

**Opening remarks by Tomás Ó Ruairc, Teaching Council Director,
on the occasion of the launch of IAPSE
(Irish Association for Primary Science Education)**

DCU St. Patrick's Campus

Good evening to you all. I wish to thank IAPSE for the invitation to launch your association here this evening. Cliona was reminding me the other day of how this stemmed (pardon the pun!) from a meeting which she and colleagues had sought with the Council some months ago. They were concerned about a number of issues in relation to science in primary education and wanted to know what the Council made of all this! One of our key messages to them was that they needed to formalise their collaborative efforts and grow them. I find myself saying this quite a lot – it is not always heeded as well as in this case! This is a theme I will return to throughout my remarks – so I want to really commend everybody involved in the establishment of IAPSE.

Collaboration sounds all warm and fluffy. But it can be hard to make a start!

In 1913, Max Planck is reputed to have said the following to Albert Einstein on hearing of his work in the area of general relativity:

As an older friend I must advise you against it, for in the first place you will not succeed, and even if you succeed, no one will believe you.

2 years later, Einstein went on to publish his theory of general relativity and our understanding of the Universe was almost literally turned on its head.

Over 100 years later, and at this launch of the all-Ireland network for Primary Science education, during Climate Change week, Planck's words seem relevant for all sorts of reasons- the scale of admirable ambition which the Irish Association for Primary Science Education has set itself; the scale of the climate change challenge which threatens to overwhelm us; and when we realise how little we still understand about the known and visible Universe, a state of awesome disbelief can sometimes seem entirely justified.

To my understanding, the visible Universe does not make sense – it should not hang together. Science has theorised that there must be dark matter – and hence dark energy – which thus far has eluded our detection and which is helping to hold the Universe together. That line from Shakespeare comes to mind –

There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.

And yet – before we all despair – I am reminded of that line from the poet Robert Browning which my English teacher in Leaving Cert, Anna Mannion, taught us:

*Ah but that a man's reach should exceed his grasp
Or what's a heaven for?*

A theory of everything eluded Stephen Hawking before his death – but the interconnectedness of all knowledge and learning is increasingly becoming

visible. It is emerging. And if this is the case – as the breadth, depth and complexity of climate change becomes ever more horrifically apparent – it seems that this interconnectedness may be paradoxically veiled in the concept of beauty.

Reflective practice, awe and beauty

Some years ago I was asked to launch an exhibition by the Crafts Council of Ireland in Kilkenny whose title was in honour of the British Mathematician G H Hardy –

Beauty is the first test

Those of you familiar with the quote will recall that he goes on to say that

there is no permanent place in the world for ugly mathematics.

And then in the interim, having been mesmerised by Brian Cox's TV series Forces of Nature, I took to read the accompanying book. And in that publication, Cox speaks of the concept of Ionian Enchantment:

[it is] named after Thales of Miletus, credited by Aristotle as laying the foundations for the physical sciences in 600 BC on the Greek island of Ionia. The feeling is one of elation when something about nature is understood, and seen to be elegant. The second reason is to revisit and enhance an idea we've been developing. Science is all about making careful observations and trying to

explain what you see. That might be the hexagonal structure of a beehive, the jagged symmetry of a snowflake, or the details of how electrons bounce off protons. Careful observations lead to Ionian Enchantment."

So we have careful observation, identification of patterns, and the importance of maintaining an almost childlike sense of awe in witness of what we are discovering or rediscovering. These are all hallmarks of good teaching – yet this evening, at the launch of an association to promote the teaching of science, it seems appropriate and reassuring to learn that they are, according to Brian Cox, the epitome of scientific enquiry and endeavour.

Hope, challenge and collaboration

Beyond beauty, it seems to me that science is fundamentally an optimistic endeavour. We believe that answers can be found, and new questions ever crafted, with the right approach, methodology, persistence, stepping back, and crucially collaboration. These dynamics must be underpinned by an ever evolving body of knowledge and insight – which is in turn attentive to the knowledge and insight of others and which engages with them in a truly collaborative spirit. In the context of climate change, this is not some fanciful or nebulous articulation of mine. I believe this to be a moral imperative if we are all to survive and thrive, both now and in the future.

Marcus du Sautoy, author of “What we cannot know” says that

it is certainly true that science flourishes when we share the unknowable with other disciplines. If the unknowable has an impact on how we lead our lives, then it is worth having ways to probe the consequences of choosing an answer

to an unknowable. Music, poetry, stories and art are powerful voices in exploring the implications of the unknowable.

Lest this sound imperious and serious, we can always have a good laugh inspired by the leadership of Dr. Jessamyn Fairfield, a physicist from NUI Galway. In July 2017, she was awarded the Institute of Physics' Mary Somerville medal. One of her specialisms is doing stand-up comedy based on her physics work!

Interviewed by the Irish Times on the occasion of her award, she said

When many people think of a scientist, they think of a man in a white coat. Soapbox Science aims to challenge this perception by showcasing the work of female scientists in a fun and friendly way... the scientific community must continue to attract the best talent, and be open and inclusive.

This closing line of Jessamyn's applies to us all. In my experience, the worlds of many sciences are beginning to knock on the door of teaching and learning in a way that they have not done historically. The emerging field of Mind, Brain and Education Science, which seeks to bring together various scientific fields with teaching and learning, is a clear example. I recall Daniel Ansari, of the University of Michigan, speaking on this at an OECD Conference in Brussels a few years ago. *This is not, he said, about the men in white coats telling teachers what to do and how to do it. That will not work.* He spoke of seeking to talk with teachers in a spirit of mutually collaborative enquiry.

