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Invention and Innovation

Businet Conference - Budapest

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Mark M. H. Goode

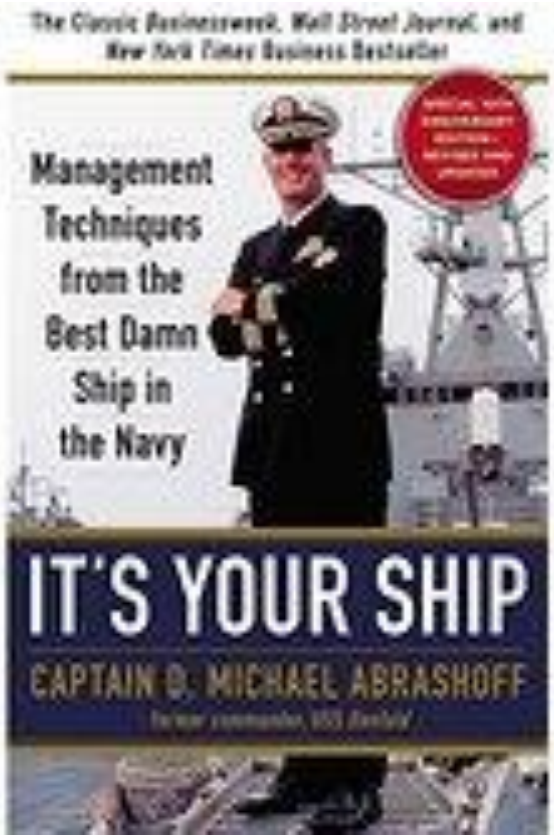
- Professor of Marketing at Cardiff Metropolitan University and Director of the Executive MBA
- Taught in four Welsh Universities over the last 30 years
- Taught over 30,000 University students, of which 5,000 are MBA's
- I have two degrees in Economics and a PhD in Marketing
- Holds the distinguished teaching award for the whole of Swansea University
- I have published over 60 academic journal articles including one in the Journal of Retailing
- Generated over £1 million in research grants in the last 15 years
- Held lecturer ships in Economics, Business Statistics, Operations Management and Marketing
- I am one of only 3,600 people in the world to be a '*Chartered Manager'* with the Chartered Managers Institute
- Recently achieved a POWIS award with a local company manufacturing cement out of landfill rubbish

Innovation and Leadership two critical skills

Red Oceans Leadership and innovation Blue Oceans

Blue Ocean Strategy

Two books to get your students thinking



Cardiff Metropolitan University – FAB Lab

The FAB Lab grew out of MIT and was launched in 2002. It grew from a course *How to Make Almost Anything*. This course still runs at MIT.

In the FAB Lab, you will find all the traditional tools, plus 3D printers, CNC milling machines, laser cutting devices, vinyl cutting tools

There are 713 FAB Labs in the world all sharing ideas and information Cardiff Metropolitan University is the only one in Wales. This is the most creative place in the University and I love to talk to students about projects they are making. If you can think it you can make it. Story of the baby buggy

FAB LAB

3D printing

I have set up a 3D print here just to show how they work – this is an Ulti maker 2 (about £800 of kit)

3D printing will change the world
Additive manufacturing not subtractive
Printing on demand
Reduction in waste (reduce over production and transportation
Printing in
Plastic, food, concrete, metal, human tissue, clothing, medical (teeth, bones etc)

https://www.youtube.com/watch?v=OYqBxEAtXZA

3d printing houses in China 1.59 minutes

In marketing we have a big debate about standardisation and adaption – in the future many products could be a one off example a pair of jeans designed and printed to fit you exactly in exactly the right colour

4D printing

- 4D printing is self assembly (houses which self assemble from flat pack on site, smart beams which stiffen if there is an earth quake, water pipes which self heal if there is a leak. This will totally revolutionise the construction and repair industries
- https://www.youtube.com/watch?v=ow5TgVTTUdY
- Minutes 3.52

Problem solving a key attribute for everyone of our students

- We are witnessing unbelievable change, we will discover more information in the next 5 years than in the last 5,000 years
- Shift happens 2016 (6.56 minutes)
- **https://www.youtube.com/watch?v=uqZiIOoYI7Y**
- The iphone was only released in 2007 and it now one of the leading mobile phones in the world
- Facebook was only launched in Feb 2004 it is now one of the top brands in the world
- Google was only launched in Jan 1998 it is now one of the top 10 brands in the world
- An Evil Experiment with my third year International Marketing Students (n=49). Can you give up your mobile phone and the Internet for 5 days
- Is has been predicted that 60% of all current jobs will disappear in the next 10 years (driverless cars will make car ownership totally redundant, taxi drivers redundant, the ability to drive a car redundant, car parks redundant and most car manufacturers bankrupt) The average car spends 80% of its time parked.

Problem solving a key attribute for everyone in the future

So one thing we can conclude is we will probably all work in the gig economy you won't have just one job but four or five short term contracts – similar to the Indian software industry.

These jobs will be well paid but short term

So our students will have to be super creativity, super innovate and learn new skills as there career progresses. If you don't continual up skill you won't be able to get work. I don't know want this means for pensions and mortgages but they will have to change radically.

