new shape, driven by two main trends. Firstly, the traditional focus on the provision of education and training, often spurred by international development agendas, has tended to emphasize schooling at the expense of effective and relevant learning. A recent report by the Brookings Institution (2011, p.3) states that there is a 'global learning crisis' affecting children and youth both within and outside schools. This has led to an emerging awareness to move beyond a sole emphasis on access, enrolment and completion to include a greater interest in quality of learning, learning processes, and learning outcomes. Secondly, there is growing recognition that the ways in which young people acquire knowledge are changing. Educational institutions no longer have the monopoly of "transmitting" knowledge: indeed, there is increasing recognition of the need to build lifelong and life-wide learning systems. Our approaches to education must adapt to these emerging realities, challenges and opportunities.

Global discussions around learning

At the international level, there is a growing momentum around learning, and consensus on its importance is widespread (Burnett, 2012). Improving the quality of learning is one of the three

[1] With almost 75 million young people under the age of 25 years of age out of the total of 200 million unemployed persons, global unemployment is clearly mainly affecting youth (ILO 2012).

[2] According to latest ILO (2012) figures, vulnerable employment is on the rise mainly in sub-Saharan Africa (22 million persons) and in South Asia (12 million persons).

[3] See, for example, UNESCO's landmark publications; *Learning to Be: Education for the world of today and tomorrow* (1972), and Learning: The treasure within (1996).

priorities in the UN Secretary General's Initiative 'Education First' (UN, 2012). The Initiative significantly raises the profile of education within the international development agenda and points to the importance of the centrality of learning. Learning has become one of the core themes in international discussions with regard to: a) the role of education in post-2015 MDGs and b) UNESCO's on-going efforts to stimulate reflections on education for the future and of the post-2015 education agenda (UNESCO, 2012). A recent high-level expert meeting, "Towards EFA 2015 and Beyond – Shaping a New Vision for Education" (UNESCO Bangkok, May 2012) also highlighted the fact that learning should be one of the areas of emphasis in shaping future education goals and strategies.

The greater recognition of the importance of learning is expressed in the report of Brookings Institution (2011) on presenting a rationale for redoubling efforts in education and establishing principles needed to fulfil the Global Compact on Learning. It is also expressed in the related work of the Learning Metrics Taskforce convened by UNESCO's Institute for Statistics (UIS) and Brookings Institution on measuring learning outcomes. The objective of its work is to catalyze a shift in the global conversation on education from a focus on access to access plus learning (UIS and Brookings Institution, 2012).

This paper outlines some of the key considerations on learning, emerging changes and their implications for education and learning for the future.

II. Selected key considerations on learning

As we embark on a discussion on learning for the future, it must be recognized that there are multifaceted approaches to learning, from different disciplines and different schools of thought. While it is impossible to present a comprehensive summary of current knowledge and thinking on learning, some selected key considerations are provided which could serve as a basis for further discussion and reflections on reshaping education.

The four pillars of learning

The landmark publication of the Report of the Delors Commission for the 21st Century (UNESCO, 1996) proposed a humanistic and integrated vision of education, based on the four pillars of learning to know, learning to do, learning to be and learning to live together. The report was based on a vision of education as a public good with a fundamental role to play in personal and social development. The Delors report took the concept of lifelong learning as the key organizing principle for education and training systems, and what it offers in terms of 'flexibility, diversity and availability at different times and in different places' (UNESCO, 1996, p. 19).

Learning and economic development

In justifying investments in education, many governments have turned to the work of experts in the economics of education, many of whom refer to the human capital theory in their work. It is now commonly accepted that allocating resources in education has positive impact at many levels, from individual lives to society and the economy. Recent rate of return studies which included both educational attainment and skill measures (OECD, 2005, 2007a) showed that the main reason well educated and trained individuals earn higher incomes is because they have higher knowledge and skill levels (Maclean and Wilson, 2009).

Previously, enrolment rates were the focus for perceived links to economic development. But increasingly, attention has shifted to the quality of learning and the relevant skills required for a dynamic workplace in a changing world. Empirical studies provide robust support that quality education contributes to economic growth (Hanushek and Kimko, 2000; Hanushek and Wößmann, 2010). School attainment alone does not lead to improved economic conditions. 'Increasing the average number of years of schooling attained by the labor force boosts the economy only when increased levels of school attainment also boosts cognitive skills.' (Hanushek et al., 2008, p. 64). While more difficult to define and measure compared to cognitive skills, there is also a series of studies showing that non-cognitive skills such as leadership, communication, critical thinking, self-esteem, values and persistent are equally or even more important in determining individual earnings (e.g., Heckman, Stixrud and Urzua, 2006).

