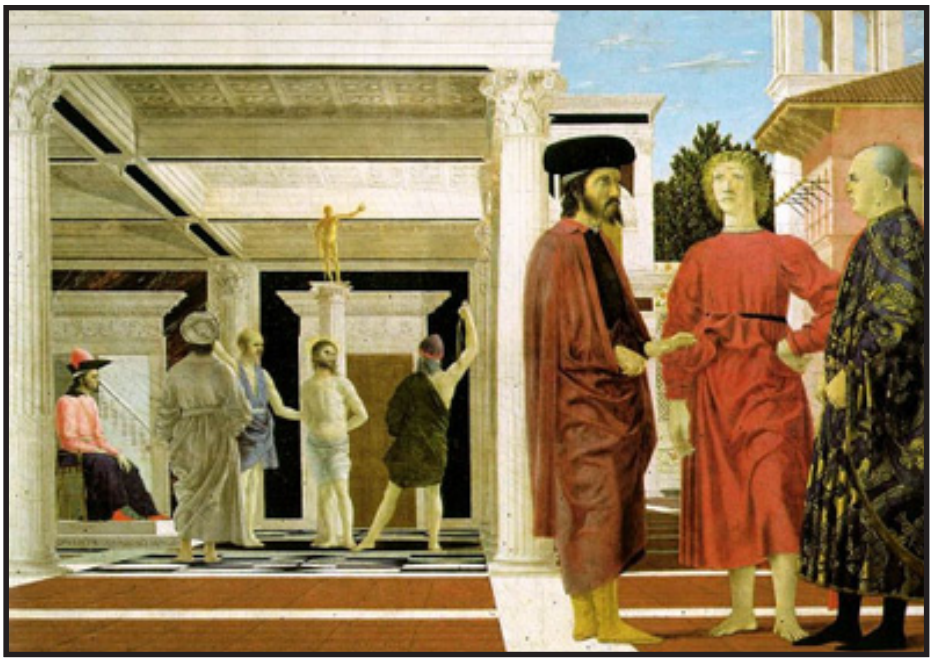
Irish Universities Association
Cumann Ollscoileanna Éireann

Address by Ned Costello, Irish Universities Association on the subject of Creativity and Higher Education[1]

"Convenerunt in Unum"

Good Morning ladies and gentlemen. It gives me great pleasure to have the opportunity to speak to you at this important symposium on Creativity and Higher Education, supported by the Strategic Innovation fund. I share the conference organiser's view that today should be an enjoyable learning experience and so it is with some trepidation that I would like to begin with a little flagellation! My interest in this topic goes back a number of years when, on holiday in Italy, I had the opportunity to visit the art museum in the Ducal palace of that renowned Renissance patron Federico DaMontrefelto at Urbino. The most critically acclaimed work in the collection is Piero Della Franscesca's "The Flagellation of Christ". It is an intriguing, not to say disturbing, creation which has troubled art scholars for centuries. I was so taken by the painting that I have a print of it hanging in my office. I was surprised just a few weeks ago when, as I was thinking about this conference, my colleague Dr Conor O'Carroll dropped in to me with a copy of a recent article in Nature2 magazine on the very topic of the painting.



Now Nature, for all its pre-eminence in research circles, is not known as a journal of fine art criticism, so it is fascinating how its coverage of Piero's Flagellation came about. It arises from a new and radical analysis of the painting made by David King Frankfurt. King's interpretation derives in the first instance, not from the painting itself, but rather from an inscription on an astrolabe given in 1462 to Cardinal Bessarion by a young astronomer protégé of his, Regiomontanus. The inscription contains oddly grouped letters with a level of apparent imprecision in their grouping that would have been entirely atypical of a skilled instrument maker but which make sense when viewed cryptographically. Given that King's theory is about to be the subject of a three hundred page book, it is impossible to do it justice in this short talk. However, in essence, King's key insight is that the figures in the painting have multiple identities – identities which can be revealed with reference to the code on the astrolabe. Part of the underpinning for the theory is the original title of the painting – *"convenerunt in unum"* – they came together in one.

