

James Dyson at the Design and Technology with Science Show

RESEARCH

James Dyson

When the term the 3 R's was coined, as it happens in Parliament in 1840, Hansard recorded that it stood for Reading, *Wroughting* and arithmetic. *Wroughting* as in 'wrought iron', or – 'I have wrought a wonderful design.' So it is rather ironic that now the academic establishment have seen fit to try and squeeze 'wroughting' or 'design' out of the curriculum.

It was an inspired move to bring design and technology into the curriculum, and make it compulsory up to the age of 16. Design and technology could be – should be – at the centre of the curriculum.

It is entirely compatible with high levels of numeracy and literacy – the design process draws on areas such as maths, science, technology, communication and art. Designing and making something is truly creative, and developing creative abilities is a basic function of education.

There is much talk these days about creativity. But in reality what are we doing about it? Do we care enough to put money towards encouraging creativity? For example, this month the Design Museum celebrates its 10th anniversary. Terence Conran founded it and has been its principal benefactor. It has been a private initiative with no government help.

The Design Museum is a great stimulus for creativity and the most important modern artefact museum in the world. As much about the future as it is about the past. Last year, *for the first time* the Design Museum received a grant of £200,000 from Chris Smith. Next year it will receive nothing because Leeds Armouries museum, which received £44 million from the government to kick it off, has overspent and needs bailing out. So weapons are more important culturally than design and our future creativity?

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The Tate Bankside, which has received £56.2 million from National Lottery funding, and has also overspent and needs bailing out.

The National Centre for Popular Music in Sheffield, which received £11 million in National Lottery funding to get started, also needs bailing out because it has too few visitors.

The fact is that other museums and the performing arts receive £2 billion a year from Chris Smith.

Meanwhile 475,000 children take design and technology at GCSE every year. It is the 4th most studied subject at GCSE – only exceeded by Maths, English and Science.

Design has the lowest truancy level of any subject and research at Exeter University shows that design and technology is by far the favourite subject at school, for which the credit should go to the enthusiasm and dedication of the teachers.

Design is partially replacing art as a form of artistic expression. Many modern sculptors and artists are even hijacking mass produced products to show them as art. For children leaving school now, it would appear that design is more important than art or the performing arts.

So in spite of all the talk about creativity, popular opinion fails to recognise the cultural importance of design, technology and manufacturing. Why don't people understand that making things matters?

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New Labour may or may not revise their spending plans, but this year none of that £2 billion will go towards design, in spite of the overwhelming trend I have demonstrated in schools, and in spite of the thousands of students studying design in higher education.

Design is a misunderstood word. When you think of a designer you think of someone who makes things look good armed with felt tip pens. Yet when your vacuum cleaner doesn't work you kick it and say – who designed this?

So when I talk about design I think of it in an holistic sense – from developing the technology, to engineering the product, designing it and testing the performance. So a well-designed product is one that performs better and is pleasing to use.

Now I want to move on to manufacturing, because you cannot divorce design from manufacturing. The two go completely together.

A designer on his own without the sales stimulus, driver of the technology and the realistic constraints of having to make his design, is impotent. And a manufacturer without a creative input is soulless and a mere processor. Put the two together and you have the second most powerful creative act. (The first being making people.)

I think it has been a big mistake in the past to try and separate out design culturally, from industries, or to have design consultancies

confined to London and away from industry. The result of that approach is a product that just looks designed and doesn't have its purpose emanating from its core. Those products have merely empty styling and quickly wane. So design is an holistic process, starting with technology and going through the whole manufacturing process. At Dyson we create new technology and designs, and build products. This is not a very popular way of doing things.

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For some reason the British look down their noses at those people who make things. So, in Britain over the past 30 years manufacturing has declined from 35% to 20% of the economy.

I think the British faced a choice in the mid-nineteenth century. We were at the forefront of the industrial revolution – with Brunel and Paxton. We chose instead to send all our educated class to run India and the Empire. Much easier to be a pirate than a builder of industry. So it is that America, Germany and Japan have dominated 20th century manufacturing. Now, of course, we are looking for another easy option – the software revolution and the service economy. But design and technology is vitally important to the future of any country – both culturally and economically. We need to inspire and empower our designers and excite passion in manufacturers so that they develop products they love with sensitivity to the market.