The understanding that learning, rather than schooling, has a direct impact on growth and development is increasingly recognized by governments and development partners. For instance, the World Bank's new strategy paper, *Learning for All*, (World Bank, 2011, p. 1) states that 'the driver of development will ultimately be what individuals learn, both in and out of school, from preschool through the labor market.' It further points out that 'Growth, development, and poverty reduction depend on the knowledge and skills that people acquire, not the number of years that they sit in a classroom' (World Bank, 2011, p. 3).

While knowledge and cognitive skills are undoubtedly determining factors of individual income and the level of economic development, at the same time economists recognize that these cognitive skills can only explain a relatively small percentage of variations in income between individuals and nations. In response, recent studies started to shed light on the positive effect of non-cognitive skills and competencies (e.g., enthusiasm, motivation, and resilience) on individual earnings and productivity. Ensuring acquisition of such cognitive and non-cognitive skills through effective learning among people is therefore crucial for economic development.

How do people learn?

Understanding how individuals learn and creating contexts to facilitate learning are key educational challenges in the 21st century. While learning has long been a central topic in psychology and education, today researchers in learning sciences are examining learning processes with new tools and insights. In all learning-oriented disciplines there is a diverse array of approaches and schools of thought. In the past, learning theories emphasized constructs like perception, memory and thinking as central to learning processes.

More recently, learning is portrayed as a socially embedded process, in which interactions between people in communities of practice enable learning to occur (Wenger, 2009). Learning emerges in and through diverse social and contextual activities. For some scholars, such as Illeris, (2003) these learning processes are not distinct but occur simultaneously. He proposes a holistic model for effective learning, in which cognitive, social and emotional components become the three complementary dimensions of learning.

In the theory of multiple intelligences, Gardner (1991, p.7) argues, based on considerable evidence, that 'students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways.' This conception challenges schools and educational systems that design learning activities based on the notion that every child can learn the same material in the same way and that uniform, standardized assessments provide valid measurements of actual student learning (Gardner, 1991).

With the explosive spread of digital technologies, some studies suggest that the current generation of learners 'think and process information fundamentally differently…' (Prensky, 2001, p.1). While this may pose a challenge to traditional education systems, it opens up possibilities for new pedagogical approaches and learning activities.

The importance of investing in early childhood, and nurturing learning at an early age, is widely acknowledged. The foundations for effective lifelong learning and future knowledge acquisition are established in these early years. In addition to acquiring basic skills such as literacy and numeracy and familiarity with ICTs, young learners need to develop active learning practices and build the confidence to explore and master entirely new skills (CISCO, 2010). The Delors Report (UNESCO, 1996) not only underscored the need for learners to receive a sound basic education, but the challenge for 'schools to impart the desire for, and pleasure in, learning, by developing students' intellectual curiosity and their ability to learn how to learn' (UNESCO, 1996, p. 21).

The growing focus on the process of learning in the education community--that is, understanding how, when and where learning occurs--has sparked interest in educational neuroscience, or neuroeducation. Recent insights reveal a wealth of information about the neuronal circuitries involved in the "how" aspect of learning as well as factors which may affect it. Neuroscience also addresses the "when" or time dimension of learning. The overall message is nuanced: studies suggest that "there are no 'critical periods' when learning must take place but [that] there are 'sensitive periods' when the individual is particularly primed to engage in specific learning activities" (OCED, 2007b, p. 18).

Drawing on insights from brain research, Spitzer (2006) argues that the conditions for successful learning and differences in learning occur at different stages of life. This premise could inform the design of learning environments and pedagogical approaches. Spitzer, for example, proposes mixed communities of elderly and young people to maximize the probability of finding innovative solutions to a problem given their distinct learning capacities and experiences.

The perhaps greatest contribution of neuroscience to learning from a temporal point of view is its affirmation of the brain's lifelong plasticity, that is, its capacity to change in response to environmental demands throughout life (Howard-Jones 2008; OECD, 2007b). This fundamental premise could help inform the design of learning environments and pedagogical approaches and could also support efforts toward a lifelong learning approach to education. The insights regarding the brain's potential for lifelong learning also has key implications, as it suggests that provisions must be made for providing opportunities for learning for all, regardless of age. This is very much in keeping with UNESCO's position on the centrality of lifelong learning.

As The Royal Society (2011, p.v) argues, "the emerging field of educational neuroscience presents opportunities as well as challenges for education. It provides means to develop a common language and bridge the gulf between educators, psychologists and neuroscientists." The implications for learning for the future are many, suggesting the need for a reciprocal relationship and dialogue between education policymakers and practitioners and those who conduct research on learning sciences, similar to the relationship between medicine and biology.

