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- Peter Cooke, Global Enterprise Architect, Ford Motor Company
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- Guy Fitzgerald, Professor of Information Systems, Loughborough University
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- Bob Galliers, Distinguished Professor in Information Systems, Bentley University
- Hazel Hall, Professor of Social Informatics, Edinburgh Napier University
- Mark Hepworth, Professor in People’s Information Behaviour, Loughborough University
- Tom Jackson, Professor of Information and Knowledge Management and Director of Centre for Information Management, Loughborough University
- Mike Myers, Professor of Information Systems, University of Auckland
- Eric Thivant, IAE Lyon – Research in Management, Jean Moulin University Lyon 3
- Philip Woodall, Distributed Information and Automation Laboratory, University of Cambridge

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Centre for Information Management, Loughborough University

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- Becca Coates
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- Claire Creaser
- Ray Dawson
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- Martin Sykora
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Introduction

The International Data and Information Management Conference 2016 was hosted by the Centre for Information Management at Loughborough University and was sponsored by CILIP (Chartered Institute of Library and Information Professionals). It was our great pleasure to offer delegates an exciting and high quality programme.

The information society and knowledge based economy rely on the organisation and retrieval of data and information; the processes associated with knowledge creation; and the knowledge required to design, develop and implement solutions that enable the exploitation of knowledge, data and information. With the ever-increasing growth in the volumes of data available digitally, how is society adapting to the challenges of extracting intelligence from the data and exploiting the available knowledge? Therefore, the overarching theme of this year’s conference was ‘exploring our digital shadow: from data to intelligence’. We hope that this conference helped to build bridges between academics and practitioners through sharing knowledge and exploring opportunities to connect disciplines and theories.

We would like to express our deep appreciation for everyone who helped make the conference possible. First and foremost, to the organising team Becca Coates, Louise Cooke, Claire Creaser, Ray Dawson, Mark Hepworth, Russell Lock, Andrea Soltoggio and Martin Sykora for their hard work and in particular, to Sharon Fletcher, Ruth Cufflin and Ondine Barry for their crucial administrative support; to the members of the programme committee John Beckford, Peter Cooke, Guy Fitzgerald, Ina Fourie, Bob Galliers, Hazel Hall, Michael Myers, Eric Thivant, Philip Woodall, for their help with reviewing and promoting the conference; to CILIP (Chartered Institute of Library and Information Professionals) for their support; and to those delegates who attended for being part of this conference!

We enjoyed a successful IDIMC2016 with plenty of constructive and inspiring debates and, of course, fun and new friendships!

Tom Jackson, Director,
Centre for Information Management and Organising Chair

Crispin Coombs, Deputy Director,
Centre for Information Management
Invited speakers

Information and the Intelligent Organisation

John Beckford
Beckford Consulting

John explored how organisations must use information for synthesising organisational performance through integration of people and process to deliver desired outcomes. He showed that organisational sustainability through learning, adaptation and knowledge management depend not upon technology but on adoption of a new model of organisation and management.

Dataverse in the Universe of Data

Christine Borgman
Professor & Presidential Chair in Information Studies, University of California (UCLA)

Data repositories are much more than “black boxes” where data go in but may never come out. Rather, they are situated in communities, with contributors, users, reusers, and repository staff who may engage actively or passively with participants. This talk explored the roles that Dataverse plays – or could play – in individual communities.

It’s alright in practice, but does it work in theory?

Danny Budzak
Senior Information Manager, London Legacy Development Corporation

The London Legacy Development Corporation is leading a major regeneration project in East London to build on the legacy of the London 2012 Olympic and Paralympic Games. One of Europe’s largest regeneration schemes, the work involves building a new urban park with sporting venues, developing a new cultural and education quarter and creating new communities complete with homes, schools and workplaces.

What data, information and knowledge are needed to support this programme? What technical tools and skills and expertise need to be organised and managed? How do linear software systems support objectives which involve complex human decision making and tacit knowledge?

This keynote looked at this world of work, and at some of the lessons learned and knowledge shared.

Humans versus Machines: the role of editorial curation in journalism

Andrew Jack
Head of Curated Content, Financial Times

The explosion of information is creating fresh demand for different forms of curation in journalism. Data to understand and respond to reading patterns plays a growing role in the function of media organisations, but its combination with human editorial judgement remains extremely important.
Developing your Research: what I wish I had known when I was younger

**Stewart Robinson**  
*Prof of Management Science, Acting Dean, School of Business and Economics, Loughborough University*

A key question for those who are early in their research careers is how can they develop their research and their profile among the research community? In this talk Stewart reflected on nearly 25 years of experience as a researcher, and on some of the successes and struggles that he has had along the way. In particular he focused on how two streams of research have developed: one, a contribution to an existing field; the other, breaking new ground and trying to lead the way. Not all was plain sailing … nor is it still.

Warfare in the Information Age: the digital transformation of defence operations in the 21st century

**Neil Stansfield**  
*Head of the Knowledge, Innovation and Futures Enterprise, Defence Science and Technology Laboratory*

We are now in the foothills of the Information Age. The combined power of exponential growth in processing power, data, and connectivity will fundamentally shape the way the world lives and works: the Internet of Things and Big Data are revolutionising the way society operates. We in Defence and National Security must be clear that we do not hold the initiative over this: it is driven by commercial and societal forces that will determine how the technology unfolds and is used. Nor can we think that we have any control over who accesses this capability – state, non-state, or individual – so there is as much risk in it being exploited against us as there is opportunity for UK Defence. Moving from a world in which we control the generation of the information we use, and can therefore trust, to a world dominated by the ubiquity of unvalidated information will challenge every aspect of the way in which the Defence and National Security enterprise functions. Mastery of the information environment is today’s arms race.
**ECR Workshops**

**Writing Journal and Conference Papers**

*Guy Fitzgerald with Ray Dawson*

This workshop looked at different aspects of writing a paper for a conference or journal, including what subject matter to include, where to target the paper, the title and message, components of a paper, style issues, writing the abstract, and learning from rejections. The workshop consisted of a short seminar followed by a discussion of problems encountered. Participants were encouraged to discuss particular problems and rejections they have encountered and to comment on the issues that others raise. To conclude, a round-up of the issues and guidance discussed was given.

**Reflections on the ‘how’**

*Reconsidering research methods in Information Systems*

*Bob Galliers*

In a highly cited article, Bob Galliers considered means of choosing appropriate IS research approaches in different contexts and with different objectives in mind (Galliers, 1992). In this session, he reflected on this earlier work with more recent phenomena in mind, including the very nature of the IS field as it is today – not just from the perspective of the changed and changing technologies, but also of our developing world views on the topics we study.

**Managing the Early Stages of your Academic Career**

*John Arnold*

Professor John Arnold, an expert in the psychology of careers led an exploration of key ideas and techniques for getting your academic career on the track you want at an early stage.

**Writing a Funding Bid**

*Tom Jackson*

This session gave an introduction to writing grant proposals. Professor Tom Jackson outlined 1) the main funding bodies such as UK Research Councils and Horizon 2020; and 2) general advice on how to write successful proposals. Attracting external funding is challenging both for early career and experienced academics, and it plays an important role in career advancing. The session aimed to give some useful information on how to successfully engage with the complex tasks and challenges of proposal writing.
Redefining IKM: what trends, what impacts, what opportunities?

Sheila Moorcroft and Noeleen Schenk

Redefining IKM: What trends, what impacts, what opportunities?

A trends briefing paper for a workshop looking at IKM 5-10 years out

Prepared by Sheila Moorcroft and Noeleen Schenk

IDIMC Conference January 13th 2016
What is horizon scanning?

- Horizon scanning identifies and integrates signs of change
- It uses a variety of sources ranging from blogs and social media to well researched reports and academic papers
- It aims to challenge thinking, raise questions, explore the implications of change
Interconnecting changes affecting the future of IKM

Each change is significant in its own right. But more importantly, each is part of a wider system of change and interacts with all other changes.
Knowledge and data – growing exponentially

- Prior to 1900, world knowledge doubled every century
- By 1945 it was doubling every 25 years
- Now it is estimated to double every 13 months.
- The IoT could result in a doubling of data every 12 hours.
- 2013, the internet = 5 million terabytes; Google had indexed 200 terabytes
- By 2020, the digital universe will be 44 zettabytes total - where 1 zettabyte = 1000 exabytes

http://lagrangianpoints.com/2014/05/expanding-digital-universe-visualizing-big-zettabyte/

http://lagrangianpoints.com/2014/05/expanding-digital-universe-visualizing-big-zettabyte/
Digital changes everything in a smart connected world

- The IoT plus 3D/4D printing, AI and robots, and new systems architectures plus new materials, nanotechnologies and synthetic biology create a smart world of radical transparency, real-time analysis and designability

- 30-50 billion connected devices could be a cybercriminal’s dream – with most on default security settings

- Smart capabilities will transform work, education, health, research, leisure – but also bring digital divides, and job losses

A Wide Variety Of Connected Devices Bring Value To Enterprises

Source: Forrester Consulting/Zebra Technologies, June 2012

Economy 4.0 - redefining the rules, in a multi-polar world

- The digital economy will affect every sector, be Just in Time, lean and circular, designed for maximum efficiency
- It will also be the sharing, zero-marginal cost, collaborative economy where everything is a service from street lighting to jet engines to manufacturing processes, and consumers expect new approaches
- By 2025, value added from the IoT could be between $3.9 and 11 trillion p.a.; interoperability will be critical

Uncertainty ahead

- The balance of the global economy is shifting, emerging markets are driving growth and will soon dominate.
- Political influence will follow economic influence in a multipolar world.
- Emerging markets could leapfrog straight to digital.

- Political and economic uncertainty ahead for the UK.
- A BREXIT could be followed by a second, successful, vote for Scottish independence.
Robo-lleagues & AI arriving – whose new jobs or no jobs?