This means empowering creative people. At Dyson we don't believe in using out of house consultancies and agencies – for anything. Our creative teams in engineering, research, graphics and marketing are the core of the company. They are searching for a new and better way of doing things – not a second hand way of doing things.

They are the heart of the company. We wouldn't dream of receiving external transplants consultants.

Dyson was founded by myself and six design engineers fresh from the RCA. Our aim was not to make money but to make a product of our own creation. In the process we now employ 350 engineers and 1600 in total. In this way, creativity and good design is a key contributor to the overall success and significance of a company or even an entire

country. The success of British companies like Rolls Royce, JCB and those with stands here illustrates the importance of keeping design, technology and innovation at the heart of a business.

In Rolls' case they went bankrupt developing new technology, but now that same technology has made them the world's number one engine maker.

Designing and making things is an intelligent activity. Why does society suggest that academic people shouldn't also work with their hands?

I think the most potent part of the design and technology curriculum is the requirement that you get rapidly into making bread board models of your device to develop it and prove it out. For me this is the most important part of any engineering and development process – the bit that teaches the most. You will never create anything by sitting staring at a drawing board or a screen. It is when you start to see with your hands how your design behaves mechanically – only then will you understand how to improve it or make it work.

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In my experience this applies whether you're developing catches for devices, aerodynamic particle analysis or electronics. Progress is only made when you've built a bread board.

I'm utterly astounded to see that higher education design courses have largely dropped the workshop element. But of course workshops are expensive and take up room – and, it would seem, as a result of Kenneth Baker's Education Reform Act, that higher education in design is increasingly about teachers, high numbers of students and low costs.

It is quite wrong to assume that manufacturing is boring and repetitive. On the contrary, it is enormously challenging and difficult to make products that must be constantly improved to a consistent and high quality. At Dyson we make 7000 machines a day, we have 21 different products, each have about 150 components, which go to 15 different language countries, with different graphics, different plugs and different

voltages. We only hold a six hour component stock. One part missing and the line stops. If anyone thinks that that operation is intellectually easy, let them please come and do it for me.

Unfortunately we engineers have a lot to learn about how to promote engineering as a creative and exciting career. It has always worried me, as a manufacturer of household things, that we have so few women engineers. 20 out of 350. I am working with Baroness Platt of Whittle from WISE (Women In Science and Engineering) to try and improve this situation. Interestingly, almost all our 20 women have fathers in engineering and who encouraged them to take cars to bits. Five years ago in Wales, design and technology was dropped from the compulsory curriculum. Now only 22% of girls take the subject. Where will this lead us?

Nowadays, 55% of all undergraduates want to choose media as a career; they think it is the creative and cerebral industry. But in reality, in many cases, it is a service built on the back of those industries that create and make real things. Unlike advertising creatives, designers and engineers create real things.

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And from my experience, the great thing is that lots of people will repeatedly buy, and are willing to pay extra for, products with intelligent design, better technology and performance.

It is demeaning (and arrogant) to suggest that people, the consumers, want the cheapest product or to suggest that they don't understand the value of design and technology. What is the economic value to Britain of design and technology?

It means greater profits, which can then be reinvested in research and development greater exports – that enhance our balance of payments and a well-motivated workforce, proud of its product and how well it works, and who are thus the guardians of its quality.

I have seen these ideas borne out in my own experiences developing products.

The design and technology behind vacuum cleaners had remained unchanged in the 90 years since Hoover and Electrolux first began to make domestic cleaners. They thought they had no need to change – they had the market under control and divided up between them.

Then, in 1993, I founded a small start up business, in my coach house. We began to

manufacture vacuum cleaners that utilised effective and radically different technology. People were prepared to pay more for this new technology. Six years later we now hold 35% of the market by volume and, more significantly, 55% by value.

This turns the marketing text books upside down. Normally it is low cost products that sell at high volume – perceived wisdom says that to get big market share you must have a low price, “pile them high and sell them cheap.”