At the same time, while the potential of applying insights from neuroscience research to educational practice may be significant, certain argue that this may be premature given the weak accumulation of studies, especially based in different cultures, e.g., in Asia-Pacific contexts (Fischer, 2010). This points to the need for further and intensified research in this area. Fischer proposed that the focus should be on integrating research with practice so as to

illuminate the brain and genetic bases for learning, while concurrently examining how social practices and cultural orientations influence learning and teaching.

III. Emerging changes and their implications for education and learning

What should be learnt and for what purposes?

Beyond the cognitive dimensions of learning, often expressed in terms of high performance in assessment, there has been an increasing recognition of the importance of other types of skills and competencies required to better prepare the young generation to live and work in the future. Based on the question of what skills and competencies are relevant for students to live a successful and responsible life, the work done by the DeSeCo Project under the auspices of the OECD is noteworthy, which aimed at defining and selecting key competencies for a successful life and a well-functioning society (OECD, 2005; Rychen and Salganik, 2001, 2003). Further work in this domain was undertaken by the European Commission (EU, 2007) in developing the European Reference Framework for Key Competencies for Lifelong Learning[4] as well as on 21st century skills by organisations such as the Partnership for 21st Century Skills (P21, 2011) and IT companies advancing the Assessment and Teaching of 21st-Century Skills project (ATC21S, 2010) to advocate for the empowering of students with skills including collaboration, communication, ICT literacy, and social and cultural competencies (Voogt and Roblin, 2010).

The impact of non-cognitive skills and competencies on cognitive skills, school attainment, earnings and employment has been illustrated by Brunello and Schlotter (2011). Burnett and Felsman (2012, p.11) argues that 'there seems to be an emerging consensus that certain non-cognitive "life skills" are essential for employment and that these need to be acquired largely in school or through specific youth training schemes. These skills have been variously defined and are often referred to as "21st Century Skills".' Of the many non-cognitive skills considered to be important for the future, creativity has garnered much attention as a prerequisite to facing the challenges of a complex world (Robinson, 2011). Creativity, when fostered in the education system, can be harnessed as an economic driver in various environments, especially in globally competitive enterprises (McWilliam and Haukka, 2008).

A related consideration concerns the importance of teaching people to live together. This conception of education acknowledges its centrality in promoting peace, citizenship and sustainable development and responding to crucial challenges such as ethnic and religious conflicts, youth unemployment, social unrest and HIV and AIDS. While this aspect of education

[4] See European Communities (2007) 'Key Competencies for Lifelong Learning – A European Framework'.

has been largely neglected in both international discourse and national policy, there are a number of initiatives to define and measure this domain, including the OECD's projects on the Social Outcomes of Learning (SQL) and Education and Social Progress as well as the University of London Institute for Education's Centre for Research on the Wider Benefits of Learning. In a similar vein, the report of the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen and Fitoussi, 2009) recommended that measurement systems should shift attention from metrics of economic production to a system based on the well-being of individuals. UNESCO Bangkok is also increasingly working in the area of 'Learning to Live Together'.

Societies of tomorrow will continue to shift and economies will evolve rapidly – today's skills and knowledge may not be relevant tomorrow. Therefore, there is a need for more flexible and adaptable skills capable of addressing new and unforeseen changes in the labour market, as a result of scientific research, technological innovations and their application to the world of production (UNESCO, 1996). Increasing emphasis on transferable skills in vocational education is a reflection of such changes. Education systems should train learners to be innovative, able to adapt to and assimilate change and be able to continue learning. In addition young people require specific sets of skills to be competent in the connected and constantly changing world, which includes critical thinking, problem solving, collaboration, communication and technology literacy (Voogt and Roblin, 2010).

In preparing education for the future, it is important to continue exploring how education systems should promote learning for the acquisition of relevant skills and competencies needed to confront contemporary challenges and to be responsible and engaged members of society in a life-long learning perspective.

How are the rapid development of Information and Communication Technologies and the growing volume of information impacting learning?

With the continued development of knowledge societies, the influence of new technologies on the creation of knowledge is growing. Not only is the rate of production continuing to grow exponentially, but information is also less and less dependent on text-based transmission and increasingly includes audio and visual support through a variety of media. The unprecedented growth in the volume of information and its changing nature are questioning the authority of traditional bodies of knowledge controlled by established educational institutions and an elite corps of specialists.