- AI / robot capabilities growing: self learning/ deep learning machines; Watson and Jeopardy; computer beat average human score on IQ tests in China; human scale AI coming by 2040 according to Ray Kurzweil
- Robots are moving out of the factory into offices, law firms, shops, onto the streets, into the air
- 50% of US jobs seen as vulnerable – especially, but not exclusively, low skilled jobs
- By 2018 – 20% of business content machine authored; 3 million workers have a ‘robo-boss’
- By 2020, 1 in 3 knowledge workers replaced by smart machines; 70% of low skilled jobs under threat

http://www.kurzweilai.net/oms-working-paper-on-the-future-of-employment-how-susceptible-are-jobs-to-computerisation
The ever changing battle for cyber-security

- Cyber-threats are growing - cost the UK economy £27 billion p.a. (2011); >$400 billion p.a. globally (2014). TalkTalk is a high profile case, most are undeclared
- IP theft costs about £9 billion p.a. in the UK; identity theft £1.8 billion p.a.
- Smart buildings and infrastructure will be increasingly vulnerable – 20% of smart buildings ‘cyber vandalised’ by 2018; the IoT a potential leaky sieve
- Biometrics plus ‘something you have’ offer new levels of personal security; fingerprint, iris, vein patterns to brainwaves – pass-thoughts could replace passwords
- The block-chain could provide decentralised, verifiable, encrypted transactions – for any transaction; you can verify the sender without seeing the content
- The block-chain ‘Like watching the birth of the internet again’ - it will decentralise organisations and enable new approaches to processes and collaboration
- Digital obsolescence and data loss/ incompatibility a growing issue

http://gendal.me/2015/02/10/a-simple-model-for-smart-contracts/
Generation effects changing expectations & needs

- People are working longer, living longer; their skills and experience are a valuable resource – organisations will need to adapt to use them effectively
- Younger generations bring very different expectations to the workplace, especially around work patterns and technology; dialogue is key
- The financial crisis accelerated the growth of self-employment, the sharing economy and new opportunities
- Diversity is rising on many fronts

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<td>Percentage in UK workforce</td>
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<td>Communication media</td>
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<td>Preference when making financial decisions</td>
<td>Face-to-face meetings</td>
<td>Face-to-face ideally but increasingly will go online</td>
<td>Online – would prefer face-to-face if time permitting</td>
<td>Solutions will be digitally crowd-sourced</td>
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http://www.thetimes.co.uk/tto/multimedia/archive/00449/Briefing_449703a.jpg

Source: Barclays, University of Liverpool
New business models to maximise resources

- Companies are using open innovation to maximise skills, knowledge and competitiveness – blurring boundaries within and between organisations.
- Open government aims to maximise data; open science and publishing – to expand access to results and content; MOOCS giving free access to learning.
- Multi-disciplinary research requires cross boundary capabilities.
- Flexible and freelance working is creating skills-tasks exchanges.
- The sharing economy is re-writing the rules on cost and competition.
- Agility and rapid responses are critical to success; so too the ability to identify, verify, and integrate resources.
Redefining IKM: what trends, what impacts, what opportunities?

Regulation and governance – whose rules/priorities

- Transparency rules! Crowdsourced governance courtesy of social media—including clicktivism, protests and whistle-blowers – puts organisations on the spot to walk the talk

- New metrics/approaches to repair trust in corporations and their actions and account for external costs e.g. environmental and social

- Major companies pursuing a new agenda, challenging conventional thinking with circular economy, triple bottom line, social capital/CSR and shared value

http://lh5.googleusercontent.com/vykKVYnpBzyCqoyAeXlITJuSWJ z-7BS58F-_nfg7jLoTgT1EON09YAtetpeLO9-9wTmcOyWTWGDk31Uv821IPNuL8S_ZtP_-cfMjyxys9v6tS_iOH4
Redefining learning and skills

- Radically new approaches to education and learning will change how and where we learn, as well as what we learn; and how we are tested
- Theory and practice – learning by doing, monitoring performance of tasks in situ, virtual learning with gamification badges and incentives; with information on tap – application and analysis is all
- The role of teaching staff and institutions across the board will change – mentor, advise and guide rather than present information

http://www.slideshare.net/moravec/toward-society-30-a-new-paradigm-for-21st-century-education-presentation?type=powerpoint
System complexity is creating system vulnerability

- Levels of system complexity - technological, social, political, organisational - are growing
- We are moving from top down control to a bottom-up self-organising world
- Complex systems are increasingly vulnerable to extreme events
- Understanding interactions and ‘unforeseen consequences’ will be critical
How things change!

We adapt to change very quickly. When looking to the future, it is therefore instructive to look back, to understand the scale of change ahead. A rule of thumb is to look back twice as far as we look forward; in this case therefore 20 years.

Where were you in 1995? How did you do your job?

1995 (2015 or latest)
- 23,000 websites (298 million)
- 40 million internet users world wide (2 billion)
- Wells Fargo adds account services to website
- Sony PlayStation 1 and Internet Explorer launched
- 42% of US population never heard of internet – 14% use
- 5% UK population have mobiles (>92%; 72% of mobiles = smartphones)
- John Major and Bill Clinton in power
- Goldeneye, Braveheart, Apollo 13, Pochontas – popular films

Arrivals (2015 users)
- 1997 – Netflix (60 million)
- 2000 – Zipcar =2 cars
- 2001- Wikipedia
- 2002 – LinkedIn (380 million)
- 2004 – Facebook (1.4 billion)
- 2005 – YouTube (> 1 billion), Reddit (36 million), Huffington Post
- 2006 – Twitter (284 million), WikiLeaks
- 2007 – Apple iPhone; 1st MOOC
- 2008 - Airbnb and Groupon
- 2009 - WhatsApp
- 2010 – Instagram (300 million) and iPad
- 2011 – SnapChat; AI MOOC Stanford
- 2014 - Royal Society Open Source journal
Survey: Impact of changes
20 Respondents in total; most statements 19 responses

Survey: Likelihood of changes
20 Respondents in total; most statements 19 responses
Survey: Impact and Likelihood of changes

20 Respondents in total; most statements 19 responses

Overall scores - impact and likelihood

- Digital governance and regulation lagging behind digital innovation is enabling the use of data as a weapon.
- The ability to assess the reliability and accuracy of sources of information and data is a critical USP for IKM.
- Advances in technology are creating major cyber-security threats.
- Organisations using open innovation to maximise skills and resources is leading to data ownership disputes.
- “Soft” skills are increasingly critical, as technology becomes more dominant in IKM services.
- The rise of me.org – the sharing economy/personalisation are resulting in dynamic and fragmented market and social...
- Integrated Digital Identity, the core organising principle in service provision, is creating radically transparent systems...
- Digital incompatibility and digital obsolescence are increasing due to the proliferation of systems and channels of...
- Advances in AI/robotics are expanding the incorporation of ethical decisions in intelligent machines.
Summary of discussions /1

Changes in governance needed
Governance and legislation are lagging behind the digital economy and technology development. The emerging gap could damage innovation. A range of pressures for change are building.

- Greater awareness, training and investment in relevant skills and procedures are needed at the organisational level. Every company should have a clear information strategy.
- With the growing reliance on technology and artificial agents, the wider ethical framework, human judgement and responsibility for quality and ethics becomes more critical.
- The increasing capabilities of data analytics will require greater data literacy as systems move from curation – i.e. what is, to what should I do which will require more management skills as well as knowledge skills.
- There needs to be more agility in the research process, in order to adapt to the expectations, greater competitive pressures and shortening timeframes in the economy. A 3-year PhD may be a thing of the past. Speed and quality will be critical.
- The web is like the wild-west, we need a social contract. The use of data, even if you want to keep it private it gets given to others especially the US government. Are companies or governments in control of the rules?
- Guiding principles rather than rigid rules may be needed in order to enable more cross sector collaboration.
Summary of discussions /2

Cyber security issues could be disruptive
Customers implicitly expect all organisations to keep personal data secure, and rarely think about it till there is a problem. More security breaches could change those perceptions, as well as the prevailing governance frameworks.

- Quality of cyber-security could become a major factor in customer choice of supplier, such that cyber security becomes an element of brand values.

- Companies may be required to reveal/report data breaches. The question will be when — immediately before full scale is known, nor the potential impacts; or later, once it has been resolved, so that it becomes a ‘good news’ story to retain confidence.

- The growing levels of connectivity, especially the migration of data to the cloud and the development of the IoT, will be a huge potential threat to companies and individuals. The nature of those threats could change: rather than denial of service attacks, we could see attempts to distort the data, adapt it for other uses. Responses among the different players may vary.

- Disconnection could increase as people and systems go off line completely

- Organisations may resort to the deep web to be ‘out of sight’, with hackers being hired to run IT departments.

- We may see more training in memory development with special exercises (e.g. learning poems by heart as in the past) and the return of the typewriter, to enable the development of parallel, freestanding systems.

- Openness and sharing could reduce as a way to protect data, which in turn could damage research and innovation.
Summary of discussions /3

Interplay between soft skills and technology

The increasing sophistication of technology, AI, analytics etc., is reducing the perceived need for soft skills. And yet, at the same time it increases the need for them as a counter-balance, safeguard and because human soft skills are still not replicable in machines.

- Human soft skills needed include: enhanced design skills, problem solving, creativity, subtle understanding e.g. for effective, more complex translation, collaboration for remote / team working. Humans can understand context- how, and can we, get machines to understand context?

- Research into the use of soft skills in systems is needed. E.g. in system design what proxies can be designed into systems to reflect and replicate these capabilities? What, if any, are the ethical issues around the development of soft skills in systems?

- Soft skills affect how people perform, how effective processes and systems are. The paradox is that technology reduces the need for those abilities, but research indicates we need more. Training and recruitment procedures will need to focus on such skills more effectively.

- Human judgement remains a critical capability to avoid rigid thinking and outmoded mental models. E.g. with greater reliance on AI/ intelligent systems, could we see more backward looking inventions solving yesterday’s problem; a Hadrian’s wall of ‘do it like this, resulting in gates that lead nowhere’. The knowledge we don’t have is as important as the knowledge we have. But recognising where the gaps are is difficult. (The unknown unknowns are a common concept in futures research, but got a bad reputation after Donald Rumsfeld’s use of the idea in connection with the Iraq war.)

- Soft skills in open innovation. Data and systems will need to be more secure. It appears that the skills that are needed are vagueness and subterfuge to say something while saying nothing!
Contributed papers

Factors that influence Information Behaviour from Psychology and Information Science: A Literature Review

Dr Peggy Alexopoulou, Mark Hepworth, Anne Morris
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Abstract

Introduction This paper reports a review of the literature of information behaviour from the perspective of two disciplines: Psychology and Information Science. The aim was to explore, compare and bring together from the two science disciplines factors that influence information behaviour, multitasking information behaviour and web information seeking.

Method This article reviewed the most widely recognised and the contributions of individual authors using a systematic review process. Articles were identified by searching online databases from Psychology and Information Science such as the Web of Science, MEDLINE, PsychInfo, Science Direct, Scopus, Zetoc citation databases, references of articles, letters, commentaries, editorials, conference proceedings and books from 1957 to 2015.

Findings The analysis of the articles suggested that multiple factors are involved that influence people’s information behaviour. Five dimensions are highlighted by information scientists: the affective (feelings, emotions, moods), cognitive (cognitive styles, working memory, attention, the users’ experience, developmental stages, and aging factors), psychological states (flow, motivation), personality (extraversion, agreeableness, conscientiousness, neuroticism, and openness), and sociological factors (self-efficacy). From the field of psychology similar factors have been associated with information seeking behaviour: the affective, cognitive, psychological states, personality dimensions, and sociological factors. However, there are some differences. The psychological affective factors include moods and emotions but not feelings, although some authors use these terms interchangeably. In the psychological cognitive category, attention is recognized but not users’ experience.

Keywords Information behaviour, web searching, cognitive factors, affective factors, psychological states factors, personality dimensions factors, sociological factors

Introduction

Multitasking behaviour is very common during web seeking (Rogers and Monsell, 1995; Carlson and Sohn, 2000). Multitasking information behaviour can be defined as the, “human ability to handle the demands of multiple information tasks concurrently” (Spink et al., 2007, p.177). Many models identified factors that may influence peoples’ information behaviour on the web and selection of web tools (Wang et al., 2000; Choo et al., 2000; Ford et al., 2001, 2005; Knight and Spink, 2008; Du and Spink, 2011). Wilson (1999) mentioned that information seeking is part of information behaviour derived from the need of the information user.

