Report on SCoTENS Conference

ART AND SCIENCE
MOVING TOWARDS CREATIVITY IN EDUCATION

St Mary's University College,
Belfast

28th & 29th February 2008

Organisers:
Dr Ivor Hickey and Mrs Deirdre Robson St Mary's University College, 191 Falls Road, Belfast BT12 6FE
Dr. Dónal O'Donoghue, Mary Immaculate College, South Circular Road, Limerick.

Guest Speakers
Professor Helen Storey, Helen Storey Foundation; Professor Tom Cross, University College Cork and Dr Lizzie Burns, Science to Life.

Objectives of the Conference
We are currently undergoing a dramatic change in our understandings of and approaches to education. In the age of electronic databases and instant access to information, the skills of learning are taking increasing precedence over the simple accumulation of knowledge in education. Amongst the most exciting aspects of this approach are interactions between subjects traditionally seen as separate entities and the recognition of the need for learning and teaching to be highly creative activities.

Art and Science are a prime example of two subjects that are beginning to be regarded as having -much in common and -their compatibility has begun to show dividends at curricular level in schools.

The intention of the conference was to bring together individuals in Initial Teacher Education (ITE) and practicing teachers on the island of Ireland with shared interests in the fields of art and science education. This would allow a sharing of information and hopefully produce a network across teacher education that would be enabled to champion the cause of sciart in the development of educational methodology on this island.

The conference was specifically structured to illustrate how the two subjects could work together in education. The opening session allowed all participants to view a display of work from the NESTA-funded Leonardo Effect pilot in which 1000 children in primary and post-primary schools across the British Isles were educated through a pedagogy that synchronised the two subjects.
The three main speakers were chosen to typify a broad range of co-operation between artists and scientists. Professor Tom Cross spoke from the perspective of a professional scientist working in collaboration with a professional artist. Dr Lizzie

Burns linked her experiences of being both an artist and a scientist and examined how these could be used in combination to engage pupils in science education, and Professor Helen Storey presented her mutually beneficial collaborations with science from the standpoint of design and art.

Participants

Beggs, Jim	St Mary's University College
Berrios, Ida	Parkhall College, Antrim
Busch, Catherine	Rathmore Grammar School, Belfast
Paula, Campbell	St. Joseph's Primary School, Crumlin
Cassidy, Fiona	St Mary's University College
Church, Stewart	Bio-Imaging, Queen's University Belfast
Clare, Helen	Creative Writer
Connolly, Clare	St Mary's University College, Belfast
Cross, Tom	University College Cork
Curry, Audrey	Stranmillis University College, Belfast
Dowling, Siobhan	University College Cork
Elliot, Denise	Stranmillis University College, Belfast
Ellison, Barbara	Artist
Ennis, Harriet	Stranmillis University College, Belfast
Finn, Peter	St Mary's University College, Belfast
Flanagan, Mary	St Mary's University College, Belfast
Fleming, Karen	University of Ulster, Belfast
Francis, Pamela	Rathmore, Grammar School, Belfast
Hickey, Ivor	St Mary's University College, Belfast
Hoey, Mary	HMIe Glasgow
Magennis, Geraldine	St Mary's University College
McClintock, Emma	University of Ulster
Murphy, Cliona	St Patrick's College, Dublin
Murphy, Colette	Queen's University Belfast
O'Hanlon, Frances	Loreto College, Omagh
O'Hanlon, Graine	Loreto College, Omagh
Reynolds, Margaret	St Mary's University College, Belfast
Robson, Deirdre	St Mary's University College, Belfast
Storey, Helen	Helen Storey Foundation
Sweeney, John	St Mary's University College, Belfast
Torrens, Patricia	Parkhall College, Antrim
Tracey, Shelley	Queen's University Belfast
Travers, Agnes	St Joseph's Primary School, Crumlin
Veale,Orliath	St Patrick's College, Dublin
Whyte, Emer	St Peter's National School, Bray

Programme

Thursday 28th February

Buffet Lunch from 1pm and opportunity to view the Leonardo Effect Exhibition

2.00pm	Welcome and Introduction
2.30 - 3.30	Session I Professor Tom Cross
	Tea/Coffee
3.45 - 4.15	Group Workshop I
	Workshop Reporting
7.30pm	Conference Dinner

Friday 29th February

9.45 -10.45	Session II Dr Lizzie Burns
	Tea/Coffee
11.00 -11.45	Group Workshop II
	Workshop Reporting
12.15-1.00	Session III Professor Helen Storey in Conversation
1.00 pm	Lunch and Conference Review

Synopsis of Talks

Professor Tom: Cross Molecular Zoologist

The opening contribution to the conference was made by Professor Tom Cross who spoke of his zoological work on jellyfish which was carried out in conjunction with his artist sister Dorothy. This resulted in the production of their iconic sciart film *Medusae*. The film represents a complete merging of science with art and this set the environment for the conference.