Even the CBI states that gains in profit, market share, and new markets, are all more likely to occur as a result of recent design innovations. As opposed to high advertising expenditure, for example. 60% of the Dyson sales today are on products new for this year. We didn't have them last year at all. Not only are we now designing products that will come out within the next year, but we are developing those that will replace them in 2001, 2002, 2003 and 2004. We cannot afford not to strive continuously for innovation.

If you want to make a product with a big difference you have to work differently. Everyone who starts work at Dyson makes a vacuum cleaner, be they in production, engineering or ex cabinet ministers. Then they can take it home and use it. In this way everyone understands the product and the reason why the company exists. Dyson would like all its employees to do things differently, almost just for the sake of it. It constantly forces you to think through every move. Even looking different helps. We don't wear suits and ties to do our work.

I'd rather the quality of my employees shone through in what they do, not what they wear. I want Dyson staff to be free thinkers who take the company forward and have revolutionary ideas. I don't want people who think they are businesspeople when they wear a suit. In fact, businesspeople as a group look distinctly unattractive. I don't think that people who seek to be creative should spend all their time stuck behind a computer screen.

Real communication is done face to face, or at least on the phone. We recently banned all e-mails for a week. As a consequence people spent less time typing endless messages to, and reading those from, people sometimes only 3 feet away.

Sitting behind a computer screen all day doesn't encourage creativity or productivity. We are taking steps now so that only a small percentage of employees have a computer. Then they don't spend days huddled behind a screen, but are genuinely engaging with the

real work of thinking differently and improving what we do.

For the same reason we have banned memos – memos just create more memos, and nobody ever reads them properly. Dialogue, argument and reaction are the founding principles for progress – if you talk to someone they will listen.

I'd prefer it if people did less, if it meant that the things they did, they did intelligently. I am not a luddite, but I am not seduced by the attractions of information for information's sake.

The current vogue is to make sure everyone is informed – the idea of a knowledge economy is merely a modern buzzword. We always have had a Knowledge economy. If you are researching then knowledge is obviously what you are seeking. The Internet just makes it easier to source. In any case, I think that excessive knowledge is stifling. I am more interested in what people do and what they create. There is a point where information overload stifles imagination and inhibits action. Better to act on less information.

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In any case, information can only tell you what has happened; it cannot tell you what to do. Maybe innocence and clarity will yield more positive results.

In order to come up with a breakthrough in any field, it is no use doing things the right way. We must think the unthinkable and do it. This may seem obtuse but it forces us to innovate and improve.

To compete in the 21st Century, where intellectual property will have overriding importance, we must be more creative than Japan, the USA, China and Korea: making better performing products that sell at a premium. We can never make as cheaply as they do.

This means investing much more in researching and developing design and technology than our competitors. But the reality is that we aren't doing this.

Britain is now 27th in the world league of net growth spenders in research and development, lagging behind countries like Eire and Spain.

At Dyson, our investment in innovative design and technology is the key to our future and we have no intention of reducing this. Last year we spent £30 million on research and development, or 15% of sales. (The norm is about 1%) Dyson's 350 design engineers are 20% of our workforce. They work in purpose

built laboratories and test facilities creating new technology.

I think, if we wish to be at the forefront of world industry, then we must be prepared to invest in the long term process of real change. We mustn't be tempted by the short term gains that can be won from superficial product re-styling and clever marketing campaigns.

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I believe that design and technology courses in primary and secondary education provide the springboard for this renaissance. Not just to provide the designers and engineers of the future, but to instil in future bankers, politicians, accountants and managers understanding that it is the performance and design of products that makes manufacturing successful.

Then, we need to create incentives for research and development spending and put creativity back into industry. We have to inspire a passion for designing and making things, and curiosity about how they might be made to work better.

We have to create a culture that is not afraid to take the risks inherent in trying something really new.

We need to inspire and empower designers and engineers to develop new technology to solve problems.

As Oscar Wilde so shrewdly said, “By having good designs, you have workmen who work, not merely with their hands, but with their hearts and heads too; otherwise you will merely get the fool or the loafer to work for you.”

Creativity is an economically and socially cohesive force. The act of creativity brings people together with a sense of mission and purpose. Creativity allows them to express their individuality and imagination. We must encourage people to embrace difference with a sense of hope and optimism. After all – only dead fish go with the river.