At the same time, the rapid advancement of Information and Communication Technologies (ICTs) has changed the way people learn and new technologies have radically changed the learning landscape which opens up new avenues for pedagogical approaches and learning without the limits of time and space and beyond traditional channels in formal and non-formal settings. A true paradigm shift for learning has occurred with the emergence of Web 2.0 and cloud computing, which allowed anyone to be a knowledge creator. In this new era of digital technologies, ICTs have been transforming the role of learners from passive recipients of knowledge in the century-old traditional school model into the main actors of their own knowledge construction. This transformative role of ICTs has yet to be fully investigated and made use of in our education systems.

A shift from teaching to an increased focus on learning

Education systems have traditionally focused on the transfer of information and knowledge from the teacher to the learner. Such a teacher-dependent education system is also "time-dependent, location-dependent, and situation-dependent" (Frey, 2010). With the multiplication of new information and communication technologies and digital media, sources of information and knowledge are becoming more diversified and accessible beyond the confines of formal and non-formal education systems. In schools, the repertoire of pedagogies employed should include student-centric strategies such as project-based learning and collaborative learning. Beyond the traditional curriculum-related questions of *what* to teach (learning content) and *how* to teach it (teaching/learning methods, pedagogical approaches), the question of *when* and *where* learning is taking place is increasingly becoming important. Recognizing that learning is increasingly happening informally beyond the walls of educational institutions, at different times and locations, the role of teachers will also have to evolve from dispensers of information and knowledge to facilitators and enablers of learning.

Towards a focus on the assessment of basic competencies

There has been a shifting focus in the global education development discourse from access and participation in education towards the *results* of educational processes. This reflects a growing international awareness that expanding access to educational opportunities must necessarily take into account the effectiveness and relevance of learning acquired. The current work of the Learning Metrics Task Force co-chaired by the Centre for Universal Education/Brookings Institution and the UNESCO Institute for Statistics (UIS) is an important illustration of this focus. The Task Force is currently identifying learning outcomes and measures at the pre-primary, primary and post-primary levels in domains of competencies which go beyond traditional areas of academic learning. Indeed, the selection of competencies around the domains of 'physical

well-being', 'social and emotional', 'culture and the arts', 'literacy and communication', 'learning approaches and cognition', 'numeracy and mathematics' and 'science and technology' is both a welcome and ambitious development (UIS and Brookings Institution, 2012)

Beyond the classroom-centred paradigm of learning

Learning in education systems is currently still focused on the schooling model. This schooling model surprisingly continues to associate learning essentially with classroom teaching, when a great deal of learning actually takes place at home and elsewhere in the form of homework, reading, writing of papers, and preparation of examinations. Formal schools and higher education institutions have been the predominant carrier of knowledge, transmitted from the teacher to the student. The physical space defined by the classroom - or what Frey (2010) refers to as 'classroom-centric learning' - remains a central feature of formal education systems at all levels of learning. This classroom-centred paradigm is being increasingly eroded with the current expansion of access to information and learning spaces. Indeed**,** newer understandings of learning have gone beyond the classrooms and schools-centred learning paradigm and moved from learning as a space to learning as an activity. Learning outside schools matters for learning inside school. New modes of learning need to be developed, both formal and informal to meet the demands of knowledge-based societies (CISCO, 2010). The challenge is how to bring these together to formulate a system that supports ubiquitous learning. Thus, there is a move towards developing an open, holistic learning system that is centered on society and built upon the concept of life-wide learning, which is a central theme for UNESCO's work. The creation of such a system will require important reorientations of current education systems.

Flexible lifelong learning systems

The considerations above are perfectly in line with the lifelong learning framework. "Encompassing formal, non-formal and informal learning, lifelong learning emphasises the integration of learning and living – in life-wide contexts across family and community settings, in study, work and leisure, and throughout an individual's life" (UIL, 2012, p.3). While the paradigm itself is not new[5], recent societal developments are reinvigorating the relevance of life-long education. In addition to the continuously quickening pace of technological and scientific development, the exponential growth and changing nature of information, the lifelong learning framework is critically important in the context of the increasingly challenging task of forecasting the emergence of new professions and associated higher levels of skills needs. There is a need to develop more responsive education and skills policies that include greater

[5] This was already articulated, for instance, as early as 1972 in *Learning to Be* (UNESCO).

diversification and flexibility and that allow for the adaptation of skill supply to rapidly changing needs and ensure that individuals are better equipped to be more resilient and can learn to develop and apply career adaptive competencies most effectively (UNESCO, 2012).

