

International Conference for Improving the Learning of Biology and Related Experimental Sciences at the K-12 School Levels

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“InterAcademy Partnership (IAP) Science Education Programme (SEP) and the UN Sustainable Development Goals (SDGs) 2016-2030”

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The InterAcademy Partnership (IAP) is the Umbrella Organisation of Some 110 National Academies of Sciences, Some 40 National Academies of Medicine and 1 National Academy of Engineering.

IAP Represents the Global Scientific Community at the Highest Level.

The 2 Priority Programs of IAP:

- **Advice to Government**
- **Science Education**

The IAP Science Education Program is managed by the IAP SEP Global Council of which the Academy of Sciences Malaysia (ASM) is the Lead Academy and I am the Chair of the Global Council. I would like to acknowledge the work of the Founding Chair, Professor Jorge Allende and the second Chair, Professor Pierre Lena.

At the Global Level, the UN Millennium Development Goals (MDGs) 2000-2015 have been succeeded by 17 UN Sustainable Development Goals (SDGs) 2016-2030:

Goal 1: End poverty in all its forms everywhere;

Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture;

Goal 3: Ensure healthy lives and promote well-being for all at all ages;

Goal 4: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all;

Goal 5: Achieve gender equality and empower all women and girls;

Goal 6: Ensure availability and sustainable management of water and sanitation for all;

Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all;

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;

Goal 10: Reduce inequality within and among countries;

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable;

Goal 12: Ensure sustainable consumption and production patterns;

Goal 13: Take urgent action to combat climate change and its impacts;

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development;

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels;

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

<http://sustainabledevelopment.un.org/focussdgs.html>

The UN SDGs are holistic, cross-discipline and multi-stakeholder in participation.

The UN SDGs boldly proclaim end of global poverty by 2030!

The SDGs are the outcome of an inclusive global consultation involving all UN Member States, the entire UN System, Experts, Civil Society, Business and 7-8 millions of people from all corners of the world since Rio+20 in 2012. In December 2014, the UN announced the completion of the multi-stakeholder consultation process.

UN Secretary-General Ban Ki-Moon issuing his Synthesis Report on the Post-2015 Development Agenda entitled “The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet”.

http://sustainabledevelopment.un.org/content/documents/5527SR_advance%20unedited_final.pdf

The Synthesis Report gives the rationale behind the adoption of the SDGs by the UN and its member states.

UN Sec-Gen's Synthesis Report mentions that the SDGs place great emphasis on technology:

“With our globalized economy and sophisticated technology, we can decide to end the age-old ills of extreme poverty and hunger. We have witnessed stunning technological progress, millions upon millions lifted from poverty, millions more empowered, diseases defeated, life expectancies on the rise, and vibrant, economies built in all regions.

Alas, the SDGs Mention neither Science, nor Engineering. Without Science and Engineering, Can There be Any Technology?

Even a cursory glance of the 17 SDGs will convince anyone that without Science, Engineering and Technology, None of the SDGs on Energy, Water, Climate Change Mitigation, Infrastructure, Cities, Food, Health and even Education and Gender Equality Will Be Achieved.

Most importantly, the Achievement of the 17 UN SDGs by 2030 will critically depend on the availability of Skilled Human Capital, especially in the Developing World.

Education is Key!

The Education SDG is:

- **Goal 4: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.**

There are 7 Targets associated with SDG No 4 with great emphasis on Vocational and Technical Education and Training at the para and sub professional levels.

As an engineer, I applaud the above emphasis on the education of para and sub professionals that will fill the great void in the developing world.

However, we should not forget that the educational foundation of science, engineering and technology for para and sub professionals is science education in schools.

This is where IAP SEP has been focusing Its efforts from Pre-School to Primary School upwards.

But with a Fundamental Difference: Science Education should be Inquiry Based more commonly known as Inquiry Based Science Education (IBSE).

In this Conference, there are many experts in IBSE, I will therefore refrain from preaching to the converted.

Nevertheless I believe it is worth reminding everyone why IBSE is so important.

IBSE starts with the scientific premise “I do not know”. Students are given a hypothesis. Through group discussion and experimentation, they eventually come to the right conclusion.

It has been proved that IBSE improves science literacy, numeral literacy and language literacy of students. IBSE enables students to question and doubt every proposition of the so-called “prophet” unless his proposition is supported by experiment and borne out by evidence.