A range of factors can positively or negatively affect the information seeking and retrieving behaviour. Affective factors include emotions, feelings and moods. Positive feelings and emotions can improve people’s information seeking strategies, whereas negative emotions can lead to lower performance (Wang et al., 2000; Nahl, 2005; Picard, 2003). Personality dimensions include neuroticism, extraversion, openness to experience, competitiveness, and
consciousness (Humphreys and Revelle, 1984; Costa and McCrae, 1992; Heinström, 2003) which in their turn also influence information seeking behaviour. Self-efficacy (Bandura 1986), is another aspect of personality that could influence peoples’ seeking process and perceived success (Wilson and Walsh, 1996; Rains 2008).

States such as flow and motivation also have an impact on behaviour. Flow has nine dimensions such as clear goal; feedback; balance of challenge and skills; concentration; focus; control; loss of self-consciousness; transformation of time; and autotelic nature (Csikszentmihalyi, 1990). Finneran and Zhang (2003) proposed the PAT model of flow and related it to information behaviour, in which the variables of person, artefact, and task have been identified as flow’s antecedents in a Web environment. They divided personal characteristics into state and trait. Vividness involves image, audio and video and responsiveness is the speed of an information system (Finneran and Zhang, 2003). Both relate to characteristics of the artefact.

Many cognitive mechanisms also underlie information behaviour. Working memory capacity and attention have been found to predict the success or not of information behaviour performance (Just et al., 2001; Bühner et al., 2006; Hambrick et al., 2010; Colom et al., 2010; Morgan et al., 2013). Other factors include cognitive styles, user’s experience, developmental stages and aging. Working memory influences the ability to hold a specific amount of information while approaching other information tasks. Low levels of working memory may negatively affect performance (Colom et al., 2010; Hambrick et al., 2010).

As can be seen above, many factors have been explored in relation to people’s information seeking behaviour from both the Information Science and Psychology disciplines. These factors, however, have not been reviewed together identifying similarities or differences. The aim of this literature review was, therefore, to explore, compare and bring together from the two science fields factors that influence information behaviour and especially, multitasking information behaviour and information seeking. This paper focused on these particular aspects of information behaviour because there was considered to be a gap in the literature and it was a pre-cursor to more detailed experimental research investigating these particular factors.

Method

This article reviewed the most widely recognized and the contributions of individual authors using a systematic review process. Studies were identified by searching online databases from the disciplines of Psychology and Information Science such as the Web of Science, MEDLINE, PsychInfo, Science Direct, Scopus, Zetoc, citation databases, references of articles, letters, commentaries, editorials, conference proceedings and books from 1957 to 2015. In consequence, 318 articles from 1957 to 2015 were examined; 175 were psychological articles and 143 were articles from Information science. Although no language restriction was applied, all articles found were in English; some abstracts, however, had already been translated from a different language.

The text words “information behaviour,” “psychology and information behaviour,” “personality factors in information behaviour”, “factors that influence information behaviour” and “mechanisms and information behaviour” were used with variations of relevant text words e.g. “psychological”, “information seeking behaviour”, information retrieval”. Second, relevant articles (judged on the basis of the title and abstract) were retrieved for more detailed evaluation. Third,
the bibliographies of relevant articles were searched for additional references. Articles were reviewed to determine the effect of various factors on the information behaviour.

Findings
The analysis of the articles suggested that multiple factors are involved that influence people’s information behaviour. Five dimensions have been highlighted by information scientists: the affective (feelings, emotions, moods), cognitive (cognitive styles, working memory, attention, the users’ experience, developmental stages, and aging factors), psychological states (flow, motivation), personality (extraversion, agreeableness, conscientiousness, neuroticism, and openness), and sociological factors (self-efficacy). From the field of psychology similar factors have been associated with information seeking behaviour: the affective, cognitive, psychological states, personality dimensions, and sociological factors. However, there are some differences. For example, the psychological affective factors include moods and emotions but not feelings, although there seems to be some confusion regarding the use of these terms. Furthermore, in the psychological cognitive category, attention is recognized but not users’ experience.

Affective Category

Emotions and feelings
Feelings are senses detecting what you feel through various inputs such as hearing, sight, smell, taste, heat, pain, pressure, balance and so on, whereas emotions are the result of these feelings and vary in intensity depending on their impact. Emotions fall into categories but the most common ones are happiness, sadness, fear and anxiety. Researchers often use the term interchangeably and this would appear to be the case in the Information Science Damasio (2001), for example, regarded feelings as being “the mental representations of the physiological changes that characterise emotions”, thus thought to be the conscious, subjective and private results of emotions. Because of this confusion, the summary below uses the term emotion to cover both emotions and feelings.

In psychology, the broaden-and-build theory, is based on the supposition that positive emotions help people more than negative emotions to broaden their attention span and to encourage actions such as exploration (Fredrickson, 1998, 2001). Fredrickson and Branigan (2005) tested participants’ attention after they watched films that provoked different emotions: positive, neutral, and negative. Participants who watched positive emotive films had a greater attention span than participants who watched negative emotive films who had similar attention spans to those who watched neutral emotive films. There are obvious implications here for information retrieval.

Both sciences suggest that emotions influence people’s cognitive performance and decision-making (Damasio, 1994; Armitage et al., 1999; Picard, 2003). Arapakis et al. (2008) found that different emotions were apparent throughout the search process. Moreover, they found that positive emotions turned to negative such as despair, anxiety, and irritation when the task became progressively more difficult.

Kracker and Wang (2002) identified three types of emotions when users search for information: positive (confidence, optimism, excited, calm), negative (anxiety, stress, confusion, uncertainty, doubt, exhausted), and transitional from negative to positive (relief). It would appear that more searchers experience positive feelings than negative emotions during the search process (Bilal, 2000; Tenopir et al., 2008). Research has shown that positive emotions are related to users’
thoughts and the search outcomes; the better the outcomes the more positive users feel (Meghabghad, 1995; Wang et al., 2000; Tenopir et al., 2008). Gwizdka and Lopatovska (2009) also found that when people generally feel happy before and during the information seeking process using the web, they will probably feel happy after the seeking process. Nahl (2005) also confirmed this. She found that self-efficacy and optimism positively influenced the seeking process in contrast to negative emotions such as irritation and frustration. She found that positive emotions caused lower affective load, lower levels of uncertainty and higher levels of control and coping skills than negative emotions. Tenopir et al. (2008) found that negative emotions were connected with thoughts regarding the system, search strategy and task. Bilal (2000) thought that negative emotions, such as confusion and frustration, were related to software failures while Kracker and Wang (2002) found that people were especially anxious at the beginning of a search.

Moods

Moods last longer than emotions and may not be associated with a specific situation (Weiss, 2002). People with positive moods know that the current information seeking process is safe, they do not ask many questions, and they rely on their existing knowledge because they feel comfortable. On the other hand, people with negative moods feel that the information seeking process is not going well, they ask more questions, and they try to analyse the situation (Schwarz, 1990; Bodenhausen et al., 1994; Bless et al., 1996).

From information science, Kelly (1963) investigated the user’s experience in the information searching process and he developed a model describing the process from the user’s perspective. He suggested that two kinds of moods an individual may assume during the information seeking phase: the invitational, which encourage people to have new ideas and be receptive to change; and the indicative, which lead people to depend on the construct and reject new information and ideas (Maher, 1969).

From the field of psychology, Gasper and Zawadzki (2012) pointed out that, when people thought that the information problem was difficult, positive moods enhanced people’s ability to seek and gather valuable information. On the other hand, when people believed that were able to seek the appropriate information, the perceived performance was strong and they did not have to search for further information. Negative moods guided people to judge the quality of the information they gathered. Mackie and Worth (1989) claimed that positive moods negatively worked for the first condition, because people did not have the time to process the message in contrast to people with neutral moods.

Cognitive Category

Cognitive styles

There appears to be contradictory evidence as to whether different cognitive styles affect the information process. On the one hand, there is evidence from both disciplines that some cognitive styles do not affect the information seeking process. (Graff, 2003; Massa and Mayer, 2006). Other researchers, however, have found correlations between cognitive styles and learning outcomes on web based learning activities. For example, it has been found that performance is improved in learning environments where people are allowed to exploit their preferred cognitive styles (Thomas and McKay, 2010; Vercellone-Smith et al., 2011; Jablokow and Vercellone-Smith, 2011; Huang et al., 2014).
From Psychology, Alloy et al. (1999) explored the depressogenic cognitive style and its relationship with information processing. Depressogenic cognitive style describes when people, who are prone to depression, develop negative thoughts about themselves when they process stressful information. Depression-prone people have specific negative self-schemata related to incompetence, worthlessness and low motivation, probably leading to low information seeking performance. They based their study on Beck’s theory of depression, which states that feelings such as loss, failure and worthlessness provoke a greater likelihood of depressive symptoms (Beck, 1967).

In Information Science, studies have investigated differences between field-independent and field-dependent searchers. “In a field dependent mode, an individual's pattern recognition is strongly dominated by the holistic organisation of the total perceptual field with its parts being perceived as ‘fused. In contrast, in the field independent mode of perceiving, the individual is more likely to see the parts of the field as distinct from the organised ground” (Pithers, 2002, p.118). Ford et al. (2002) found that field-independent people were more analytic than field-dependent whereas Palmquist and Kim (2000) found that novice field dependant students needed more time to complete the search tasks than novice field independent users. Frias-Martinez et al. (2008) found that field dependant users searched using the author, the title and a few keywords. On the other hand, field-independent users searched using the title without any further words or phrases.

Belk et al. (2013) found that people had different navigation patterns regarding their cognitive styles. Holists had more linear navigation in contrast to analysts, who perceived a more non-linear approach. Ford et al. (2002) found that holists showed a more exploratory information seeking behaviour and were more idiosyncratic than serialists. Park and Black (2007) found that people with an analytical cognitive style used significantly more keywords than people with a holistic cognitive style.

**Attention**

Attention refers to a person’s ability to time-share activities and to process information. In terms of information seeking behaviour, it determines how much and which information is held in working memory during the process, and it determines what information is going to be retained (Festinger, 1957; Oberauer and Hein, 2012). Thus, attention is fundamentally linked to working memory; people need to be attentive to process and store information. It is hypothesized that, attentive mechanisms are located in the central executive system of working memory (Baddeley and Hitch, 1974; Cowan et al., 2007).

There are different schools of thought with regard to attention. Some researchers believe that people can only focus their attention on one thing at a time (single channel theorists) while others believe that people can rapidly juggle their attention between several stimuli at the same time thereby giving the appearance of being able to process information in parallel. Others even contend that people can perform two or more tasks simultaneously, particularly if one of these can be performed without conscious attention in an ‘automatic mode’ of processing (Morris and Dyer, 1998). It is generally believed that the brain filters stimuli enabling people to focus on what is important and relevant; this is called selective attention (Oberauer and Hein, 2012). The greater the number of stimuli, the more difficult it is for the filter to be selective. When people need to attend two or more stimuli simultaneously, they have to divide their attention and this can adversely affect performance (Spelke et al., 1976).
From Information Science, Dervin’s model (1983) enhances the meaning of attention and cognitive discomfort. Ingwersen (1992) also synthesised attention, previous knowledge, and experience in the process of categorization and memory recall. From psychology, attention and multitasking are related since effective multitasking means people’s ability to focus and allocate attentional resources (Kahneman, 1973). In high demanding multitasking situations, memory suffers (Sanjram and Khan, 2011). When people feel that their seeking process is threatened by irrelevant and distracting information, then they experience anxiety. Anxiety may result in the focus on distracting stimuli (Eysenck et al., 2007).