Professor Cross emphasised the role of imagination in science as being vitally important, and explained how the Wellcome Trust funded *Medusae* project originated. The project developed from his interest in the biology of jellyfish, and his sister's artistic interest in jellyfish and the work of Maude Delap, a self taught naturalist who studied jellyfish and other marine creatures on Valentia Island in the late nineteenth and early twentieth century.

He described the anatomy and physiology of *Chironex fleckeri*. For its size, this jellyfish is the most venomous of all marine creatures, and is also the fastest swimming member of the jellyfish group. Its natural habitat is the tropical seas round the north of Australia. The anatomy was described in exact zoological detail and it was noted that the eyes were very well developed but connected only to a network of nerves rather than to a brain, that would be presumed to be needed to process their signals. Two aspects of *Chironex fleckeri* were dealt with in detail, the stinging process and mechanism of propulsion.

The stings of *Chironex fleckeri* can be fatal if a victim is not treated in a hospital within 30 minutes. Micrographs of the stinging cells were shown before and after firing and it was highlighted that the process of releasing the sting was the fastest cellular movement in the animal kingdom.

Propulsion works through a mechanism similar to the jet engine. Its analysis was the object of the scientific study. The methodologies used in this part of the study were briefly outlined. These included physical measurements that were analysed in a manner that can also be used to study of human swimming, and using fluorescent dye to observe the vortices produced in the wake of the swimming jellyfish.

After this introduction, the film was shown. Summarising the *Medusae* in words is a difficult if not impossible task. It would be easier to state what it is not. It is not simply a way of making hard-nosed scientific facts more palatable for the non-specialist. Nor is it just an art work made more informed by the inclusion of some scientific facts. The film achieves both these goals with ease but the synergism of the two disciplines produces something unique that benefitted the audience at many levels.

The story intertwines footage of current studies of the biomechanics of jellyfish with timelines of separate studies of marine creatures. Initially, examples of the exquisite glass replicas of creatures produced in Germany in the nineteenth centaury by Leopold and Rudolf Blaschka that link directly to the work of Haekel are shown in some detail. This leads onto the story of Maude Delap which is central to the film.

The film opens with white-on-black images of swimming jellyfish with the haunting accompaniment of Irish hymns being played on a glass harmonica, and takes the watcher on through a series of visually compelling sequences of Valentia Island and old still photographs of Maude Delap. The beauty of both the natural world and the artefacts made to represent it are contrasted with the spoken commentary that deals with factual aspects of jellyfish evolution and anatomy. Specific scientific terminology finding itself completely in place within clearly art based imagery.

The few personal facts we know about Maude Delap, the practicalities of her science and the timeline of discovery are simultaneously conveyed in both words and through images of her Edwardian house in its current dilapidated state. The use of the song "Come into the Garden Maude" in a tenor voice added to the historical perspective.

The juxtaposition of sensitive imagery and precise science about metabolism and movement and life cycle of *Chironex fleckeri* led into the start of the scientific investigation, and as often in such activities the first steps were dogged by failure caused by factors outwith the control of the investigators. Water temperature changes meant that *Chironex fleckeri* was absent during the first visit to North Queensland and a second species *Chiropsalmus* became the subject of study. The humdrum functional nature of the scientific laboratory is presented with very beautiful shots of swimming medusae, the one again complementing the other. Dialogue between artist and scientist on the behaviour of the creature and the nature of sleep posed interesting questions in both disciplines.

A seamless transportation in time and place shifted the focus to a fascinating study of the meticulous scientific recording and observational skills of Maude Delap in County Kerry. The appearance of original tables from her notebook lent authenticity to the reading of her written observations. It also indirectly points up the importance of observation in both art and science as is often seen in da Vinci's work where his anatomical drawings inform his art work and it is sometimes difficult to tell one from the other. These descriptions of Maude Delap's work merge to modern images of marine creatures underlining an ancient and modern theme and the historical progress of science.