1 This paper originated as an illustrated oral presentation given to the NUIM Symposium on Creativity, Dublin 27 May 2007
2 Marchant, Jo, Science and Art - A Leap of Faith, Nature Magazine, 29 March 2007

While King's new interpretation is hotly disputed by some established art historians, it serves to show how the creative impetus can take many forms and how by breaking out of disciplinary silos, new knowledge and new understandings can be arrived at. It is especially appropriate that to see this through the prism of a Renaissance painting since the *resorgimento* represented perhaps the greatest single outpouring and intermingling of creativity across what we now see as distinct fields of engineering, physical sciences and the arts – convenerunt in unum, indeed.

Moving from the sublime to the slightly ridiculous, part of the imperative to look at creativity and how it can be promoted derives from vulnerabilities inherent in the Celtic Tiger. Ireland's growth in the past decade has been so dramatic and so sudden that we run the risk of ending up like the apocryphal Ladies of Ryga who went for a ride on a tiger, and; returned from the ride with the ladies inside and a smile on the face of the tiger! More seriously, the National Competitiveness Council[3] has identified some of the vulnerabilities I have just referred to, as follows:

◊ A market share of world trade which peaked in 2002 and which has been in steady decline since;

◊ A current account balance of payments with the rest of the world which shifted from surplus as recently as 1999 to a deficit of €4.2 billion in 2005 and which is forecast to continue to deteriorate – reflecting the growth of debt financed personal consumption;

◊ The loss of 32,000 jobs in manufacturing in the five years to 2006.

These data, coupled with the downturn in the housing market demonstrate that there are very real limitations to the current growth paradigm. Quite simply, it is hard to see how Ireland can prosper in the long term based on a model which is dependent on, variously, a massive productivity injection from manufacturing FDI, or high levels of government investment playing infrastructural catch up, or from personal consumption which, as the NCC says, is increasingly debt financed.

The challenges facing us are made more apparent by creativity thought leader Richard Florida's contention in his paper, The World is Spiky[4], where he contends that globalization is not a rising tide that lifts all boats when it comes to innovation and economic activity. Taking data for light emissions (as a proxy for development and economic activity), or more directly relevant patenting and expressing these as topographical maps, Florida shows that growth and innovation is becoming more, rather than less, concentrated. For example, nearly 90,000 of the 170,000 US patents granted in 2002 went to US Citizens; 35,000 to Japanese; 11,000 to Germans. 11,000 went to the next ten most innovative Countries.

This has been recognised by Government in its publication of the National Strategy for Science, Technology and Innovation[5] which states: "Progress has been significant, but it is essential that we continue the drive to build a truly knowledge based society. Such a society will offer new opportunities for employment and social advancement. It will harness our long tradition of creativity and our talent for communication. It will bring together researchers and innovators from all disciplines, including the physical and social sciences, arts and humanities, to meet the challenges and opportunities presented by an increasingly diverse and rapidly changing world."

2. Definining Creativity and Innovation

I would now like to delve into the terminology a little and to look, particularly at the relationship between innovation and creativity. Some of the definitions appearing in the literature[6] are:

3 National Competitiveness Council, Annual Competitiveness Report, 2006
4 Florida, Richard, The World is Spiky, The Atlantic Monthly, 29 March, 2005
5 Government of Ireland, Strategy for Science, Technology and Innovation - Taoiseach's Foreword, July 2006
6 Hordon, Deborah A and Irish Management Institute, Creativity and Innovation in Business, April 2007

◊ Creativity – is the ability to use the imagination to develop new and original ideas or things;

◊ Innovation – is the manifestation of something new and/or different than has existed before in its particular usage and/or configuration;

◊ Creativity is the human engine of innovation, breaking down prior assumptions and making new connections for new ideas…

◊ Creativity is the generation of novel and appropriate ideas. Innovation implements those ideas and thereby changes the order of the world and turning them into organisational and marketplace reality."

◊ Innovation is the result of creative activity, however all creativity does not necessarily lead to innovation.

◊ Creativity is frequently associated with notions such as talent, spontaneity and coincidence, i.e. cannot be influenced or determined but ultimately are left to chance. We find this expressed, for example in the popular idea of a "creative leap" or "flash of genius" as the origin for major scientific, artistic breakthroughs (e.g. Newton observing a falling apple).