**Working memory**

Working memory is a limited capacity cognitive system, which is responsible for the storage and processing of information, for decision making, and planning (Oberauer, 2002). It is the ability to retain a specific amount of information (Engle et al., 1999; Conway et al., 2002; Colom et al., 2005a, 2005b; Conway et al., 2005). Miller (1956) mentioned that people can maintain seven plus or minus two items or chunks (letters or words). Other researchers suggested that adults could only recall 3 or 4 verbal chunks (Gilchrist et al., 2008).

Gulbinaite et al. (2014) found that people with high working memory capacity suppressed their attention to irrelevant stimuli, whereas people with low working memory capacity enhanced their attention to irrelevant stimuli. In multitasking situations, working memory is loaded and this is called working memory load. As attention decreases, information passes through the working memory without filtering resulting in lower performance, (Lavie, 2005). Researchers from the field of Information Science found that, in multitasking environments working memory capacity was a performance predictor (König et al., 2005; Bühner et. al., 2006; Hambrick et al., 2010; Colom et al., 2010). Butler et al. (2011) investigated the working memory of participants; they had to recall a series of words while being presented with an equation. The results showed that working memory capacity had no effect on how people choose which task to perform first. However, participants with low working memory capacity made more errors in word recall, especially under time pressure. It seems that people with low working memory can also multitask, but their performance is lower than those participants with high working memory.

**User’s experience**

From the field of Information Science, researchers have found that, compared to novice users, experts are more likely to have positive outcomes when they seek information relevant to their existing fields (Marchionini, 1997; Ford et al., 2001, 2005). Tabatabai and Shore (2005) found that novices had many differences to experienced users in terms of cognitive, metacognitive, and their use of prior knowledge strategies. Experienced users with prior existing knowledge evaluated web pages in more depth, reflected more on strategies, and browsed the web with more purpose. Chevalier and Kicka (2006) found that novice users spent more time and recalled fewer and irrelevant items than experienced users. Performance can improve with training however; Bruder et al. (2014), for example, found that older users, with less experience benefited from additional training in the use of electronic devices.

**Developmental stages**

The field of Psychology provides developmental stages in which multiple cognitive processes such as language, memory, and decision-making are involved. These processes take different forms in each developmental stage. The psychological perspective examines information behaviour from an evolutionary perspective through the developmental stages. Butler (1999), for example, found that children have different information seeking capabilities according to their
ability (Butler, 1999). Children at the age of seven (preoperational stage of Piaget) are more likely to seek and use information in order to prove their superiority to other children (Nicholls and Miller, 1983). After the age of 11 or 12, children have the ability to understand that their seeking results represent their effort and individual differences (Butler, 1999).

In the Information Science field, Spink (2010) tried to superimpose information behaviour onto the major psychological cognitive development models to show that information behaviour, “develops over a human lifetime in a sequence of cognitive developmental stages” (Spink, 2010, p.56). The models she investigated were Piaget's (1951) stage model, Erikson's Erikson's (1963) eight stages model, Vygotsky's (1978) theory (which claimed that people are influenced by their socio-culture environment), Baron-Cohen's (1995) four hierarchy model during infancy and early childhood, and Spelke's (1991) physical nature.

**Aging**

Both sciences support the idea that aging results in a decrease of many cognitive functions such as working memory, attention, and inhibition (Bopp and Verhaeghen, 2005; Riecker et al., 2006; Mishra et al., 2013). Older people also find it difficult to divide their attention between two or more competing tasks which affects their performance (Korteling, 1993). People over the age of 60 years, have reduced ability to search for information, to distinguish between relevant and irrelevant information; to use the available information effectively; and reduced ability to use different search strategies (Stoltzfus et al., 1993). Raz et al. (2005) suggest that as people get older, areas in the brain responsible for cognitive functions declines. Other researchers, however, think that older and youngsters' brains function differently. For example, Reuter-Lorenz (2013) suggests that older people may experience greater interaction with the specific areas in the brain related to executive control processes causing them to become more overloaded than the same brain areas in younger people. Both Information Science and Psychology disciplines agree the importance of aging results. It is important that, when people design web systems for older adults, they should bear in mind all these cognitive changes (Bruder et al., 2014).

**Psychological States Category**

**Motivation**

Motivation is the term used by psychologists to describe the study of what induces people to act (Morris and Dyer, 1998). An individual's level of motivation will determine whether outside stimuli receives attention and whether it will produce a response. Thus, it will affect people's ability to learn new concepts and to respond to different situations. Motivation has been linked to “engagement” in the field of Information Science (Beck and Jessup, 2004; Cocea and Wibelzahl, 2007) and vigilance and alertness by some psychologists (Humphreys and Revelle, 1984). Highly motivated people are more able to produce cognitive learning strategies to counteract their limited cognitive working memory capacities during information processing tasks (Astleitner and Wiesner, 2004). However, Humphreys and Revelle (1984) also believed that extensive high motivation could eventually cause fatigue and tiredness and thus result in lower performance.

**Flow**

Csikszentmihalyi (1997), a psychologist, defined flow as a state where people are fully immersed in a feeling of involvement. Csikszentmihalyi (1997) suggested that people are more likely to experience flow if they have: an autotelic nature, exhibit exploratory behaviour, become absorbed in the task, lose a sense of time, feel a loss of self-consciousness, are able to balance
skills and challenges, have clear task goal, and are able to benefit from the artefact and feedback, and enjoy the playfulness of interacting with the system. Massimini and Carli (1988) found that teenagers, who experienced flow, felt happier, were better motivated, more creative, more excited and had better control of their actions. Csikszentmihalyi (1990) and Wigfield et al. (2012) also concurred with the fact that people who feel flow are also more motivated, and are happier.

Finneran and Zhang (2003), Information Scientists, constructed the PAT model (person, artefact, and task), whereby three variables were thought to be flow’s antecedents in computer environments. They divided personal characteristics into: state and trait. State represents people’s moods and is dynamic in contrast to trait, which represents people’s personality. Artefact involves telepresence such as vividness and network speed, whereas task characteristics are reliant upon the level of task complexity. All these factors are thought to influence whether a person experiences flow which, in turn, affects performance; the greater the flow experienced the better the performance. Not surprisingly, poor website designs reduces flow and therefore adversely affects performance (Koufaris and Hampton-Sosa, 2004; Chou et al., 2005).

**Personality Dimensions Category**

Psychologists sometimes classify people as having a distinct personality type such as being an introvert or an extrovert (thought-orientated versus action-oriented persons). Other psychologists, however, believe that introversion and extraversion are part of a continuous dimension because most people exhibit both of these traits with varying degrees. Some researchers also define personality has having several dimensions. Costa and McCrae (1992), for example, describes personality as having five dimensions: neuroticism (negative emotions and feelings); extraversion; openness to experience; agreeableness; and consciousness. These five dimensions have been explored in relation to information behaviour (Heinström, 2003; Fayombo, 2010; Rose et al., 2010). The results show that performance is adversely affected by people’s degree of neuroticism and extraversion (extraverts are less likely to concentrate on tasks). However, performance generally improves when people are open to experience, agreeable, and experience more consciousness.

Early psychological literature reviews also concurs with the view that introverted people appear to be more motivated and aroused than extravert people and hence perform better when faced with information seeking tasks (Humphreys and Revelle, 1984; Rusting and Larsen, 1998).

**Sociological Category**

Social cognitive theory (SCT) argues that people learn by observing others and that this is influenced by three determinants: personal (whether an individual has a belief in their own ability to organize and execute tasks otherwise known as self-efficacy); behavioural (the feedback they receive from performing the behaviour); and environmental (whether the environment provides a conducive setting for an individual to succeed). Hepworth (2004), from the Information Science field, included such factors in his framework describing the information seeking process. He acknowledged that information seeking outcomes are affected by both sociological and environmental factors.

Much research has been undertaken in both the psychological and information science fields to investigate the effect of self-efficacy on learning performance. Bandura (1986) and others have shown that people with high self-efficacy, who are generally more motivated, are more likely to
recover from setbacks and master challenging situations compared to those with self-efficacy. In recognition of this, Wilson (1999) included the concept of self-efficacy in his model of information behaviour. Research has shown that people with high self-efficacy are more likely to be successful when seeking information (Wilson and Walsh, 1996; Brown et al., 2001; Rains, 2008; Tella, 2009; Chen and Feeley, 2014).

According to McAlister et al. (2008), self-efficacy can be developed or increased by: Mastery experience (building experience by setting simple tasks before more complex ones); Social modelling (providing a suitable model that shows the processes involved in accomplishing a behaviour); Improving physical and emotional states (making sure a person is relaxed during the learning process); Verbal persuasion (providing encouragement and feedback during the sessions). These should be born in mind when teaching information seeking skills.

Psychologists have also related self-efficacy to mental effort, effort management, cognitive performance, and cognitive process enhancing motivation (Pintrich and De Groot, 1990).

**Discussion**

It would appear from the literature review that several variables may affect multitasking information behaviour when using the web.

Emotions, for example, are connected with web seeking behaviour and the perception of task difficulty. It has been shown that positive emotions improve a person’s information seeking behaviour during and after the seeking process, particularly if the person is not very confident and they have enough time to conduct a thorough search.

Research investigating the link between cognitive styles and information seeking behaviour has proved inconclusive. Further research is therefore needed to better understand the effects of different cognitive styles on information seeking performance.

Working memory is a crucial cognitive system for information seeking behaviour and cognitive outcome. Both sciences, Psychology and Information Science, mentioned its importance for information behaviour and performance. Attention determines how much and which information is going to proceed to working memory when information seeking. People who are attentive and have high working memory capacity are often better searchers than those who have poor attention spans and more limited working memory capacity.

Research has shown that experienced users seem to need less time to seek information, achieve better outcomes and use more information seeking strategies than non-experienced web users. Developmental stages prove that people have different cognitive, information processing, and retrieval abilities, depending on the developmental stage they have reached. Performance appears to decline in older people, it is therefore important that web designers recognise these cognitive changes and make their systems as easy to use as possible.

Both science fields provide evidence that motivation and flow are related to information seeking behaviour. When people are motivated their information seeking process and performance is generally enhanced. However, high motivation over a long period can have negative results; searchers become fatigued and start to seek irrelevant information. Flow is also affected by people’s, task and artefact characteristics. Again when people experience higher flow rates they usually produce better search outcomes than those with lower flow rates.
Personality dimensions and their effect on information behaviour and performance have been investigated in both disciplines. It would appear that more introverted searchers perform better than extraverts. However, it must be recognised that most people lie on the continuum between being an introvert or an extravert. Finally, both disciplines support Bandura’s theory about self-efficacy and its positive results in information seeking behaviour and performance.

References


BADDELEY, A. D., and HITCH, G. J., 1974. Working memory. The psychology of learning and motivation, 8, 47-89.


MILLER, G. A., 1956. The magical number seven, plus or minus two: some limits on our capacity for processing information. Psychological review, 63(2), 81-97.