A return to Australia allowed the capture of *Chironex fleckeri* and the study to recommence. This is followed by a section of the film that is much more scientific although the interaction between the two disciplines is maintained. The music may help with this or it may be the visual impact of the jellyfish in movement. The sophisticated scientific recording of biomechanical movement and even data collection and statistical analysis do not jar with the overall intent, but again emphasise the timeline theme as indicated earlier in linking back 100 years to the work of Maude Delap.

The fluorescin-aided images of the vortices produced by the swimming jellyfish provided an example of how knowledge can be determined mathematically and can be understood through visual literacy, and highlighted the commonality between reason and aesthetic appreciation. Again there are echoes of da Vinci's work on vortices.

The film fittingly ends with a discussion between artist and scientist about what can and cannot be examined by science and the beauty of the swimming medusae may relate more to what can be studied by art.

In summing up Tom raised two questions that he saw as fundamental to the relationship between art and science:

- Are there mutual benefits for both artists and scientists in working together?

He suggested that there may be more benefits for science in this partnership. The interaction provides science with an acceptable and optimal interface. This is not simply limited to improving the presentation of science but can lead into ways in which artists and scientists can work together to simplify the presentation of difficult concepts to the public. A major benefit to artists is that science may provide them with new sources of inspiration in nature

- How do the approaches of the artist and the scientist differ?

He pointed out that science has a reasonably well defined way of proceeding: the scientific method, and asked whether there is an equivalent method in art. Art appears to have no clear rules such as those associated with scientific research. His tentative conclusion was that it is more difficult to work in the area of art as it has fewer rules than are found in science.

Finally he noted that some areas that were previously the domain of artists such as scientific illustration were now being replaced by photography. This however, is due to technical advances and not to one subject causing a diminution of the other.

Dr Lizzie Burns: Science-based Artist

In her opening remarks Dr Burns described herself as a science-based artist; the meaning of this would become clearer as her talk progressed. In her opinion, art and science had some undoubted differences but also great areas of commonality. These included observation and the importance of keeping an open mind. It was important in both disciplines to see what was actually there, rather than what you assumed would be there from the basis of your previous knowledge and experience. She stressed that drawing was a really important element of observation. The sciences, in particular the life sciences, were a rich source of visual subjects that could be used by artists. The act of making art was similar to that of carrying out scientific research in that it asked questions. In science these are obvious but the artist continually seeks out originality by asking what has not been done before. Creativity is a major bridge between art and science. Individuals working in both disciplines use creativity and imagination to solve the problems that arise in their work.

There are great benefits for any individual who combines the two disciplines. Viewing a topic from differing standpoints greatly aids the thinking process. She had often found that creating a painting had helped her to understand difficult scientific concepts. Art and science are about appreciating the wonder of life and both help individuals to express their understanding of the world in which they live. This led on to the capacity for self-expression. This is well recognised in artists, but scientists are also passionate about their work in ways beyond the analytical. Creating art related to the topic allows for greater personalisation of the topic under study. Finally, from an educational standpoint, blending the two subjects engages learners and leaves them with a positive experience.

She went on to describe factors that had influenced her in relation to art and science. Whilst at school she had the fortunate opportunity to take a year out, during which she had travelled widely with her parents in India and North Africa. Throughout this time

she kept a diary and accompanied the daily entries with pictures. She showed several of these including a dead geko being carried off by ants which she had completed at the age of eleven. Others were of snails and cattle and she also showed a portrait of her father that she had painted at the age of 15. During her later teenage years she was profoundly influenced by the work of Salvador Dali. In particular, his 1963 painting "Galacidalacidesoxiribunucleicacid" which he had painted in response to the discovery of the structure of DNA by Watson and Crick. She emphasised the way in which the painting held secrets about selves that could be learnt through science. The chemical bond structures were drawn as people shooting at each other, showing the tension in the molecular structure.

She then posed the question "How have I crossed the boundaries between art and science?" She had felt torn between the two subjects but chose to take a degree in biology while continuing to paint as a hobby. Her research career focussed on cell biology, a particularly visual area of research, but she eventually went on to link the two subjects by developing a career as a science-based artist. This has involved the making of sciart and also using the combination to interpret science and stimulate learners.