Operationalizing the concept of life-long learning would require a sector-wide education reform as well as the creation of learning opportunities in all settings or modalities (formal, non-formal and informal) for people of all ages (infants, children, adolescents and adults). Taking this a step further leads us towards the concept of broader learning systems and ultimately a learning society. The process of moving from an education system to a learning society (CISCO, 2010) demands the creation of a lifelong learning infrastructure which cultivates and embraces new learning providers, from the public, business and NGO sectors, a strong coalition of government and other learning providers. In such a setting, employers will play an important role in creating employment practices and opportunities that support a culture of learning.

Not only do we have to reflect on how to bring such broader learning systems to fruition but also ways in which education systems, which are at the core of such broader systems, should be transformed. Education systems for the future need to place more emphasis on equipping learners with the necessary skills to be competent in an increasingly connected and constantly changing world so that they are able to be innovative and be adaptive to changing social and economic requirements. Learning is thus not only about knowledge acquisition, but about learning to learn and to continue learning throughout the course of one's life. Consequently, learning should be addressed across the life-cycle and future approaches to education need to be underpinned by a life-long - and a life-wide - learning approach.

Towards the recognition, assessment and validation of skills acquisition

The growing recognition of the importance of learning and relearning taking place outside the formal education and training systems raises the issue of the recognition, assessment and validation of learning acquired through self-learning, peer-learning, work-based learning (including internships and apprenticeships), on-the-job training, or through other experiences of learning and skills development beyond formal education and training. From a traditional focus on the *content* of learning programmes and teaching/learning *methods*, the focus is now shifting to the *recognition*, *assessment* and *validation* of knowledge and skills, regardless of the formal, non-formal and informal pathways through which they were acquired. In terms of skills development, "there is [also] evidence of increasing attention paid to the measurement of skills levels and the efficient matching of these skills with those required by the world of work. This is being done either through the development of outcome-based national/vocational

qualifications frameworks or through large-scale assessments of skills levels among adults"[6] (UNESCO, 2012). It is therefore important to envisage new approaches to education and skills development that capitalize on the full potential of all learning settings.

Implications for education policy making

What we need to ask at this point is how can these new understandings of learning be translated into educational policy and its implementation? Too often, an abundance of research and knowledge has not been applied to policy and practice. In this view, it is key that we identify ways in which these different insights can be translated into policies and practice at the country level. It will also be important to get a better understanding how existing and future research could be applied and what future research would be required.

While the development status of a given country will determine its educational requirements – and as such, education and learning will be contextualized – education systems for the future will need to provide learners with a set of skills to be competent in an increasingly connected and constantly changing world so that they are able to be innovative and adaptive to changing social and economic requirements. This reinforces the concept that learning is not only about knowledge acquisition, but about learning to learn and to continue learning, throughout the course of one's life.

In view of the above considerations, traditional education systems need to be transformed and reimagined as broader learning systems. Systems should consider alternative means of delivery and provision, which improve and expand learner skills and competences in an increasingly connected and ever-changing social and economic world.

IV. Implications for the Asia-Pacific Region

The Asia-Pacific is far from a homogenous entity: it is a complex and exceptionally diverse region. It is home to over four billion people, constituting 61 per cent of the world's population (UNESCAP, 2011). Yet this population is far from evenly distributed. The region contains a number of the world's most populous countries – Bangladesh, China, India, Indonesia and Pakistan, which together account for almost half of the world's population – as well as its smallest island states. The diversity of the region is also shown in the number of languages spoken: there are in fact, over 3,500 languages in the Asia Pacific with over 600 in Indonesia, one hundred in the Philippines and more than 800 in Papua New Guinea (UNESCO, 2004). This

[6] See, for example, the inventory of the European Training Foundation (ETF, 2010); CEDEFOP (2011); ILO (2010); PIACC etc.

diversity is a major factor to be taken into consideration when discussing the future of education in the regional context of the Asia-Pacific.

In 2010, fertility rates in the region were equivalent to the “replacement rate” of 2.1 In other words, Asia and the Pacific is a rapidly aging region. This situation, in combination with a large young population (youth bulges) in many countries of the region has important implications for education systems for the future.

Over the past decade, the Asia-Pacific region has shown rapid economic growth and overall development. Together with the emergence of a growing number of middle-income countries and wider social development achievements, the region has become a considerable economic and political force. However, despite these positive macro trends, there are vast disparities between and within countries in living standards and social and economic opportunities. While Asia and the Pacific have maintained the lowest unemployment rate of any region at 5.0% in 2009, it is still vulnerable to global economic uncertainty and is plagued by widening economic disparities, both among and within countries. An Australian person, for example, is on average 45 times financially better off than a person in Timor-Leste, one of its closest neighbours. In Thailand, Bangkok’s Gross Provincial Product was roughly 20 times higher than the remote North Eastern province of Amnat Charoen (UNESS, 2011, p.12).