Taking account of these definitions, I would now like to look at some of the core characteristics of creativity. These include:

◊ Originality: creativity is not about reproduction, but entails new developments (which albeit may build on established knowledge) and requires a certain disrespect for established ideas and concepts as well as personal courage;

◊ Appropriateness: not every novelty is creative, but creativity manifests itself in new approaches that are appropriate to the problem at hand;

◊ Future orientation: that is, not looking backwards, but being concerned with what may happen in the future and dealing with the resulting insecurity and uncertainty;

◊ Problem-solving ability: the capability to identify new solutions to problems; this requires "thinking outside the box", looking at things from a new angle, venturing off the beaten path and risking failure.

3. Organisational Culture - the Green and the Blue

Organisational Culture is a critical factor to consider in promoting creativity. At the recent Irish Management Institute National Management Conference, Professor Andre Laurent gave a very interesting talk entitled Managing at the Crossroads of Culture[7]. In his paper Laurent posits two archetypal cultures which he titles "blue" and "green". He outlines what he sees as the characteristics of those two archetypes. For example, for the blue and green respectively:

Blue	Green
Clarity	Flexibility
Predictability	Creativity
Task Focus	People Driven
Structured processes	Intuitive
Objective driven	Long term horizon
Short term results	People driven

Laurent then goes on to describe what he calls the pathologies of those cultures. By this he means the dangers inherent in an overly rigid adherence to either of these cultural archetypes. Again, for the blue and green, respectively.

7 Laurent, Andre, Reinventing Management at the Crossroads of Culture, IMI National Management Conference, March 2007

Blue	Green
Machine like	**Confusion**
Obsession with numbers	Chaos
Overly controlled	Reinventing the wheel
Means become the end	Fiefdoms and kingdoms
Uninspiring for people	Casinos of power
Doing things right v doing right things	Lack of focus

It is quite clear that from the description of these pathologies, that any culture taken too far becomes destructive to the organization and those within it. This is important in the context of creating an environment in which creativity can flourish, to the degree that a purely "green" culture is not necessarily conducive to creativity. Moreover, it is even less suited to melding creativity and innovation. However, it might be asserted that an excessively blue culture is even more damaging since it will, to paraphrase William Blake, murder the infant (of creativity) in its cradle.

Within the public sector reform process – the Strategic Management Initiative – broadly defined, there has been a considerable emphasis on process: three yearly statements of strategy, business planning, structured performance management systems; new budgetary, accounting and reporting/compliance systems. All of these may be desirable in themselves, but care needs to be taken to ensure that an excessive focus on compliance does not drive out the creative impulse.

4. The Importance of Diversity

Another culturally related aspect of creativity that features strongly in the literature is the importance of promoting diversity. This was reflected in a Business Week article: How Six Sigma Destroyed GM which quoted the current 3M CEO George Buckley[8]: "You cannot create in that atmosphere of confinement or sameness," Perhaps one of the mistakes that we made as a company—it's one of the dangers of Six Sigma—is that when you value sameness more than you value creativity, I think you potentially undermine the heart and soul of a company like 3M."

In the university context, three areas where the creation of diversity strike me as being important are:

- In the student body
- In the research and teaching staff
- In relations with external partners

In relation to the first of these, continuing efforts to develop access are especially important at undergraduate level. In the postgraduate and research area, the expansion of University research under the national Strategy for Science, Technology and Innovation offers considerable opportunity to increase diversity by bringing new blood into the researcher population, with a significant cohort of researchers hired from overseas. Diversity is being supported also by the Strategic Innovation Fund, where IUA itself has a number of cross sectoral projects focusing on access and internationalisation.