Ways to invent and innovate

One – Trial and error (The light bulb)

Two – Brain storming and mind mapping

Three – Ask an expert (the £1,500 book)

Four – The Eureka moment (Archimedes)

There has to be a better way

Five – Tool boxes and rule books (TRIZ and Biomimicry)

Solving Problems

- TRIZ is Russian for '*problem solving analysis and forecasting tool'*
- It was first developed by Soviet Patent inventor Genrich Saulovich Altshuller (1926 - 1997) in 1946.
- This work has been expanded and improved on by a number of colleagues. You can even study for a degree in TRIZ in a number of Russian Universities.

Solving Problems

- Biomimicry
- Using nature 3.8 billion years of R&D to solve business problems. Nature has no waste and is totally sustainable. If it does work in nature it doesn't exist full stop.
- https://www.youtube.com/watch?v=UHb_XNgIHFY
- 4.19 minutes

Not being creative can cost

- True story
- A person in a University was asked to order a safe for the finance department to keep money and other valuable items. They where told the make, size, cost (£1350), supplier, colour and serial number of the safe to order. Easy job.
- Well they decided to go on www.ebay.co.uk and save some money. They purchased a bigger safe, saving £350.

No problem 1

- However when the safe arrived it was 5cm too big to go down the corridor. No problem, they decided to order a crane to lift the safe up the side of the building plus a glazer to remove the window and replace it – cost £650. However when the safe was half way up the build the head of estates arrived and ask want was going on. When he found out the weight of the safe – he said it was too heavy to go on the floor.

No problem 2

- So the floor was strength at a cost of £6,500 and the crane and glazer came back additional cost of £650. The safe was half way up the building when the head of estates arrived and asked what was going on, the purchaser of the safe proudly gave the buildings letter which confirm the floor was now definitely strong enough. Yes said the head of estates, but who is going to use the safe. Oh the finance department, but didn't you see the Memo three months ago the finance department are being relocated to another building. Someone is storing there sandwiches in the safe so know one can steal them. Total cost £1,000 + £650 + £6,500 + £650 = £8,800 and the finance department still need a new safe. The person who order the safe has been promoted twice since this event.

Car falls into the habour by accident

- Lesson water weighs more than air

We need a crane

We need a bigger crane

Have you got a bigger crane

Do they make bigger cranes ? We definitely need a big crane

Some innovate thing I have done in teaching

- Students like to copy off each other

- Multi choice
- Set four different multi choice questions on the same colour paper – same questions but a different order, Students who copy will get the wrong answer

- Set 400 different assignment
- I taught a group of 400 MBA students, so a decided to set 400 different assignments. It took me 20 minutes to do it. First get 30 different FT 100 companies then take groups of 3 companies for each person. Each person gets a different set of three companies which they need to compare and contrast (I use web sites on a digital marketing course). Students are allowed to change industries but they lose 1/3 of the marks for each company they change

Tutorial

- Set up a group of five students
- Give them a case study of one page of information where each page given looks exactly the same. However there is different information on each of the five sheets. It normally takes them about 20 minutes to start working as a team and figure out they have different information. You need to put all the information together to solve the case study

Two of my students approach me about an idea after my zero waste lecture

- Waste

- Wrong place
- Wrong amount
- Wrong type
- Wrong quality
- Wrong customer

- All waste is a resource if viewed in the right way

- Resource

- Right place
- Right amount
- Right type
- Right quality
- Right customer

Old Bicycle tires to belts

- First there is no such thing as waste
- The students where very keen cycle riders and thought they could use old bicycle tires for something
- They took an old bike tire, original cost £19 and remove the wire from the rims cut the tire to make a long snake, washed it and make it into a belt with a buckle and some holes. They sold 250 at £20 each on ebay all over Europe. Cost of the tire free, cost of the buckle £3, net profit £17

Executive MBA at Cardiff Metropolitan University

Not all classrooms have four walls

Our Executive MBA students on Challenge Wales 72ft round the world yacht. In the morning we teach the students to sail and in the afternoon we run the leadership challenge. All students are shadow by an experienced member of challenge wales crew

Leadership Challenge

Captain the boat over a 3 mile course in 30 minutes or less. The students draw lots to see the running order. If you don't beat 30 minutes you go again. But if a student goes faster time this is the new deadline

Spiking the spinnaker on Challenge Wales

Developing confidence and team building skills under pressure

Conclusion

- Both TRIZ and Biomimicry are incredibly powerful toolboxes and once understood can lead increase your level invention and innovation. Alternative techniques like brainstorming or trial and error can also produce great innovations and inventions but are very time consuming and don't use the whole body of inventive knowledge to solve problems.
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- It is thought that a number of large multi-national companies are already using TRIZ to solve problems, generate new designs and improve the performance of products and services (these include Boeing, Daimler-Chrysler, Dow Chemicals, Ford, Hewlett Packard, IBM, Johnson and Johnson, NASA, Otis Elevates, Procter and Gamble and Samsung).
- I will give a more detailed talk on TRIZ and Biomimicry later today
- Finally both my keynote and the semester on TRIZ/Biomimicry will go up on Businet web site if you would like to download and use them with your students you are very welcome