Aspectual Analysis as an alternative way of understanding the definitions of Big Data

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Abstract
This paper considers the application of philosophy to the field of Big Data. In particular, the paper considers how “Dooyeweerd’s aspects of everyday life” can contribute to the reconceptualization of Big Data. The paper reviews recent debates relating to Big Data as a concept by investigating the meaning of Big Data definitions gathered in the De Mauro study published in 2015. In doing so, Dooyeweerd’s “philosophy of everyday life” can assist us, not only in finding the more precise meaning of definitions, but also in contributing to concepts that help our understanding of Big Data. In conclusion, this study shows a useful way of exploring the meaning of Big Data definitions towards affirming and enriching them.

Keywords: Big Data, definitions, diversity, everyday life, Dooyeweerd

Introduction
Big Data is seen as the core of a “new era”. The application of Big Data in different fields of research and practice can be seen to be very promising. There is considerable literature regarding the potential benefits of Big Data (Manyika et al., 2011; Chen et al., 2012; Raghupathi and Raghupathi 2014). It has been said that examples demonstrating the applicability of Big Data only scratch the surface of how Big Data can effect business transformation. Many studies have tried to characterise and define the term Big Data, yet academic understanding of Big Data is fragmented, lacks clarity, and definitions are sometimes rather broad and vague. There have been attempts to address the diversity and ambiguity of the definitions of Big Data, but these attempts are not sufficient for today’s – and tomorrow’s – digital, seamless, connected society. There is therefore a need for a new approach which will help us to understand each definition, and provide a broad picture of the literature surrounding the definitions of Big Data.

The aim of this paper is to explore the meaning of Big Data definitions using “Dooyeweerd’s modal theory” as a tool for analysis. Taking a conceptual approach, this paper demonstrates how “Dooyeweerd’s suit of aspects” could help improve the conceptualisation of Big Data. This is achieved in the following ways. The first section allows for a discussion of the recent attempts in redefining Big Data. Second, the appropriateness of these attempts is considered. Third, Dooyeweerd’s modal aspects are introduced as an alternative approach for analysing the concept. Fourth, the extant definitions of Big Data are aspectually analysed. Finally the results of the analysis and the possible contribution to the field are discussed.

Attempts to redefine Big Data
A convincing definition of a concept is an “enabler of its scientific development” (De Mauro et al., 2015). As Ronda-Pupo and Guerras-Martin (2012) suggest, the level of consensus shown by a scientific community regarding the definition of a concept can be used as a measure of progress of a discipline. Big Data however, has instead evolved so quickly and disorderly that such a universally accepted formal statement denoting its meaning does not currently exist. There have been many attempts to define what is meant by the term Big Data, However, none
of the definitions to date have been fully satisfactory as scholars are still creating new definitions (De Mauro et al., 2015).

There is currently no single, accepted, unified definition of Big Data (Ward and Barker, 2013), although various stakeholders have provided diverse and often contradictory definitions. The lack of a consistent definition introduces ambiguity and hampers the discourse relating to Big Data. Ward and Barker (2013) aimed to gather the various definitions to create a concise definition of an otherwise ambiguous term. They argued that “Big” implies significance, complexity and challenge. The problem arises when the term “Big” also invites quantification and this then presents difficulty with definitions. From Ward and Barker’s point of view most definitions have three factors in common: size, complexity and the use of technologies. According to Ward and Barker (2013) most definitions encompass at least one of these factors.

To give justice to the term, Ward and Barker believed there should be a combination of various technologies and the significant use of data sets. Therefore, as an outcome of the study, they defined Big Data as: “Big data is a term that can be used to describe the storage and analysis of large and or complex data sets using a series of techniques including, but not limited to: NoSQL, MapReduce and machine.”

In taking the study of Ward and Barker (2013) further, De Mauro et al., (2015) examined a large number of abstracts of peer-reviewed conference and journal papers. They identified four top research themes in current literature, namely: Information, Technology, Methods and Impact. They reviewed a non-exhaustive list of previously proposed Big Data definitions (Table 1) and conceptually tie them to the aforementioned four themes of research. After analysing the commonalities between definitions they proposed a consensual definition of Big Data as “Big Data represents the Information assets characterized by such a High Volume, Velocity and Variety to require specific Technology and Analytical Methods for its transformation into Value.”

To De Mauro et al., (2015), agreement among the definitions of Big Data comes from the acknowledgement of the centrality of some recurring attributes associated with Big Data. De Mauro et al., (2015) hope that a definition, carefully constructed, which takes into account the views of scholars and practitioners, would be less prone to attack from previous authors.
Table 1  Existing definitions of Big Data, adapted from De Mauro et al. (2015)

<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beyer and Laney (2012)</td>
<td>High volume, velocity and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making.</td>
</tr>
<tr>
<td>2</td>
<td>Dijcks (2012)</td>
<td>The four characteristics defining big data are Volume, Velocity, Variety and Value.</td>
</tr>
<tr>
<td>3</td>
<td>Intel, I. T. Center.(2012)</td>
<td>Complex, unstructured, or large amounts of data.</td>
</tr>
<tr>
<td>4</td>
<td>Suthaharan (2014).</td>
<td>Can be defined using three data characteristics: Cardinality, Continuity and Complexity.</td>
</tr>
<tr>
<td>5</td>
<td>Schroek et al.,(2012)</td>
<td>Big data is a combination of Volume, Variety, Velocity and Veracity that creates an opportunity for organizations to gain competitive advantage in today’s digitized marketplace.</td>
</tr>
<tr>
<td>6</td>
<td>NIST (2014)</td>
<td>Extensive datasets, primarily in the characteristics of volume, velocity and/or variety that require a scalable architecture for efficient storage, manipulation, and analysis.</td>
</tr>
<tr>
<td>7</td>
<td>Ward and Barker (2013)</td>
<td>The storage and analysis of large and or complex data sets using a series of techniques including, but not limited to: NoSQL, MapReduce and machine learning.</td>
</tr>
<tr>
<td>8</td>
<td>Microsoft (2013)</td>
<td>The process of applying serious computing power, the latest in machine learning and artificial intelligence, to massive and often highly complex sets of information.</td>
</tr>
<tr>
<td>9</td>
<td>Dumbill (2013)</td>
<td>Data that exceeds the processing capacity of conventional database systems.</td>
</tr>
<tr>
<td>10</td>
<td>Fisher et al.,(2012)</td>
<td>Data that cannot be handled and processed in a straightforward manner.</td>
</tr>
<tr>
<td>11</td>
<td>Shneiderman (2008)</td>
<td>A dataset that is too big to fit on a screen.</td>
</tr>
<tr>
<td>12</td>
<td>Manyika et al., (2011)</td>
<td>Datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.</td>
</tr>
<tr>
<td>13</td>
<td>Chen et al., (2012)</td>
<td>The data sets and analytical techniques in applications that are so large and complex that they require advanced and unique data storage, management, analysis, and visualization technologies.</td>
</tr>
</tbody>
</table>

It is clear that none of the presented definitions make it easy to understand the ambiguity associated to the term. Even the definition of De Mauro et al., (2015) is more of finding the relationship between the four Vs., by rearranging and shuffling the four Vs., than actually reducing the ambiguity of Big Data concept. A “good” definition of Big Data should represent the everyday experience of all the stakeholders, which is what may be necessary in a real-life application. However, before generating and introducing another definition to the field, one needs to understand the insight within the existing definitions and the reasons why they are ambiguous.
An alternative approach

This section outlines the need for an alternative approach to defining Big Data.

• First, some of the definitions are complicated and difficult to understand. They have a tendency to be rather broad and vague, and sometimes even poetic in nature. For example Shneiderman (2008) defined Big Data as “A dataset that is too big to fit on a screen.”

• Second, there are overlaps between some of these definitions as they are sharing the same core understanding, have common elements with each other and yet treated as an exclusive definition from a different perspective. For example, the overlap between definitions provided from Oracle and Intel perspectives.

• Third, looking at the list of definitions presented in the second part of this paper indicates that these definitions are the product of recent years. Considering the issues and challenges in the field, in the years ahead, there is a chance of adding more definitions to the field. We need to remember that the potential of technologies, people, and organisations cannot be limited to these definitions. So as both attempts show there is, and will be, a diversity of definitions. This being so then it would be useful to recommend an approach for accommodating the diversity in the field both for now and the future.

With all the points mentioned above it is tempting to think that the two attempts in redefining Big Data provided by Ward and Baker (2013) and De Mauro et al., (2015) are not probably sufficient and perhaps a new approach is required for analysing the definitions with the hope of opening up new avenues for defining the concept. Therefore a new solution needs to be explored which is applicable in many organisational contexts.

For tackling these problems, unlike the two attempts already discussed, this paper takes an approach which is pre-theoretical - one that allows us to consider the definitions from everyday life perspectives. This requires an approach that enables us to identify distinctly what is/are important in each definition, especially where this is multidimensional, which does not presuppose a certain context, and can view definitions as constituted in a coherence of diverse human experiences, across time and context. One approach that facilitates all these is based on modal aspects of the Dutch philosopher, Herman Dooyeweerd.

Dooyeweerd’s Philosophy

In order to fully understand how Big Data impacts on our lives we need a philosophy that acknowledges the possibility of a genuine point of contact between technology and human beings. Being mostly of the “life world”, with the human being in the social context, Big Data requires a philosophy that affords dignity to everyday life and to what it means to be fully and socially human. Thus materialist and rationalist philosophies are unlikely to be helpful (Eriksson, 2001). To deal with the definitions that are mostly of human origin, a philosophy is required to transcend and yet uphold the perspectives of the Big Data stakeholders.

Herman Dooyeweerd (1894-1977) who was a Dutch philosopher introduced the concept of “philosophy of everyday life”. His philosophy was a reaction against the Neo-Kantian trend in continental thought prevalent at that time. One of his significant domains of thought is the modal theory. For the purpose of this study we found the modal theory was useful in meeting the research aim.
Modal Theory

The Modal Theory emerged from Dooyeweerd’s comprehensive studies of theoretical thought and its relation to human reality. Dooyeweerd maintained that our thought is based upon, and bound to, our experience and that this experience exhibited a number of distinct modalities (or aspects) of organization or laws (Dooyeweerd, 1955). Accordingly a modality emerges out of human interaction with reality, which includes both perceptions and conceptions (Eriksson, 2001), and it is a particular type of knowledge that has its own unique and distinct characteristics. Dooyeweerd proposed 15 modalities which he termed “Aspects of everyday life” and these are shown in Table 2. The first column is aspects and the second column shows their kernel meaning.

Early aspects anticipate the later aspects (for example, the lingual anticipates the social) and later aspects give more meaning to earlier ones. Each aspect is a sphere of meaning that is centred on a kernel meaning. Dooyeweerd believed that kernel meaning of aspects cannot be defined by theoretical thought, but can be grasped by intuition. The aspects cannot be directly observed, but they are expressed in things, events, situations, and so on as ways these can be meaningful. All things in real-life involve functionality in a variety of aspects, usually all the aspects. By this we do not mean that aspects are different parts of things in reality, but rather that they are different ways in which it occurs meaningfully. To Dooyeweerd “each aspect plays a different but necessary part in making life richly good” (Basden, 2008). Therefore, all things within our experience make sense by reference to one or more of the aspects.