The world and our young are constantly confronted by “prophets” of excessive military expenditure, of religious fundamentalism leading to terrorism, of profligate consumption as the model of economic development. I believe the only effective defence is a discerning and rational global citizenry, nurtured by evidence based education the scientific way.

Through IAP and its member academies, IBSE has spread to many countries and taken root in their education curriculum especially in the developed world.

The outstanding example is “La Main a la Pate” Initiative of the French Academy of Sciences, now the LAMAP Fondation www.lamap-foundation.org

LAMAP has helped to spread IBSE to more than 60 countries. In Asia Pacific, LAMAP has mentored Brunei, Cambodia, China, Indonesia, Laos, Malaysia Pakistan and Vietnam.

In China, it is known as “Learning by Doing” “做中学” and in Malaysia “I Do, I Discover”. www.istic-ibse.org

However I personally believe IAP SEP has barely scratched the surface.

Amongst the 193 nations of the UN, IBSE is not known in most countries in the developing world.

If IAP SEP is to be an effective player in helping UN and its member states achieve the SDGs through IBSE, we must break out of the cocoon of academies and reach out to the wide world yonder.

In this endeavour, I would like to introduce my other organization ISTIC.

The International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (ISTIC) is a successful outcome of the 2nd Summit of China+G77 in Doha 2005. The Summit urged UNESCO to balance initiatives on the supply side of S&T with more initiatives on the demand side for the benefit of peoples in South countries.

UNESCO approached Malaysia to host ISTIC as a Category II Centre in 2006. UNESCO Category II Centre is funded by the host nation. Malaysian government agreed. ISTIC was formally launched in Kuala Lumpur in 2008.

All ISTIC programmes have been devoted to institutional and human capital capacity building in science, engineering and technology in the South through South-South and North South Cooperation. www.istic-unesco.org

IBSE has been one of ISTIC's Priority Programmes.

ISTIC's partner is "La Main a la Pate" of France. ISTIC has been working to spread IBSE to developing countries in Africa and Central Asia by conducting training programs for teachers.

As ISTIC is an UNESCO Centre, I have harboured the ambition to get UNESCO, the global custodian of education, science and culture, to take the global leadership of IBSE.

The logical step would be to get the two Paris based organisations, UNESCO and LAMAP together.

I think I have finally succeeded!

On 5 April 2016, ISTIC organized a Historic Event in UNESCO Head Office Paris on School Education with LAMAP.

I managed to get UNESCO Director General Irina Bokova and the Malaysian Minister of Education Mahdzir Khalid to officiate.

But the biggest impact was made by the French students from the Cave' Primary School who demonstrated scientific principles a la LAMAP with such confidence and assurance that astounded the audience of representatives of Permanent Delegations to UNESCO and UNESCO Executives.









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联合国教育、
科学及文化组织

**Address by Irina Bokova, Director-General of
UNESCO on the occasion of the ISTIC One
day event on “Embracing the Future:
Improving Quality of Science Instruction in
Schools”**

UNESCO, 5 April 2016

Le monde a besoin de science, la science a besoin de jeunes talents et nous connaissons l'ampleur du défi devant nous.

The world needs science, science needs young talents and we know the challenge we are confronted with is one of major scale.

L'éducation scientifique se ralentit dans le monde entier.

Science education slows down all over the world.

Les élèves de collège et de lycée se détournent de la science – la culture générale scientifique ne reflète quasiment rien des avancées de la science depuis un siècle.

Students from lower and higher secondary schools turn away from science – the scientific literacy and culture reflects nearly nothing of past century scientific progress.

La science moderne, disait Gaston Bachelard, s'est construite sur une opposition au « sens commun », et sur l'idée que pour atteindre la vérité, il faut souvent tourner le dos à nos intuitions premières – et d'une certaine manière nous en payons l'effet retour : la science est considérée comme trop difficile, déconnectée de la vie quotidienne, lointaine, abstraite.

Gaston Bachelard told modern science developed in opposition to the 'common sense', and through the idea that to reach the truth, it is often necessary to turn away from our first intuitions- and in a certain way, we now pay for the repercussion of this: science is considered as too difficult, disconnected from daily life, distant, abstract.