Other key emerging trends in the region which have major implications for education for the future include the rapid advancements in information technologies and interconnectivity. In 2009, the number of internet users was more than 5 times higher than in 2000 (UNESCAP, 2011). We have witnessed the emergence of Singapore as a “wired island”, with 83% of the population broadband internet subscribers. But this contrasts starkly with Myanmar, with the third-lowest digital opportunity in the world at 0.04%.

The great diversity of the region also applies to its education systems. While education is central to many Asia-Pacific countries’ development approaches and noticeable achievements have been made, significant challenges and disparities between and within countries remain. Some countries have education systems that produce high academic achievements. In others, access, quality and completion remain a major concern. Peoples from war-torn zones, remote communities, ethnic minorities and women still face difficulties accessing education. There has been considerable progress in youth and adult literacy, but is still inadequate to meet needs in Asian and Pacific countries, and the region contains the largest number of illiterate adults of any region in the world. Countries have now also become concerned with improving the quality of education, increasing access to post-basic education and to skills development, as well as improving the learning environment.

These development trends and diverse circumstances and needs raise questions about the approach to education and learning in the region. As education challenges and types of learning requirements vary, the understanding of the purposes of learning and skills requirements differ from country to country. For example higher education and research will become more important for economically advanced countries as innovation will be the main source of growth (CISCO, 2010). This diversity calls for diverse solutions to diverse challenges and provides a wide spectrum in terms of perspectives for rethinking learning in the context of the region.

Education for the future in the Asia-Pacific also requires revisiting the purpose of education from a social and cultural perspective, and not simply an economic one. A model of human development for the region would necessarily incorporate a wide range of considerations such as quality of life and respect for diversity. It would be characterized by increased attention to social participation, equity and cultural diversity including the use of local languages, the inclusion of traditional knowledge and value systems, ethics and transparency in education policy and planning.

In a discussion of learning in the Asia-Pacific region, one may also take into consideration the influences of philosophies such as Taoism, Buddhism and Confucianism which play an important role in the cultural identity of part of the region. As these philosophies offer a certain perspective of an approach to life, it is interesting to get a better understanding how they may have contributed to the educational outlook and performances of various countries.

For example, the Taoist concept of 'carefreeness' (逍遥游) means that personal achievements or competition are not emphasised as a major value. Similar to Taoism, Buddhism does not prize knowledge with its promise of material benefits, and it has influences and a legacy in East Asia, India and Southeast Asia. At the same time, certain countries/territories within the region with this cultural heritage which includes a concept of achievements that extends beyond academic performances, like the Republic of Korea, Singapore and Hong Kong have a strong belief in competitiveness and high-stake testing in education. This combination of seemingly contrasting beliefs may offer a potential area for future research and a consideration when implementing the new insights in learning that are currently mostly Eurocentric in nature, taking into account the local contexts and cultures.

Because of its diversity and strive for rapid growth, Asia-Pacific countries possess tremendous potential to become a hotspot for innovations in education, to develop new visions of learning and construct an ideal learning system that can be used to invigorate and inspire current mainstream systems that are tied down by traditional educational baggage. In working towards the creation of a learning system with a lifelong perspective, by building up its ICT capacity,

having dialogues with local communities and continuing with EFA efforts, the Asia- Pacific region will be a very dynamic region to take note of in time to come.

V. Implications for the post-2015 development and education agendas

In general, it can be said that there is consensus at the international level that the current emphasis on enrolment and completion in the international education agenda must be broadened to also include a focus on learning. The Brookings Institution-led "Global Compact on Learning" (Brookings Institution, 2011, p.5) strongly argues that 'Learning for all' should be the new goal driving the global education agenda. These considerations are echoed by a growing agreement among many governmental and non-governmental stakeholders that quality education and learning should be among the core constructs around which new policy priorities are designed in the post-2015 era (Benavot, 2011).

While there is consensus on learning becoming a central topic in the post-2015 agendas as well as for education in the future as such, further discussions and reflections are necessary as to how this can be best achieved. This is closely linked to the discussion of whether a learning goal should be included in the post-2015 agendas. Burnett (2012, p.2) points out that, 'while almost all members of the global education community agree that learning should receive more attention, there is no consensus that this is best achieved through an international learning goal.' He proposes that countries should be able to set their own specific learning goals within a general MDG framework.