Table 2  Dooyeweerd’s aspects

<table>
<thead>
<tr>
<th>Aspects</th>
<th>(Meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>(Discrete amount)</td>
</tr>
<tr>
<td>Spatial</td>
<td>(Continuous extension)</td>
</tr>
<tr>
<td>Kinematic</td>
<td>(Flowing movement)</td>
</tr>
<tr>
<td>Physical</td>
<td>(Fields, Energy, mass)</td>
</tr>
<tr>
<td>Biotic/organic</td>
<td>(Life, organism)</td>
</tr>
<tr>
<td>Sensitive/psychic</td>
<td>(Sensing, feeling, emotion)</td>
</tr>
<tr>
<td>Analytical</td>
<td>(Distinction, concepts, Abstraction, logic)</td>
</tr>
<tr>
<td>Formative</td>
<td>(Deliberate shaping, Technology, skill, history)</td>
</tr>
<tr>
<td>Lingual</td>
<td>(Symbolic signification)</td>
</tr>
<tr>
<td>Social</td>
<td>(Relationships, roles)</td>
</tr>
<tr>
<td>Economic</td>
<td>(Frugality, resources; Management)</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>(Harmony, delight)</td>
</tr>
<tr>
<td>Juridical</td>
<td>(‘Due’, appropriateness; Rights, responsibilities)</td>
</tr>
<tr>
<td>Ethical</td>
<td>(Attitude, Self-giving love)</td>
</tr>
<tr>
<td>Pistic/Faith</td>
<td>(Faith, commitment, belief; Vision of who we are)</td>
</tr>
</tbody>
</table>

Big Data such as patients’ health records, IMF datasets, etc. are the product of everyday human experiences with the system and so can be thought about in terms of aspects. The present study uses the modal theory as a tool for finding and understanding the everyday life meaning of each definition of Big Data.
The next section presents an analysis of each of the definitions (as shown in the earlier Table 1) using Dooyeweerd’s aspects.

**Aspectual Analysis of the definitions**

This section reviews ways in which Big Data researchers and commentators have conceptualized and defined Big Data. Here we look at the words which directly explain Big Data. The present investigation uses the modal theory of aspects as a tool of investigation. We represent our analysis in Table 3. The second column indicates the authors, and the third column shows our analysis of the definitions.
<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Aspectual Analysis of the definitions in Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beyer and Laney (2012)</td>
<td>Volume is functioning in Quantitative and Spatial aspects. Velocity is functioning in Quantitative and Kinematic aspects. Variety is Analytical aspect. Cost-effective is functioning in Economic aspect. An innovative form of processing information is functioning in Formative aspect.</td>
</tr>
<tr>
<td>2</td>
<td>Dijcks (2012)</td>
<td>Volume is functioning in Quantitative and Spatial aspects. Velocity is functioning in Quantitative and Kinematic aspects. Variety is Analytical aspect. Value is referring to the facilitating conditions. It shows Oracle belief that existing technical infrastructures are available to support storage and analysis of Big data. That is giving due to the infrastructures which were supporting data management. This is functioning in Juridical aspect.</td>
</tr>
<tr>
<td>3</td>
<td>Intel, I. T. Center.(2012)</td>
<td>Being Complex is functioning in Analytic aspect. Unstructured is mainly Formative aspect. But here by Complex and unstructured the author means large amounts of data which is a functioning in Quantitative and spatial aspects.</td>
</tr>
<tr>
<td>4</td>
<td>Suthaharan (2014)</td>
<td>Cardinality is a functioning in Quantitative aspect. Continuity is a function in Spatial aspect. Complexity on its own is a functioning in Analytical aspect.</td>
</tr>
<tr>
<td>5</td>
<td>Schroek et al., (2012)</td>
<td>Volume is functioning in Quantitative and Spatial aspects. Velocity is functioning in Quantitative and Kinematic aspects. Variety is Analytical aspect. Veracity refers to trust which is mainly a functioning in Pistic aspect.</td>
</tr>
<tr>
<td>6</td>
<td>NIST (2014)</td>
<td>Emphasize on volume, velocity and variety. Volume is functioning in Quantitative and Spatial aspects. Velocity is functioning in Quantitative and Kinematic aspects. Variety is Analytical aspect. Here the author refers to the efficiency in storing, manipulating and analysis of Big Data which is mainly functioning in Economic aspect.</td>
</tr>
<tr>
<td>7</td>
<td>Ward and Barker (2013)</td>
<td>Here Ward and Baker (2013) emphasize in on the large and/or complex data sets. Large is a functioning in both Quantitative and spatial aspects. If complex here means large then it is function in the same aspects, but if not then it is Analytical aspect.</td>
</tr>
<tr>
<td>8</td>
<td>Microsoft (2013)</td>
<td>Massive is mainly both Quantitative and Spatial aspects, highly complex is mainly Analytical aspect.</td>
</tr>
<tr>
<td>9</td>
<td>Dumbill (2013)</td>
<td>Emphasize is on exceeding the processing capacity of conventional database systems. This exceeding is referring to a kind of mastery and power which is a functioning in Formative aspect.</td>
</tr>
<tr>
<td>10</td>
<td>Fisher et al.,(2012)</td>
<td>This is a vague definition. The author is telling us what the Big Data is not. Not handled and processed in a straightforward manner is an emphasis on complexity in handling which is both Analytical and Formative aspect.</td>
</tr>
<tr>
<td>11</td>
<td>Shneiderman (2008)</td>
<td>Dataset that is too big to fit on a screen is a function in Economic aspect.</td>
</tr>
<tr>
<td>12</td>
<td>Manyika et al., (2011)</td>
<td>Emphasis is on the size which is beyond the ability of typical software tools. Similar to Dumbill (2013) this is referring to the mastery power of Big Data which is mainly Formative aspect.</td>
</tr>
<tr>
<td>13</td>
<td>Chen et al.,(2012)</td>
<td>Similar to Microsoft (2013), again Large here is a functioning in Quantitative, Spatial aspects and complex is a functioning in Analytic aspect.</td>
</tr>
<tr>
<td>14</td>
<td>Boyd and Crawford (2012)</td>
<td>Both cultural and technological are functioning in Formative aspect. Being scholarly is functioning in Analytical and Formative aspect.</td>
</tr>
<tr>
<td>15</td>
<td>Mayer-Schönberger and Cukier (2013)</td>
<td>Key shift and organising society is a functioning in Formative aspect.</td>
</tr>
</tbody>
</table>
Summary of analysis

Table 4 indicates all the results together. The first column shows the numbers associated with the definitions, the second column shows their related main aspects and the third column is the secondary aspects. Main aspects were derived via aspectual analysis, an understanding of their kernel meaning. Notice that some definitions are the manifestation of three aspects, which is mainly because the three aspects were considered as equally important to the desired definition. For most definitions there was a chance of finding other aspects. These aspects are deduced from their associated definitions. In this initial study we only focus on the main aspects.

Table 4  Summary of the aspectual analysis

<table>
<thead>
<tr>
<th>Definitions No.</th>
<th>Main aspects</th>
<th>Secondary aspects in their order</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quantitative, Spatial, Kinematic, Analytical</td>
<td>Economic, Formative</td>
</tr>
<tr>
<td>2</td>
<td>Quantitative, Spatial, Kinematic, Analytical, Juridical</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>Quantitative, Spatial</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>Quantitative, Spatial, Analytical</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Quantitative, Spatial, Kinematic, Analytical, Pistic</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Quantitative, Spatial, Kinematic, Analytical</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Quantitative, Spatial, Analytical</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Quantitative, Spatial, Analytical</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Formative</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Analytical, Formative</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Economic</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Formative</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Quantitative, Spatial, Analytical</td>
<td>None</td>
</tr>
<tr>
<td>14</td>
<td>Analytical, Formative</td>
<td>None</td>
</tr>
<tr>
<td>15</td>
<td>Formative</td>
<td>None</td>
</tr>
</tbody>
</table>

To have a better view of comparison between the different aspects, Table 5 below presents the results in another format. The first column shows fifteen aspects in their usual order and the second column shows the number of times one aspect has been the main sphere of meaning for different definitions of Big Data.
<table>
<thead>
<tr>
<th>Aspects</th>
<th>Frequency of aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>9</td>
</tr>
<tr>
<td>Spatial</td>
<td>9</td>
</tr>
<tr>
<td>Kinematic</td>
<td>4</td>
</tr>
<tr>
<td>Physical</td>
<td>0</td>
</tr>
<tr>
<td>Biotic/organic</td>
<td>0</td>
</tr>
<tr>
<td>Sensitive/psychic</td>
<td>0</td>
</tr>
<tr>
<td>Analytical</td>
<td>9</td>
</tr>
<tr>
<td>Formative</td>
<td>5</td>
</tr>
<tr>
<td>Lingual</td>
<td>0</td>
</tr>
<tr>
<td>Social</td>
<td>0</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>0</td>
</tr>
<tr>
<td>Juridical</td>
<td>1</td>
</tr>
<tr>
<td>Ethical</td>
<td>0</td>
</tr>
<tr>
<td>Pistic/Faith</td>
<td>1</td>
</tr>
</tbody>
</table>

The Table 5 illustrates that Quantitative, Spatial and Analytical aspects have appeared more as the main aspects in different definitions compared with other aspects. Formative aspect has been the main component of conceptualising Big Data five times. Kinematic repeated four times as the main aspect. From Social and Normative level of real-life only one aspect has received attention one time, which is Economic aspect. Interestingly, from Societal and Normative level two aspects (i.e. Juridical and Pistic) have received attention once for each.

Dooyeweerd’s aspects were used as a tool to analyse the definitions of Big Data. In the next part of the paper, the value of the Dooyeweerd’s approach is discussed, based on these results.

**Discussion**

Investigation of meaningfulness based on what is more important in each definition yielded in the aspectual picture which provides various ways of discerning characteristics of Big Data as a whole, some of which support what we might already suspect, while some disclose new and surprising things.

**So what?**

The most important factor that has resulted from this analysis is that eight of Dooyeweerd's fifteen aspects are represented. The range of aspects represented in the collection means that the current definitions do not offer a wide range of exemplars. Few aspects predominate, and the others feel like outliers. Though certain aspects - the Quantitative, Spatial, and Analytical - occur more frequently, there is no more or less attention to other aspects. These most occurred aspects are not isolated from the rest.

This shows that, using Dooyeweerd we can identify gaps in conceptualising Big Data. Showing gaps allows us to provide a way of reducing the ambiguity in the definition of Big Data, one factor which was the aim of research for Ward and Barker (2013) and De Mauro et al., (2015).
Ward and Barker (2013) intention was to give justice to the term. But there is an alternative way of doing that. If things are centred on meaningfulness, then this gives a philosophical basis for considering each of the definitions to understand which aspects were and were not taken into account. Dooyeweerd’s aspects are all equally important in our everyday life. To give justice to the term Big Data, the existing definitions of Big Data would benefit from the Modal Theory.

Dooyeweerd argued that there is no incompatibility between the aspects and all work in harmony with the others, as instruments of an orchestra do when playing a symphony. This leads to the Shalom Principle: that if we function well in every aspect then things will go well, but if we function poorly in any aspect, then our success will be jeopardized (Basden, 2008). For example the definition "complex unstructured large amounts of information" is too general, and would benefit from other aspects. It may be helpful, to take into account equally other aspects such as Pistic, Ethical, Juridical, Aesthetic, Social, Lingual. It is Dooyeweerd’s contention that we function in all aspects: that all of these aspects work in harmony in a thing.