Il est grand temps d'inverser cette tendance, et de mettre, comme l'avait si bien proposé George Charpak, « la main à la pâte ».

It is high time we reverse this trend, and we 'put our hand to the dough', as so well proposed by Georges Charpak.

Nous devons replacer la science au cœur du cursus scolaire, initier les élèves aux miracles scientifiques, trouver de nouvelles approches, plus innovantes, et transmettre le goût des sciences.

We shall place science at the heart of school curricula, initiate students to scientific miracles, find new approaches, more innovative, and convey the taste for sciences.

C'est pourquoi l'UNESCO milite en faveur de la Pédagogie d'investigation, qui place l'élève en situation active de recherche.

This is why UNESCO campaigns in favour of the investigation pedagogy, which puts students in an active inquiry situation.

A travers le Prix et les Bourses UNESCO-L'Oréal, nous distinguons des femmes scientifiques d'excellence mondiale, comme autant de rôles modèles pour les filles du monde entier.

Through the UNESCO-L'Oréal Prize and Scholarships, we distinguish women scientists of international excellence, as many role models for girls around the world.

La même vision inspire le partenariat entre UNESCO et le Centre international pour la coopération Sud-Sud dans le domaine des sciences, de la technologie et de l'innovation (ISTIC).

The same vision inspires the partnership between UNESCO and the International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC).

Le monde a besoin de science, la science a besoin de nouveaux talents, et ensemble, avec l'ISTIC, avec le travail formidable des équipes de la Fondation La main à la Pâte dans plus d'une cinquantaine de pays, l'UNESCO va continuer de travailler pour attirer toujours plus de jeunes vers la science, partout dans le monde. Parce que le talent est partout dans les pays en développement, dans le monde développé, prêt à se développer, prêt à coopérer.

The world needs science, science needs new talents and, together with ISTIC, with the astounding work done by the teams of the Fondation La main à la pâte in more than fifty countries, UNESCO will continue to work in order to attract more young people towards science throughout the world. For talent can be met everywhere, in developing countries, in the developed world, in the world ready to develop, ready to cooperate.

It is now up to LAMAP Fondation to follow up with UNESCO Director General Irina Bokova. I stand ever ready to help.

In reaching out to embrace the world, I am now engaging the “One Belt One Road” Initiative of China and also trying to engage the Trans Pacific Partnership (TPP).

“One Belt One Road” focuses on bringing together China, Central Asia, Russia and Europe, linking China with the Persian Gulf and the Mediterranean Sea through Central Asia, South East Asia and the Indian Ocean covering some 60 countries. China has reportedly committed US\$900.0 Billion to this Initiative.

I have proposed to the IAP SEP member from China to develop a “One Belt One Road” Education Curriculum on the Fusion of Civilisations for schools in the 60 partner countries. In the current dangerous clash of civilisations, the solution lies in interfaith and cross civilization dialogue of our young.

This “Fusion of Civilizations” Education Curriculum is inspired by the LAMAP thematic programs “Discoveries in Muslim Countries” and “Discoveries in European Countries” that highlight for French students the scientific discoveries by the giants of science in the Golden Age of Islam and by the European scientific giants after the European Renaissance.

At the Chinese end, it can tap into the 26-volume opus of Professor Joseph Needham aptly titled ‘Science and Civilisation in China’.

The inaugural IAP SEP Forum on the development of the “One Belt One Road” Fusion of Civilisations Education Curriculum is proposed to be held in July 2016 in Karamay, Xinjiang in North West China.

Mrs Zhu He from China will elaborate on this later.

The Trans Pacific Partnership (TPP) consists of 12 countries, namely USA, Canada, Mexico, Peru, Chile, Japan, Vietnam, Brunei, Malaysia, Singapore, Australia and New Zealand. TPP will be the largest trading bloc in the world.

It originated with the four small countries of Brunei, Chile, New Zealand and Singapore.

In TPP Agreement, Chapter 20 deals with capacity building with emphasis on education. I understand this Chapter was proposed by Chile.

I would like to try to engage TPP on IBSE, perhaps starting with “Hands On” Computer Education and Coding for school children.

This must be of interest to a trade oriented organization like the TPP with the growing importance of the global digital economy.

I hope to interest important role players in Chile to lead this initiative during this Conference.

Many think I am crazy.

But I firmly believe when there is a will, there will be a way!

THANK YOU