In terms of relations with external partners, I would highlight the entire area of commercialisation and interface with the enterprise sector as being worthy of particular attention. Universities also have a significant role to play contributing to public policy by harnessing their research capability in the Humanities and Social Sciences. In the enterprise and public policy context, however,

8 Hindo Brian, At 3M The Struggle Between Efficiency and Creativity, http://www.businessweek.com/magazine/content/07_24/b4038406.htm

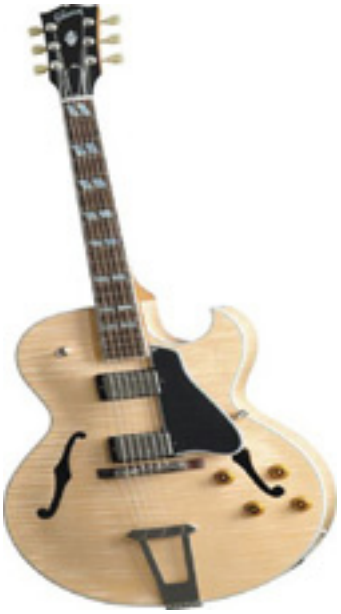
the challenge is the same: how to contribute to the solution of real world problems while still maintaining high standards of academic excellence. Resolving this tension is an area which may be worthy of further research in itself. Notwithstanding these tensions, however, the creation of a connectedness between the university and the wider world is vital to avoid becoming excessively self referential and to maintaining a forward and outward looking perspective.

5. Future Orientation

There is great value in solving today's problems, but it is equally, or perhaps even more important, that Universities have the capacity to look beyond the horizon. The failure of the direct drive turntable in the picture is not that it was analogue – for it was actually marketed as being the state of the art in its day – but rather that its servo control mechanism was constantly trying to correct previously measured fluctuations, and thus ensured that it was never at the correct speed!

Like the physical universe, the universe of knowledge is constantly expanding. With the advent of the internet and near instantaneous global communications that rate of expansion is growing exponentially. It presents a tremendously exciting and a wonderful opportunity for universities, but it does create a challenge in terms of our capacity to renew and reshape institutions to allow them to maintain a position at the forefront of knowledge. This poses a particular challenge for the Arts and Humanities – but it is one which must be faced.

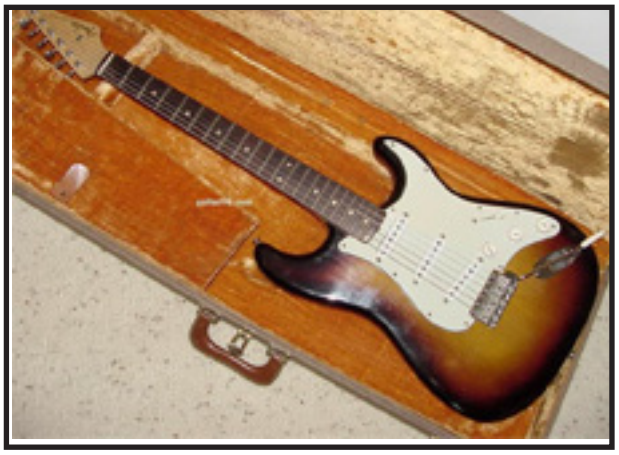
6. Disruptive Innovation



The evolution of the electric guitar provides an interesting case study on the theme of Disruptive Innovation. Pictured here is the Gibson ES 175, the quintessential Jazz Guitar. Interestingly the guitar, which debuted in 1949 was an economy version of Gibon's L5, with the "175" designation referring to its price in dollars when introduced.

The "ES" in the title is an acronym for "Electric Spanish", and this very much reflects Gibson's design paradigm. Even by 1949, the company had a venerable history, having been established in Kalamazoo, Michigan by Orville Gibson in 1894. As we can see, the Electric Spanish moniker is very apt, as the guitar is precisely that – an electrified version of the traditional waisted Spanish guitar shape, albeit with the addition of a "Florentine" cutaway to ease access to the upper frets.

Now contrast the Fender Stratocaster, introduced just five years later in 1954. Here we have a true "electric" guitar with virtually no references to its Spanish antecedents. Some salient features: the body is solid rather than hollow so as to eliminate acoustic feedback when amplified; the neck is bolted rather than glued on; the asymmetrical shape and double cutaways are designed to allow perfect balance when played standing; the bridge contains the first truly functional vibrato mechanism which allows the pitch of the strings to be dynamically varied by the player; and there are many more. One particularly significant factor which must be mentioned, however, is the "modular" construction of the guitar which was designed for ease of manufacture and serviceability. For example, all the electronics are contained on the screw on pickguard. These innovations allowed the guitar to be manufactured in an industrial environment rather than the traditional artisan mileu found at Gibson.