Lingual aspect is concerned with the meaning of the data. This would seem important in Big Data; surely if we do not know what the source of data means, we will not deal with it correctly. Social aspect is about the status or affiliations of the sources. For example, the head of a political party might lead to biased data. Looking at Economic aspect, waste and superfluity is a problem. Big Data is massive, but if there is a way of reducing waste without losing data, that is surely important. Looking at Aesthetic aspect, one can think of the harmony of the data and the data sources and question how they all fit in a large picture. Both rightness of the Big Data source and appropriateness of the analysis techniques are highlighting the importance of Juridical aspect. Thinking about the user of the findings of Big Data analytics is Ethical. So much data is collected and mined by Facebook, Google, mobile phone companies that raise the issue of users’ awareness. It is not clear where in the four or five Vs. we would be able to fit the Ethical aspect. Finally, trustworthiness of the data and the processing algorithms or techniques is centred on Pistic aspect.

These all go beyond the Vs in the existing definitions of Big Data and need our attention in conceptualising the concept. From Dooyeweerdian point of view each aspect brings a blessing to temporal reality, which cannot be obtained from other aspects, even in combination. None of the aspects could be alleviated against others.

We also observed that while De Mauro et al., (2015) see the consensus between definitions coming from centrality of some attributes (i.e. information, method, technology and impact), the Dooyeweerdian approach enables us to see the fifteen aspects of everyday life as a common ground for all definitions and upcoming ones. This way Dooyeweerd helped us to shed a new light on the definitions of Big Data by extracting the essence of what Big Data means to academics and practitioners.

**Conclusion**

The aim of this paper was to explore the meaning of Big Data definitions using “Dooyeweerd’s modal theory” as a tool for analysis. This has been achieved through the aspectual analysis of the extant definitions in the literature.

The paper discussed the possibility of applying Dooyeweerd’s aspects to the definitions of Big Data by seeking to understand in which sense the definitions are meaningful. In the first place, the vagueness of the concept inspired the scholars to make an attempt in redefining the
concept of Big Data. To some extent Ward and Barker (2013) and De Mauro et al., (2015) have addressed the ambiguity of the definitions. But in doing so, their approach seems not to be sufficient. This initial study has provided a way of showing gaps in the definitions of Big Data.

This research has implications in line with the interests of those who are concerned about the concept, challenges and improvement of research in the field of Big Data. Regarding the discussion section, this study contributes to the attempts in defining and conceptualising the concept of Big Data.

First, this study has concentrated on the definitions of Big Data in the literature. This paper has not aimed to criticise the definitions of Big Data, but, by finding the spheres of meaning in the definitions, it has shown the gaps in the concept of Big Data. We hope this opens up new avenues for thinking for those interested in redefining the concept of Big Data. Dooyeweerd’s philosophy helped us to have a pre-theoretical view and consider the definitions from the everyday life experience. The idea that early aspects anticipate the later ones will help academics to ponder about a new definition of Big Data and recommend one, which includes multiple aspects.

Second, if we see each aspect as a distinct category but interrelated to other aspects, then we are able to categories about 16 definitions into 8 aspects. The advantage of this is that, compared to 4 aspects considered by De Mauro et al., (2015), future research would be able to examine current and upcoming definitions on the basis 15 aspects.

This preliminary review provides a basis from which to investigate and target the gaps in how the Big Data is defined. Future research should i) draw attention to these definitions and provide a way of enriching them, ii) look at the ways of accommodating diversity of, and addressing the overlaps in, the definitions of Big Data.

Acknowledgement:
The authors would like to acknowledge thanking Professor Andrew Basden from the University of Salford for providing insight and expertise that greatly assisted the research.

References


Intel, I. T. Center. (2012) Big data analytics: Intel's it manager survey on how organizations are using big data.


Developing a model for investigating academic libraries as learning organisations

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Aberystwyth University

Contemporary academic libraries need ‘to add value to their roles and show the impact of their work’ (Delaney and Bates, 2015: 32) by becoming learning organisations, transforming themselves into organisations “where people continually expand their capacity to create results they truly desire” (Senge, 1995: 3). The concept of a ‘learning organisation’ is problematic; there is little agreement in relation to its inherent characteristics and how one may be created (Garvin, 1993; Bui and Baruch, 2010). Few frameworks or models exist to diagnose and describe existing organisational practices prior to a planned transformation into a learning organisation (Thomas and Allen, 2006).

This study proposes a model for investigating the development of academic libraries into learning organisations, based on literature and empirical data derived from a doctoral case study of academic libraries in Thailand (Limwichitr et al., 2015).

Human Resource Development (HRD) and Knowledge Management (KM)

HRD and KM are the two critical components in relation to creating and sustaining a learning and knowledge culture within an organisation. HRD offers learning opportunities - building in supportive mechanisms such as performance management, appraisal, and reward systems, with KM providing a means to capture and transfer individual knowledge to group and organisational level. Similarly, HRD plays a key role in promoting learning opportunities - enhancing continuous learning and improvements, whilst KM facilitates learning capture and sharing, effecting its transformation into collective learning to improve individual, team, and organisational performance. The two strands are thus complementary and should be viewed in parallel (Marsick and Watkins, 2003; Haesli and Boxall, 2005; Thomas and Allan, 2006; Pastor et al., 2010).

Although a number of studies have examined the role of either HRD or KM in the development of learning organisations, HRD and KM practices are normally investigated separately, as they are deemed to be different (Haesli and Boxall, 2005). This is evident from the case study data; HRD is normally located within HR functions, with KM assigned to a special task force or committee specifically established for this purpose. To date the two have largely been treated separately, thereby creating a lack of understanding as to their interrelationship and collective impact.

Background

Based on the literature review and case study empirical data current practices in relation to HRD and KM may be categorised as ranging in scope and maturity from the mechanistic to a more holistic and integrated level. The mechanistic level is one whereby organisations and their staff are viewed as machines, with an emphasis on structured and standardised work processes, based on the belief that such systematic, repetitive work processes and cycles enhance performance (Huczynski and Buchanan, 2013). In academic libraries, the mechanistic level is demonstrated by the high degree of task specialisation (Martin, 2013). This is supported by evidence from the six case libraries; their organisational structures reflect classic bureaucratic characteristics: top-down authority hierarchies, rigid departmental divisions, with tight specification of responsibility and authority. The work of each department is highly
structured and standardised, based on a formal set of rules and regulations and breaks down into routines and well-defined tasks. It has been argued that the mechanistic view fails to explain the complexity of organisational phenomena, especially in relation to building a learning organisation, with its over-reliance on systematic work processes, causing the aspect of learning and development to be disregarded (Huczynski and Buchanan, 2013).

**A new model for investigating a learning organisation**

In developing a new model combining both HRD and KM, this study allows a more detailed understanding of the factors necessary to transform academic libraries into mature learning organisations.

The model outlined here is informed by Garvin’s 3M framework (1993):

1. **Meaning**: establishing the meaning of learning organisations;

2. **Management**: producing and implementing supportive practices, focusing on interactions between HRD and KM

3. **Measurement**: measuring and evaluating the outcomes of the implementation.

To supplement Garvin’s 3 Ms framework, one more aspect is added:

4. **Critical success factors** (CSFs) affecting development into a learning organisation.

CSFs are developed acknowledging the importance of organisational context and other related aspects such as systems, processes, policies and mechanisms designed to promote learning, ensuring their alignment (Hitt, 1996; Senge, 1995; Bui and Baruch, 2010; Marquardt, 2011).

**Meaning (M1)**

Given that the creation of a learning organisation necessitates implementing cultural change into a learning culture, the first stage, establishing meaning is critically important as it involves examining values and assumptions that reinforce the status quo about how things should operate. Cummings and Worley (2008) identify three main strategies: 1) developing clear meaning and definitions; 2) creating a vision of what the libraries want to become; and 3) communicating this vision to staff.

Staff resistance is a potential outcome as implementing a learning culture may appear a top-down initiative. Staff may fail to recognise its importance due to lack of adequate information, or low motivation, and exhibit little confidence in such changes (Cummings and Worley, 2008). An initial review of the case libraries revealed problems in transforming the libraries into learning organisations resulting from a lack of understanding of the concept, creating staff uncertainty and hence reluctance to embrace such initiatives fully.

**Management (M2)**

There are two main dimensions to be investigated here. Firstly, HRD and KM practices are combined and become the centre of interest. The main focus is on investigating how a learning organisation can be built up, based on applying and coordinating the two practices which are considered as two complementary strands. Secondly, the authors investigate the levels of practices of both HRD and KM which are then categorised into two main groups: mechanistic and integrated. Mapping of the key features of the two concepts is shown in Table 1 below.
Table 1  Key features of human resource development and knowledge management

<table>
<thead>
<tr>
<th></th>
<th>Mechanistic level</th>
<th>Integrated level</th>
</tr>
</thead>
</table>
| Human resource development| • adheres to the planned and prescriptive approach to training and development following the stage of planning, implementation, and evaluation.  
• focuses on providing off-the-job training normally treated as ad-hoc learning activities. | • reflects attempts to integrate training and development into day-to-day practices.  
• involves more on on-the-job training; self-direction of employees rather than classroom or instruction-based. |
| Knowledge management      | • reflects the use of codification strategy emphasising the application of technology and resources 'to do more of the same but better'.  
• considers KM as ‘ad-hoc programmes’ or piecemeal implementation and is driven by small groups. | • reflects the use of personalisation aiming at getting people to share knowledge.  
• emphasises the importance of alignment between organisational policy and strategies, KM practices, and other aspects of the organisation. |

To simplify and show the relationship between the components of the management, all components are mapped into two dimensions and divided into four quadrants to illustrate the two managerial strands. The horizontal dimension examines the extent to which libraries have implemented practices in relation to HRD on one side with KM on the other; the vertical dimension reflects the extent to which the libraries possess a degree of control, ranging from a rigid mechanistic level into a fully integrated level. The model is divided into four quadrants using a diamond-shape model to plot current practices based on the two main dimensions as shown in Figure 1.

**Figure 1  Mapping the concepts into a diamond-shape model**

**Quadrant A** represents the implementation of HRD practices at the mechanistic level. At this relatively low level, organisational policy and learning strategies are structured; HRD practices are categorised as ‘a systematic or planned approach’ (Gold, 2012). Training and development...
may fall into this quadrant if practices adhere to a more prescriptive approach, whereby training needs are identified, training programmes designed and implemented, with end stage evaluation to ensure original objectives are met.

At this level, academic libraries may launch major efforts to develop staff and allocate significant amounts of their budget to enhance learning and development. Similarly, budgets may have been allocated to provide training opportunities, but these will have been treated as ad-hoc learning opportunities or events, rather than integrated into day-to-day operations. It is also evident from the empirical data that although libraries provided training and development opportunities for staff, these tended to focus on off-the-job training, usually classroom- and instructor-based, delivered by internal or external specialists, with some evidence of staff enrolment on external training programmes elsewhere, such as Masters’ schemes.

**Quadrant B** represents HRD at a higher integrated level. Advocates of an integrated level of HRD believe that learning organisations must build in desire and opportunity to learn in such a way that learning is integrated and becomes a regular part of day-to-day organisational activity. At this level the emphasis is on employing a variety of approaches, combining formal and informal learning activities to make learning a way of life throughout the organisation with off-the-job training and on-the-job learning provided (Beardwell and Clayton, 2010). There is movement away from classroom-based and instructor-led learning to self-directed learning by staff. Training needs become demand-led rather than being driven by top management (Gold, 2012), with increasing interest in the role of leaders in assessing and developing staff, entailing managers and department heads engaging in mentoring and coaching activities.