These considerations point to the need for further discussions and increased consultations at the country level for the relevance of introducing a possible goal on learning into future education and development agendas. Such a goal, while universally valid, would need to be relevant to country needs and adopt a flexible approach towards countries setting their own learning goals. An interesting possibility to be further explored could be the idea of region-specific learning goals and indicators like in the European Union and Latin America. As 2015 approaches, it is imperative that these questions now be raised and considered carefully by each region and each country.

VI. Conclusions

In light of the above considerations, it is clear that rethinking learning cannot be discussed from one perspective alone. It requires insights from multiple disciplines and schools of thought and needs to draw upon the multitude of discussions and knowledge on this topic. While learning has clearly been acknowledged as a key theme for education for the future at both the national and international level, it remains unclear how it will be featured within the international post

2015 development and education agendas. A second challenge is its operationalization at country level, which requires a definition of a realistic set of skills and competencies and their measurement. Based on the outcomes of the meeting 'Beyond 2015 – Rethinking learning in a Changing World' and other work in this area, UNESCO will continue its activities towards education for the future in the post 2015 era and chart the contours of a forward-looking vision of learning.

VII. References

ATC21S. 2010. *Draft White Paper 1 – Defining 21st Century Skills.* Assessment and Teaching of 21st-Century Skills, a research project by University of Melbourne, CISCO, Intel and Microsoft. http://atc21s.org/ (Accessed 5 September, 2012)

Benavot, A. 2011. Improving the Provision of Quality Education: Perspectives from Textbook Research. *Journal of International Cooperation in Education*, Vol. 14, No. 2, pp. 1–16.

Brookings Institution. 2011. *A Global Compact on Learning: Taking Action on Education in Developing Countries.* Brookings Center on Universal Education in Washington, DC. http://www.brookings.edu/~/media/research/files/reports/2011/6/09-global-compact/0609_global_compact.pdf (Accessed 16 October, 2012)

Brunello, G. and Schlotter, M. 2011. *Non-cognitive Skills and Personality Traits: Labour Market Relevance and their Development in Education and Training Systems.* Discussion Paper No. 5743 for Institute for the Study of Labour. http://ftp.iza.org/dp5743.pdf (Accessed 1 November, 2012)

Burnett, N. 2012. *A learning goal for education? Scoping for MDG2 post-2015*. Report to Hewlett Foundation/Wellspring Advisors, Results for Development Institute.

Burnett, N. and Felsman, C. 2012. *Post-2015 Education MDGs*. ODI, Results for Development Institute.

CISCO. 2010. *The Learning Society*. CISCO Systems, Inc. http://www.cisco.com/web/about/citizenship/socio-economic/docs/LearningSociety_WhitePaper.pdf (Accessed 12 September, 2012)

EU. 2007. *Key Competences for Lifelong Learning – European Reference Framework*. European Commission. http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf (Accessed 12 September, 2012)

Fischer, K. 2010. The Future of Neuroscience. *Mind, Brain and Education*, Vol. 4, No. 2, pp. 68-80.

Frey, T. 2010. *The Future of Education*. FuturistSpeaker.com. http://www.futuristspeaker.com/2007/03/the-future-of-education/ (Accessed 24 September, 2012).

Gardner, H. 1991. *The unschooled mind: How children think & how schools should teach*. New York, Basic Books.

Hanushek, E. A. and Kimko, D. D. 2000. Schooling, Labor-Force Quality, and the Growth of Nations. *American Economic Review*, Vol. 90, No. 5, pp. 1184-1208.

Hanushek, E. A. and Wößmann, L. 2008. The Role of Cognitive Skills in Economic Development. *Journal of Economic Literature,* Vol. 46, No. 3, pp. 607-68.

_____. 2010. Education and Economic Growth. P. Penelope, B. Eva and M. Barry (eds), *International Encyclopedia of Education,* Vol. 2. Oxford, Elsevier, pp. 245-52.

Heckman, J. J., Stixrud, J. and Urzua, S. 2006. The Effects of Cognitive and Noncognitive Abilities On Labor Market Outcomes and Social Behavior. *Journal of Labor Economics*, Vol. 24, No. 3, pp. 411-82.

Howard-Jones, P. 2008. *Neuroscience and education: Issues and opportunities.* TLRP-ESRC. http://www.tlrp.org/pub/documents/Neuroscience%20Commentary%20FINAL.pdf (Accessed 15 October, 2012).

Illernis, K. 2003. Towards a contemporary and comprehensive theory of learning. *International Journal of Lifelong Education*, Vol. 22, No. 4, pp. 396-406.