Leo Fender's capacity to approach the design of electric guitar from an entirely different perspective to those who came from a background in traditional lutherie entirely revolutionised the instrument and the industry. Fender's own background was in Accountancy and Electronics. Thus it could be said that it was Fender's multidisciplinary background, and his willingness to venture into a field to which he brought no intellectual baggage, that underpins his creative and innovative contribution. In the case of staid old Gibson, Fender's innovation pushed the company to new heights of creativity, with the introduction of the radical Explorer and Flying V models in 1958 ,and the adoption of the innovations of Les Paul in his eponymous guitar.

In the process, he also contributed to the revolutionisation of popular music as epitomised by Jimi Hendrix's iconoclastic rendition of the Star Spangled Banner at the Woodstock Festival on 18 August 1969[9], demonstrating clearly the power of disruptive innovation to transform not just industries but cultures too.

7. The Discipline of Innovation

Moving back to the university context, I would like to bring this address to a close by talking about the relationship between creativity and discipline. While creativity and innovation can be disruptive, this does not necessarily imply a lack of rigour. Pictured across is the father of Modernism, Mies Van Der Rohe and one of his most revered buildings, the Farnsworth House near Plano Illinois. Mies himself looks every inch the conservative merchant banker and yet was, arguably, as iconoclastic in his demolition of traditional architectural precepts as Hendrix was musically. However, Mies iconoclasm was borne of an almost ruthless adherence to rigour in the design process, where no detail was too small to be fully worked through. Franz Schult's in his Critical Biography[10] recounts how Mies would observe his students work and utter just one word: "again". While one could not recommend, or even condone, this as a pedagogical technique!, it serves to underscore the fact that in an educational context, the development of creativity is not dependent on the random ignition of the "spark of genius", but rather on equipping students with the tools, techniques and conceptual strategies to harness the inner creative flame. It is what Curtis Carlson, CEO of Stanford Research Institute calls "the discipline of innovation".

8. Conclusions

In summing up this fairly broad ranging and eclectic overview of creativity in the university context, I would like to briefly mention some key challenges and issues which I see facing the universities in supporting the creative aspect of the knowledge society to which we aspire. These include:

- ◊ Fully supporting diversity in all the aspects I have mentioned;

9 www.youtube.com/watch?v=jhLp2IcZxwM
10 Schultz, Franz, Mies Van Der Rohe A Critical Biography University of Chicago Press, 1985

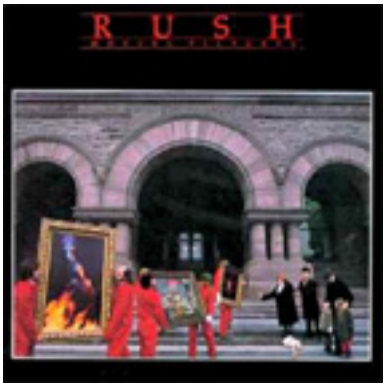
◊ Ensuring that the overall culture is conducive to creativity and that the aspiration to be "world class" is not allowed to foster a culture that is inimical to risk taking and the associated inevitability of occasional failure;

◊ Thinking in a more structured way about multidisciplinarity and in particular, the relationship between the humanities and the sciences, and how convergence in many areas of technology and business can be reflected in University teaching and research;

◊ Harnessing creativity for innovation and equipping researchers with the tools necessary to be creative *and* innovative;

◊ Finally, resourcing creativity education and thinking about how educating for creativity and innovation can be integrated into potentially many different facets of University education.

As I began this address with reference to a picture, I thought it would be appropriate to close it with another reference in a similar vein: this is to the recording 1981 Moving Pictures by Rush. The record is a contemplation of the themes of creativity and the relationship between individual freedom and authority. The following lines from "Limelight[11]" are I think an apposite reflection of some of the issues and ideas I have presented here today:



Living in the limelight
The universal dream
For those who wish to seem
Those who wish to be must put aside the alienation
Get on with the fascination
The real relation
The underlying theme.

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