She discussed a series of micrographs of human chromosomes made using either scanning electron microscopy or fluorescence microscopy. These structures had an aesthetic beauty, but they represented images of dead, fixed material and had no colour of their own. This had been added afterwards. A series of her early paintings were shown where imagination had been used to make the chromosomes come to life and have a movement and dynamic that could not be seen in the micrographs. She commented that these had been useful in explaining science to non-specialists and she had gone on to produce other images that dealt with complex scientific topics. Some of these were used as covers for well known scientific periodicals including the EMBO Journal and Trends in Biochemical Sciences. Her method was to read the relevant scientific papers in detail but then to set these aside before commencing to paint. A similar approach related to a commission from a nephrology journal. Here a painting of a kidney was produced directly from a dissection but emphasising that through its structure the kidney was an object of beauty.

These paintings were associated with the need for scientists to communicate and she emphasised how important this was both at the individual level and from the standpoint of funding bodies. Dr Burns explained how she had obtained support from the Medical Research Council for a two year project in which she visited 24 laboratories in order to represent the research of the individual groups in through the medium of art. She went on to describe some of this work from the Medical Research Discovered collection. Images included gonaotrophin releasing hormone. She explained that although this was an artwork in its own right, it was also in a way similar to a textbook figure of the molecule with each atom being represented by conventional colours. Interestingly, none of the scientists present were able to recognise the molecule. The shape and functionality of the hormone came across strongly from the image. Other images were linked to quotes from the researchers that reinforced the personal aspect of the investigation. This approach allowed both questions to be asked and discovery to be celebrated even where the images were dealing with disturbing subjects such as disease and death.

Moving on to work with children Dr Burns described how some of these images were capable of developing children's understanding of what goes on within their bodies in a way that biology lessons may not be capable of. Paintings of the AIDS virus were capable of representing its capacity to cause suffering in ways that electron micrographs do not. Images of the malaria parasite life cycle elicited positive responses from children in India who were themselves, suffering from malaria. Similarly paintings of arteries in the heart blocked with fat allowed children to discuss healthy lifestyles. Particularly interesting were images of the brain and disorders such as strokes. The associated researchers' quotes were very insightful "We are who we are because of what we learn through our lives" Images of neuronal synapses in which the colours represented the flame spectra of sodium and potassium conveyed much more about sodium potassium pumps than diagrams from science textbooks. The theme continued with the hippocampus in taxi drivers and drugs used in treating brain disorders. Here, paintings of the chemical structures of drugs lead on to the development of jewellery based on the chemical structures of molecules within our bodies.

She then turned to specific applications of the sciart approach in classroom situations. The first example dealt with was the microscopic world around us in relation to Key Stage II. Stressing the importance of images and their availability to the teacher from sources such as Google, Dr Burns stressed how viruses and bacteria, and their positive and negative effects on humans could be developed in a fun way through the use of art. Work by several children was shown. Particularly noteworthy was a three-eyed virus which used its eyes to find its target cell. Other microorganisms such as protozoa and particularly diatoms also make suitable subjects, the symmetry of diatoms being suited to ceramic work. Working in this way allows children to make use of and exhibit their skills of imagination and observation. She stressed that children were asked to produce artwork about the organisms but not to simply humanise them by adding faces etc. In addition, topics such as skeletons, particularly dinosaur skeletons could initiate learning situations driven by children's questions. Representations of muscles used in moving an arm could be developed into flick books that brought the subject to life for pupils.
Examples from Key Stage I classes involved sound and hearing, subjects that present some difficulty in schools. Examples included children's work based on painting favourite noises and building a giant ear.

The topics described above could be formally fitted in with areas of the curriculum such as PSHE and Healthy Eating. Dr Burns stated that she found work of this kind in schools was very rewarding as it was clear that it helped children to find science a more human subject. In addition, thinking skills and creativity were well developed. Teachers frequently reported that many children who did not usually shine in typical classes performed surprisingly well in this environment.

The approach was not limited to formal school education. Material from science festival activities where both adults and children were involved was displayed. This was based on a "Create a Cell Workshop" activity. Here the function of each part of the cell had to be understood and cells could be made in 3 D. The cells were varied in nature and some were produced by families working together. One quote which accompanied a cell was particularly striking "My cell has dull colours on the outside because it looks small and boring, but it is colourful inside because it is full of life."