ILO. 2012. *Global Employment Trends 2012: Preventing a Deeper Jobs Crisis*. International Labour Organisation in Geneva. http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_171571.pdf (Accessed 16 August, 2012)

Maclean, R. and Wilson, D. 2009. *International Handbook of Education for the Changing World of Work: Bridging Academic and Vocational Training*. Netherlands, Springer.

McWilliam, E. and Haukka, S. 2008. Educating the Creative Workforce: New Directions for Twenty-first Century Schooling. *British Educational Research Journal*, Vol. 34, No. 5, pp. 651-66.

OECD. 2005. *Definition and Selection of Key Competencies – Executive Summary*. DeSeCo Project, OECD. http://www.oecd.org/dataoecd/47/61/35070367.pdf (Accessed 3 September, 2012)

_____. 2007a. *Education at a Glance*. Paris, OECD.

_____. 2007b. *Understanding the brain: The birth of a learning science.* Centre for Educational Research and Innovation, OECD. http://www.oecd.org/site/educeri21st/40554190.pdf (Accessed 9 October, 2012).

P21. 2011. Partnership for 21st Century Skills. http://www.p21.org/ (Accessed 5 September, 2012)

Prensky, M. 2001. Digital natives, digital immigrants. *On the Horizon*, Vol. 9, No. 5, pp. 1-6.

Robinson, K. 2011. *Out of Our Minds: Learning to be Creative*. Oxford, Capstone.

Rychen, D. S. and Salganik, L. H. 2001. *Defining and Selecting Key Competencies*. Göttingen, Hogrefe & Huber Publishers.

_____. 2003. *Key Competencies for a Successful Life and a Well-Functioning Society*. Göttingen, Hogrefe & Huber Publishers.

Spitzer, M. 2006. Chapter 3: Brain Research and Learning over the Life Cycle. *Personalising Education*. Paris, OECD, pp. 47 – 62.

Stiglitz, J., Sen, A. and Fittousi, J. 2009. *Report of the Commission on the Measurement of Economic Performance and Social Progress*. Commission on the Measurement of Economic Performance and Social Progress. http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf (Accessed 12 September, 2012)

The Royal Society. 2011. *Brain waves module 2: Neuroscience: implications for education and lifelong learning.* Brain Waves' Project, The Royal Society. http://royalsociety.org/uploadedFiles/Royal_Society/Policy_and_Influence/Module_2_Neuroscience_Education_Full_Report_Printer_Friendly.pdf (Accessed 8 October, 2012)

UN. 2012. *Education First, an initiative of the United Nations Secretary-General.* New York, United Nations.

UNESCO. 1996. *Learning: The Treasure Within: Report to UNESCO of the International Commission on Education for the Twenty-first Century*. Paris, UNESCO. http://www.unesdoc.unesco.org/images/0010/001095/109590eo.pdf (Accessed 10 September, 2012)

_____. 2012. *Education and skills for inclusive and sustainable development beyond 2015*. Thematic Think Piece by UN System Task Team on the Post-2015 UN Development Agenda, Paris, UNESCO.

http://www.un.org/millenniumgoals/pdf/Think%20Pieces/4_education.pdf (Accessed 8 September, 2012)

UNESCO Bangkok. 2012. Summary Outcomes Document: Towards EFA 2015 and Beyond – Shaping a New Vision of Education. http://www.unescobkk.org/fileadmin/user_upload/epr/Images/Summary_Outcomes-Post_2015_FINAL.pdf (Accessed 16 October, 2012)

UNESCO Institute for Lifelong Learning (UIL). 2012. *UNESCO Guidelines for the Recognition, Validation and Accreditation of the Outcomes of Non-formal and Informal Learning*. Hamburg, UNESCO Institute for Lifelong Learning. http://unesdoc.unesco.org/images/0021/002163/216360e.pdf (Accessed 30 September, 2012)

UIS and Brookings Institution. 2012. Learning Metrics Task Force. http://www.brookings.edu/about/centers/universal-education/learning-metrics-task-force (Accessed 14 November, 2012)

Voogt J. and Roblin P. 2010. *21st Century Skills*. Discussion Paper for Kenniset, University of Twente. http://www.internationalsymposiumoneducationalreform.com/storage/21st%20Century%20Skills.pdf (Accessed 5 September, 2012)

Wenger, E. 2009. A social theory of learning. K. Illernis (ed.), *Contemporary theories of Learning - Learning Theorists in their own words.* New York, Routledge, pp. 209-18.

World Bank. 2011. *Learning for all: Investing in people's knowledge and skills to promote development*. Washington, DC, World Bank.