Rethinking learning in the new digital age

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The digital revolution

• We are in the middle of the greatest digital revolution in human history
• More than 40% of the world’s population has access to the internet
• Digital technologies have boosted growth, expanded opportunities, and improved service delivery
• Industries around the world are subjected to this revolution and should seek to grasp the benefits
Social Age of learning

- In this information age, Knowledge resources and expertise are as crucial to success as other economic resources.
- This is starting a new Social Age for learning (Stodd, 2014), where personal and professional developments are being reimagined.
Social Age of learning

• Foresight studies offer a new vision of future learning that promotes
  – personalisation
  – collaboration
  – informalisation

• This promotes a lifelong and lifewide learning shaped by exponentially growing digital networked infrastructure

• This requires learners to see the world in a connected way
Connectivism

• Here learning is driven through forming connections between sources of information and other components in the environment to create useful information patterns

• This is mainly useful in rapidly changing environments such as disaster situations
Connectivism

• A combination of principles explored
  – Chaos theory
  – Network theory
  – Complexity theory and
  – Self-organising theory

• Connectivism is about understanding the patterns and self-organising through finding the connections within networks to learn something new
Connectivism

- knowledge is distributed across the networks
- Learning is no longer an internal, individualistic activity
- Works through understanding the decisions which are based on rapidly changing information
  - nature of the collaboration also needs to be altered according to these changes
Disaster management context

- Disaster management has become a multi-faceted subject area in the recent years.
- Complexity is due to its multidisciplinary nature, multi-institutional involvement and inclusion of all the basic management functions.
- Knowledge continues to grow and evolve however, ‘important’ or ‘valid’ knowledge has become different from prior knowledge.
Connectivism approach to DM?

• Who are the learners?
• Are we a community of leaners?
• What are the information sources?
• How Connectivism shapes life long learning?
Case study: The UK Built Environment

• Construction industry and the built environment professionals have a vital role in contributing to society’s improved resilience

• Resilience should be systematically built in to the whole design, construction and operation process and not simply added on as an afterthought

• Building Information Modelling and management and smart cities provide an avenue to integrate resilience
Smart cities

• 80% of global GDP is generated in cities
• Smart technologies could help address some of the challenges of urbanisation
• This requires system wide deployment. Existing processes will need to change.
• People need to learn the new approaches to digital integration to use and manage this system
What is a smart city?
What is a smart city?

• Effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens

• Main areas to consider: water, buildings, energy/power, transport and assisted living/people
Energy/Power

- Generation
- Grid
- Distribution and Supply
  - Distribution Network Operator (in UK)
  - Distribution Automation
  - Real time/Dynamic Pricing
- Home
  - Demand Response
  - Peak Demand Smoothing
  - Smart Appliances
  - HEMS
  - Microgeneration Management
  - Smartmeter/AMI
  - Consumption Feedback and Control
- Commercial
  - Office and Retail (BEMS & Facilities Management Tools)
- Industrial
  - EV Energy Storage
  - Energy Dashboards and Displays

Legend:
- Supply chain elements
- Smart Technologies
- Themes / Topics
Transport

City Management – ITS System
- Traffic Management Centre
- Emergency Services
- Dynamic Road Use Charging
- E Payment
- Integrated Parking
- Real Time Information
  - Oyster Card
  - Google
  - Octopus
  - T-money

Marketing, Advertising, Social
- Google
- Channel 4
- Twitter
- SKY
- Waze
- BBC

IT & Traffic Infrastructure

Connected with the vehicle
Connected Mass Transport
Connected to personal devices

Commuters
- Vehicle/HGV
- Train/Tram
- Bus
- People

Connected with the vehicle

Automotive Industry
- BMW
- AA
- Renault
- RAC
- Ford
- VW
- Cars Direct
- Toyota

Design & Engineering
- ARUP
- WSP
- Atkins
- AECOM
- Mott MacDonald
- Kier Group
- Laing O'Rourke

Mobility Service Providers
- BMW I

Vodafone
Telefonica
O2
Orange

Location Based Services
- Esso
- Heathrow
- TfL
- Zipcar
- Hotels.com
AND BUILDINGS...
Building Information Modelling

• BIM (Building Information Modelling) is one of the key developments in the built environment

• It is about managing information
Why BIM (Building Information Modelling)?

• Government Construction Strategy (2011), Section 2.32
  – The UK Government has mandated that all construction companies tendering for government work should have level 2 BIM by 2016 (BSI)
What is BIM?
What is BIM?
What is BIM?
A BIM federated model: abstract view

- Architectural
- Structural
- MEP

Federated Model in BIM Environment
Learning in this new digital construction world

• People are different
• Organisations are different
• Tasks are different
• Information requirements are different

• How do we provide a learning environment in this context?
People are different

Planning
Procedures
Quantities
Reports

Structuralist

Actions
Sensing
Qualities
Solutions

Adapter
The world of different tasks

**Calculative**
- Have been done before
- Have been determined and rationalised
- Have been procedurised
- Have been quantified
- Stable

**Structuralist**

**Adapt**

**Judgement**
- The uniqueness
- What doesn’t work
- Contested
- Dynamic
- Complex too many variables

\[
\begin{align*}
\sin(2a) &= 2 \sin(a) \cos(a) \\
\cos(2a) &= \cos^2(a) - \sin^2(a) \\
\cos(2a) &= 2 \cos^2(a) - 1 \\
\cos(2a) &= 1 - 2 \sin^2(a) \\
\tan(2a) &= \frac{2 \tan(a)}{1 - \tan^2(a)}
\end{align*}
\]
Technology can be the wrong tool for some tasks

Find more tasks that can have aspects undertaken by BIM
These aspects become the task

Solution finding the problem
If you spend all your time managing BIM (technology), you don’t manage project
It’s Not Information we are after?

GET ALL THE INFORMATION YOU CAN, WE’LL THINK OF A USE FOR IT LATER.
It’s Not Information we are after?

Get all the information you can, we'll think of a use for it later.
When do we trust the data?
Digital dividends and analogue complements

• World is changing and starting to accept digital technologies
• Connectivism provides an approach to learning in the digital world
• However we need a much more inclusive approach to promote continuous learning which can recognise the components from both real (analogue world) and digital representations.
Thank you.

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