Similar challenges given to year 11 pupils to create model organs of whole bodies proved very successful in stimulating creativity and getting across scientific knowledge.

A series of tips for teachers wishing to apply sciart in schools included:

- Decide on a topic
- Try to think about the science in unconventional ways
- Keep an open mind
- Make sure you have plenty of images to start from
- Look for interesting science stories in the media
- Allow pupils to come up with ideas and to be creative
- Collaborate with art teachers
- Continually encourage
- Challenge stereotypes
- Invite a local scientist to answer questions

The work can be carried out in groups or individually as the children wish, but aim for a final exhibition or someway to showcase their work. For many topics in science this approach will be much more beneficial than asking pupils to give talks where individuals can hide behind the jargon of the subject allowing the shortcomings of their knowledge to be masked.

The presentation concluded with a brief review of Dr Burns' current project. This is entitled "The Brain" and involves learners from primary, secondary and special needs backgrounds. Children are informed about the brain and how it functions. Questions such as, "What would happen if this part was not working?" are posed. The children write down their ideas and opinions alongside the paintings and sculptures they produce. The audience were shown a series of pictures and quotes. These indicated that not only had the children greatly enjoyed their activities but that they were expanding their knowledge of the working of the brain.

Professor Helen Storey: Artist and Scientist

Prof Helen Storey received a rapturous welcome by the gathered audience, in acknowledgement of her international reputation in the fields of fashion, sciart and education. In the welcome introduction Deirdre Robson said: "Despite leaving school with one 'O' level Helen is astonishing in her achievements which include: an international reputation as a designer and artist; four professorships; collaborations with some of the most accomplished scientists working today and her work with young people. Reading from Helen's autobiography she added "…there is little in the educational process to give an artistic child a sense of their place in the world, or indeed the prospect of a job…..as a teenager there were few opportunities to feel good at much." yet she concluded….."Rarely do young, creative people, once given the opportunity to use their gifts turn away from the challenge." Prof Storey gave a fascinating account of her journey from fashion design in the 1980s through to sciart today, by discussing some of her most pivotal pieces of work and the collaborations she has been involved in, such as Primitive Streak, Mental, Wonderland and Ideas that can Change the World. On reflection even during her period as a very successful

fashion designer there were indications of a curiosity about science and creative expression far beyond the commercial.
“Over the years of building the Helen Storey fashion brand there were moments that often bore no relationship to sales or profit
margins, but were little beacons of light tome as a creative person.” The first sciart collaboration was initiated by her sister Kate, a developmental biologist who As Prof Storey explains “showed me her world.”
Primitive Streak was one of the first sciart partnerships funded by the Wellcome Trust. It consisted of a collection chronicling the first 1,000 hours of human life in textiles and fashion.
Cell Division 1.5 – 4 Days was a typical example of the work. “Overall 27 pieces take the viewer on a journey from fertilisation to the recognisable human form.” Not only did Primitive Streak tour extensively (7 Countries) but it also had an educational dimension involving schools, encouraging young people to work across disciplines. “In collaboration with Creative Partnerships (Arts Council England) it has been used as a blueprint for a ‘Creative Lab,’ a concept which is now being replicated across the UK.” Importantly Primitive Streak communicated science in a new way. At this point the Helen Storey Foundation was founded, a not-for-profit organisation promoting creativity and innovation that allowed Helen and her business partner to continue working in this way by seeking external support.

The next theme presented was: Mental. A 5 part work that explores key emotions present during the creative process. It was autobiographical in nature and resulted in an interactive exhibition where participants could do the same, answering questions, creating layers of answers, unique to them. Helen said: “I often think of creativity as a place of refuge, and that children who occupy the art room instead of the playground at lunch time experience that.” The death dresses displayed as installations in Mental explored issues such as Loss of Fertility and Fear of Death.

Her most recent collaborative project, Wonderland with the distinguished polymer scientist and nanotechnologist, Professor Tony Ryan of Sheffield University has a strong ethical element, and was inspired by quantum mechanics “Perhaps I have been forever interested in how things become or disappear, and far less in what already exists. It was whilst “trying” to read a book about Quantum Mechanics that the idea for this project suggested itself.”

“Coincidentally at the time I had come to a creative dead end on a packaging design project I was working on. As sometimes happens, seemingly from nowhere, the idea for a “disappearing bottle” suggested itself. A bottle that would have an intelligent relationship with its contents, which would know it was no longer needed when the contents were gone and would shrink or disappear all together. A kind of “drink me – shrink me” conversation.”