Climate change

And this has to be key, particularly in the spirit of this evening. We may have awe-inspiring beauty, we may have a determined optimism, we may even have levititious humour. And yet we have one of the most overwhelming challenges to face our species as a collective since our earliest ancestors set off from Africa to travel around the world. What can we possibly do?

Three things – a grim yet optimistic determination not to give up; a commitment to collaboration of the highest quality and greatest impact; and an open mind to learning and paradoxes whenever and wherever they emerge.

Marcus du Sautoy says

On the one hand, as humans we must recognize that we cannot know it all. There are provable limits to knowledge. Such a state of humility is intellectually important, or we will live in a state of delusion and hubris. Yet the other lesson is that we cannot always know what it is that will forever transcend our understanding. This is why it is essential for a scientist not to give in too early. To believe that we can find answers. To believe that perhaps we can know it all.

#paradox! This has echoes of Plato:

How will you search for something you do not know at all? And if you should meet with it, how will you know that this is the thing that you did not know?

Our aim outreaching our grasp perhaps is not a reminder of human frailty and futility but rather a constant source of renewal, ambition and courage. How else does a child learn to walk?

And then we are here this evening, in the middle of climate change week, and we need to take stock of some of the sobering circumstances in which we find ourselves.

Philip Fernbach and Steven Sloman are the authors of “The Knowledge Illusion – Why we never think alone”. In that book they seemed to throw a fairly challenging gauntlet down to the education and scientific communities – and tonight we are witnessing a significant cross-over between the two!

"Decades of attempts to educate people about science have been ineffective at achieving the aspirations of the Bodmer Report: to promote positive views about science throughout society by fostering scientific literacy. Despite all the effort and energy that has gone into promoting public understanding of science, the millions and millions of dollars spent on research, curriculum design, outreach, and communication, we just do not seem to be making headway on that goal. Antiscientific beliefs are still pervasive and strong, and education does not seem to be helping."

The Royal Society's Bodmer report was published in 1985. And while it did seem to have some positive impacts in the short to medium term, Sloman's and Fernbach's cut may sting for good reason. Scientists the world over have collaborated on a number of climate change reports for the UN; Greta Thurnberg is taking our world by storm of a very different and positive kind – yet if we ask ourselves to what extent we are all changing our behaviours to take account of what science is telling us, we would find ourselves as a society

and a species sorely lacking. If excellence, scale, breadth and depth of collaboration alone was the answer, we would not be where we are.

BEACONS

There is a missing link somewhere in all of this. We have significant resources being invested in research in the sciences. We have international collaboration on an unprecedented scale. 20 of the warmest years on record have occurred in the last 22 years. The evidence, if we care to look at it, is clear and mounting.

If we care to look at it- what about when we care to talk about it – with each other? How often do we create the space and choose the time to have a real conversation with a diverse group of others about what this evidence and insight means?

As a Council, we have been spearheading the prototyping of a new process that we hope will facilitate teachers, parents and students, at the heart of our school communities, in having conversations with each other at the same time about issues that are of concern to them. We are calling this BEACONS – Bringing Education Alive for our Communities On a National Scale.

We held the first BEACONS prototype event in Ennistymon in May of this year, and we received funding from D/PER's Public Service Innovation Fund for three more events between now and the end of the year. No other country has managed to do this to scale. At the Ennistymon event, the children and young people flocked to the group which was discussing the environment. At the end

of the event, 2 schools, 1 primary and 1 post-primary, agreed to collaborate on the procurement of an outdoor fountain to cut down on the use of plastic bottles. None of the issues were new, nor were the actions. What was new was a school community coming together to take ownership of both these areas, and hold them to account.

We will have a Sharing Learning event on 13 December in our offices in Maynooth and we will be inviting key influencers to hear about the evaluation we have commissioned of this phase. If you wish to attend, please let us know!

Collaboration, research – next steps

Tonight, in the middle of November, we are here on the campus of one of the largest faculties of education in Europe. It is a flagship of Government policy in terms of the restructuring of ITE provision. It has heralded the launch of a number of centres of excellence in research, one of which I was here for the launch of – Sealbhú.

But the importance of enhancing the connections between that research and policy and practice cannot be overstated. This is at the heart of the Teaching Council's policy, as evidenced by our CROÍ Research Series and our co-funding of T-REX, along with the CES and the NCCA.

And it is for this reason that I am delighted to formally launch IAPSE. Take a look at its establishing document. Its core aims include:

- *To ensure classroom practice is informed by National and International research*
- *To support Continuing Professional Development for primary school teachers*
- *To collaborate with practitioners, policy makers and stakeholders in primary science*

They say that we strive to:

- *Encourage greater connection between research and practice in order to support primary teachers in using innovative and up-to-date methodologies for teaching science.*
- *[And perhaps with one eye to the Bodmer Report] Develop an informed and scientifically literate society (increase public awareness and understanding of science).*

And in your mission statement, IAPSE says:

We endeavour to ensure that children in primary school classrooms throughout Ireland experience a rich learning environment that promotes a deep understanding of scientific concepts and the development of scientific skills. This environment should support children in developing the requisite attitudes and values that will enable them to make sense of the world in which they live.

“A rich learning environment” – “attitudes and values”- “make sense of the world in which they live.”

These are platforms on which collaboration with all other endeavours, disciplines and energies in education can be built both sustainably and inspirationally.

For to hark back to Browning, we need inspiration to keep striving.

And with one thought to the Universe not making sense – perhaps the closing line could be tweaked so that our rich learning environments which we all create together could help us all make the world in which we live make sense.

I wish all those involved in the establishment of IAPSE every success with your work – I trust that you will always seek out new forms of collaboration – and I look forward to making sense!

Tomás Ó Ruairc

13 November 2019

DCU St. Patrick's Campus