This suggested a somewhat “fantastical conversation between bottle and contents.” However, Prof Ryan in Sheffield thought it was not so fantastical and thus embarked a process whereby it became easier to secure funding for developing the idea as art rather than science; dissolving dresses rather than water bottles. She described the dresses as a form of Trojan horse. Wonderland began touring the UK in January 2008.

Helen explained how she is passionate about how this kind of creative thinking "thinking like a child" should be encouraged in schools, so the germ of "Ideas that can Change the World" was born. This educational dimension to her work has enabled children to enter into discourse with adults to discuss ideas, and as she explained has already led to least one 15 year old already patenting an invention.
She summed up successful art science collaborations as "a meeting of minds," a meeting that is clearly unlocking the potential in young people as well as art and science.

www.helenstoreyfoundation.org
http://www.showstudio.com/project/wonderland
www.sciencetolife.org

Workshops
Two periods were set aside for small breakout groups of about five participants to discuss aspects related to the theme the conference. Conclusions and ideas on these topics were then reported to the complete conference. The topics raised are listed below with a synopsis of contributions.

Topic	Points Raised
Creativity: the essential core of education?	In the beginning we are all creative. But there are constraints at secondary and third level education such as assessment. To foster creativity in education we need: creative teachers and creative learning opportunities; time to play; collaboration between groups to allow for creative thinking, questioning and acknowledgement that we don't know all the answers
Topic	**Points Raised**
How can educators promote creativity?	Outdoor activities e.g. gardening free-play, adventure, explore/investigate, time to be creative, interactive-hands-on learning, open ended activities, children make choices learning from other countries-different approaches e.g. Reggio Emelia and Steiner schools Importance of informing ourselves of what is working in other places/situations-can it work here-does it depend on different factors? Challenge for teachers to promote creativity all the time. Does promotion of creativity require/ depend on resources or is it about thinking creatively and using what is free (re-cycle)/ readily available-natural environment? Value of bringing in outside experts/visitors/professionals-allowing children

Topic	Points Raised
	to learn through working with others.-regularly as opposed to one –off events. More creativity workshops-teachers and teacher educators
Identifying Progression Of Creativity In Learners	Inspiration; risk taking; coping with uncertainty; confidence; using more of your brain; play; practise thinking; willingness to express ideas; making connections; wider spectrum of interests; self assessment.
Comparing Scientific method and Artistic methods	Similar investigative processes carried out in science and art Both approaches involve reflection and evaluation Both areas are experimental and often involve pushing the boundaries-breaking new ground-taking risks-breaking rules-in the pursuit of new knowledge/ understanding/ to create something unique. Ethical issues- have to be considered. Some discoveries are by accident rather than by design-valuing the unexpected Sci-art-not new/novel-Leonardo Science education- taught as a social science? People's perceptions are challenged as to what art encompasses-What is Art? Move away from teacher being regarded as bank of knowledge- teacher as facilitator Science and art compliment one another-linked/connected/not separate/distinct spheres.
Are there constrains on imagination in our educational processes?	Without imagination you cannot ask the questions you need to. Can you teach science without imagination? Yes, but it will be badly done. The exam system constrains both art and science. Art isn't valued or understood for the type of thinking it promotes.

Topic	Points Raised
Role of creativity in science versus creativity in science education	Curiosity: Does curiosity lead to imagination? Do we have to promote curiosity? Does curiosity decline with age? Imagination: It's harder work as an adult. Imagination requires thinking outside the box and we don's allow this to happen in school. Learning outcomes are set. We want to get to a set place or point. We need to give children more opportunity for open-ended thinking. Creativity: Is it the role of our education system? How many young people see art and science as providing careers? Is there a big difference between science research and science education? There is certainly more of a division between research and education than there used to be. The biggest hindrance to creativity is the curriculum and the examinations system. Some exam boards were described as being rigid. You can never ask the questions you need to without imagination, and you won't stimulate interest without imagination. Applies from primary level through to HEI

Wiki

The importance of maintaining future links between the various groups of art and science educators who attended the conference was realised. To that end an on-line Wiki has been established. This is open to, not only to those who attended the conference, but to anyone who is interested in the topic of the conference and can be accessed at http://sciarteducationireland.wikispaces.com/ .

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