**Quadrant C** represents KM at the lower, mechanistic level. KM initiatives occur in response to the external environment, and reflect a codification strategy focusing on the application of technology and resources ‘to do more of the same, but better’ (Ghuman, 2010). Information technology (IT) plays an important role but is used to facilitate codification, storage, and retrieval rather than as a platform for knowledge sharing. This is supported by empirical data; KM initiatives in the case study libraries in Thailand reflect mechanistic characteristics as they are initiated in response to legal requirements of the governmental organisations: the Office of the Higher Education Commission (OHEC) and the Office of the Public Sector Development Commission (OPDC). KM initiatives are primarily IT-led initiatives, as evidenced by their focus on developing institutional repositories to store and distribute the universities’ intellectual assets at the early stages of implementation.

Here, KM implementation is ad-hoc or piecemeal, largely driven by small groups. Whilst libraries may attempt to implement KM as an organisation-wide project, KM is embarked upon in piecemeal fashion within small silos in organisations, thereby creating a lack of understanding and awareness amongst staff (Ahmed et al, 2002).

**Quadrant D** shows KM at an integrated level, with developments based on assumptions that knowledge processes and people are more important than technology; ‘nothing would happen unless people accept and make use of the knowledge’ (Ghuman, 2010). There is a move away from IT-driven policy and strategies towards a more people-driven perspective.

In addition to investment in IT and facilities, KM at this level requires people to share information, individual knowledge and experiences, in order to develop collective capability. Greater attention is paid to developing communities of practice and providing supportive
processes and mechanisms to induce knowledge sharing and learning, such as the use of rewards and incentives. Here, IT becomes a supportive tool for codification, storage, and retrieval (Ahmed et al: 2002; Ghuman, 2010).

Whilst the mechanistic level focuses on control and coordination by senior management to facilitate KM, at the integrated level, emphasis is placed on staff participation and involvement. The establishment of a formal KM team or committee at senior executive level, with managers and representatives from all departments assisting in smoothing knowledge flows and ensuring practices are integrated into all library functions, is a feature of a fully integrated learning organisation.

Measurement (M3)
The final stage of the cycle is Garvin’s third M, ‘Measurement’ (M3). This aspect follows as a result of applying the empirical data gathered from M1 and M2 to the model, in addition to the CSFs. All these aspects are combined to measure whether and to what extent current practices in the case study organisations result in their being fully-integrated and mature learning organisations. The outcomes should also identify any further modification of managerial practices required to fully transform the libraries into learning organisations.

Critical success factors (CSFs)
A learning organisation comprises complex multi-layers, combining together interrelated aspects; investigating these requires taking a holistic, systemic view of organisations in context. These are critical success factors which can either facilitate or block the development of a learning culture. To construct a learning organisation, organisations need to examine factors which keep organisational practices at a low, mechanistic level, representing barriers to developing into learning organisations. CSFs are categorised into five main groups:

1. organisational policy and strategies
2. leadership
3. organisational structure
4. organisational context and culture
5. measurement and evaluation systems.

The characteristics of CSFs at both levels are shown in Table 2
Table 2  Critical factors affecting learning organisations

<table>
<thead>
<tr>
<th>Focus</th>
<th>At mechanistic level</th>
<th>At integrated level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational policy and strategies</td>
<td>are driven from top management and feed through the individual level down the hierarchy.</td>
<td>are developed based on staff involvement; policy in relation to learning strategy is integrated with organisational policy and strategies.</td>
</tr>
<tr>
<td>Leaders</td>
<td>use a hierarchical command and control leadership style focusing on directing and controlling.</td>
<td>play an important role in facilitating and promoting workplace learning.</td>
</tr>
<tr>
<td>Organisational structure</td>
<td>rigid and is designed for maintenance hierarchy and a need for control.</td>
<td>more fluid; unbounded structures with fewer divisional barriers.</td>
</tr>
<tr>
<td>Organisational context and culture</td>
<td>Commitment to completing routine work or day-to-day operations.</td>
<td>engages in continuous learning and improvement.</td>
</tr>
<tr>
<td>Measurement and evaluation systems</td>
<td>occur at the final stage or at the end of projects/activities/events to evaluate satisfaction to prove the worth of investment.</td>
<td>occur throughout the processes to identify changes and improvements and involve the idea of self-examination and continuous improvement.</td>
</tr>
</tbody>
</table>

The four aspects are combined to develop the proposed model for investigating a learning organisation in academic libraries as shown in figure 2 below.

The diagnostic process begins with an identification of Meaning and Management, together with the CSFs, exploring the following themes:

1. **Meaning**: explores how libraries develop clear meaning, create shared values and vision together with how they communicate this vision to library staff
2. **Management**: establishes how HRD and KM has been developed and used to create a learning organisation
3. **CSFs**: determines what CSFs are in place, whether they align with the concept of learning organisation and fit with each other.

These data are then combined and reviewed in **Measurement**, to derive an assessment of the extent to which current practices are compliant with those of a fully integrated learning organisation. The results of this final phase may be used to modify or propose actions to transform current organisational systems and processes.

Thus the model may be used to guide managers responsible for integrating the concept of learning organisation into work practices. It may also be used to develop a step-by-step plan to assist academic libraries in achieving implementation, in addition to addressing any problems in the transformation process.
Figure 2  Proposed model for investigating a learning organisation

Application of the model

The validity of the model is tested by applying it to all the Case Libraries in the thesis, the results of one of which are outlined below, that of CU Library. The concept of the learning organisation was introduced in academic libraries in Thailand in 2009 in response to the Royal Decree of Good Governance and the standard criteria formulated by the Office of the Public Sector Development Commission (OPDC) and the Office of the Higher Education Commission (OHEC). Initiatives, particularly in relation to HRD and KM, have been implemented to conform to the standard criteria.

HRD and KM practices of the CU library still reflect mechanistic characteristics. A budget has been allocated for training and development, and staff are required to produce a report outlining means for knowledge sharing. Training is classroom based and separate from normal working patterns. KM was implemented as a planned project with the establishment of a KM committee, formulating policy and strategies, and executing and evaluating the KM plan. A linear KM process was followed, according to OPDC/OHEC standard criteria, beginning with knowledge identification, through to knowledge sharing, knowledge codification, knowledge dissemination and application.

Enterprise resource planning (ERP) or e-HRM system is used to support knowledge work. In the initial stages, the focus was on the development of an intellectual repository and a community of practice designed to preserve institutional intellectual property. Although the ultimate goal of IT implementation is to replace administrative works with new working practices allowing more time for experimentation to develop work routines (Andreu and Ciborra, 1996; Barrett and Oborn, 2013), it was found that the systems were used mainly for keeping records
of activities and storing knowledge rather than developing means to enhance knowledge sharing and learning.

Some evidence of transformative practice was identified during interviews with stakeholders. In relation to HRD, opportunities were provided for staff to join residential programmes, internships, or workshops abroad allowing them to increase their knowledge and skills which could be applied to library work. On-the-job training was promoted to enhance work-based learning. Staff were encouraged to work in cross-functional teams or networks. Initiatives or projects such as the Development of Subject Specialists and Process Improvements were also launched. In terms of KM, a more personalised strategy was employed, focusing on bringing people together for knowledge sharing in order to capture and make use of their tacit knowledge. KM activities such as knowledge forums, expert talks, or morning talks, were organised to promote knowledge sharing as an integral part of staff behaviour. These HRD and KM practices in relation to HRD and KM are summarised in Figure 3.

Figure 3  Key HRD and KM practices in CU Library

Assessing CSFs
The five CSFs identified above are assessed in relation to the CU Library below.

Organisational policy and strategies
Highlighted here is the importance of aligning organisational policy and strategies, KM and HRD, and other aspects to ensure learning and development are embedded within the cultural fabric of the organisation (Ahmed et al, 2002). As the library still possessed the characteristics
of a bureaucratic structure, staff were familiar with the use of command and control and this inhibited learning and creativity (Newell et al, 2009). Cummings and Worley (2008) also address the importance of staff participation and involvement in planning and implementing organisational transformation as it is more likely that they will commit to and become involved in the initiatives, if they feel they are a part of the process.

Leadership

Studies highlight the role of leaders in practicing and modelling learning for the whole organisation to follow. Such leaders expound energy in encouraging employees to commit to learning and development, providing time, resources, and opportunities to generate ongoing learning for their employees (Marquardt, 2011). At a mechanistic level, the learning organisation was led by a top down approach, reflected in a hierarchical, command and control leadership style. A learning culture was initiated by senior management and fed down through the hierarchy to individuals, rather than empowering staff to decide their own learning and development. To transform the organisation to a higher level, the role of the leader needs to change from the pattern of ‘leaders influence and employees follow’ to paying attention to the role of staff, helping them to develop their capabilities, motivating them to develop and share knowledge (Huczynski and Buchanan, 2013; Northouse, 2013). The role of leaders in providing guidance, encouraging and empowering staff, monitoring problems and supporting staff with facilities (i.e. budgets, facilities and time) was particularly highlighted in the library.

Organisational structure

In mechanistic organisations, staff require control, with organisational structures designed to maintain a rigid hierarchy, reliant on organisational charts. Learning and development is predetermined; practices are standardised by rules, regulations, work manuals and procedures (Huczynski and Buchanan, 2013). It was found that the case library still possessed a high degree of formalisation and centralisation. Library processes were defined and controlled by rules, regulations and standardised procedures, with formal decisions made by senior management. Library work was organised into functional departments, increasingly fragmented, creating a barrier for collaboration and coordination of work between departments. This model resulted in staff possessing specific skills sets for technical work or reference services for example, and produced unique departmental languages, inhibiting learning across departments. Bureaucracy and unnecessary rules require removal, unnecessary restrictions and procedures need to be cut, and restrictive control and boundaries that keep individuals and groups isolated should be removed as blockages to learning (Newell et al, 2009; Marquardt, 2011).

Organisational context and culture

A learning culture should be created in an organisational context in such a way that staff are motivated to experiment and search for better work practices. (Andreu and Ciborra, 1996). For the CU library, its context and culture, to some extent, still reflects the mechanistic level. Staff focus on delivering services and completing departmental day-to-day workloads rather than on self-improvement. Learning and development is viewed as an unusual event happening only in classrooms, at conferences, or staff retreats and treated as discrete from routine work. A preferred characteristic of the learning organisation is that organisation members view learning as a natural part of their daily work, learning from experience and developing their own learning continuously. Increasing workload was identified as a key barrier; inhibiting individual learning and development. To effect a transformation to a more integrated level, employees’ commitment needs to be transformed from commitment to completing routine day-to-day tasks into commitment to learning and development and continuous improvement, by establishing
these aspects as core values as well as developing supportive characteristics of openness, trust and tolerance within the organisations.

Measurement and evaluation systems

"What gets measured gets managed" is a key principle of management, highlighting the importance for aspiring learning organisations to develop a variety of ways to measure and evaluate their practices to ensure learning is integrated. The measurement and evaluation systems used currently as mechanisms for the creation of a learning culture are evaluated here, including their appraisal, rewarding and recognition systems.

Transforming the library into a learning organisation is effected largely through developing policy and strategies, identifying key performance indicators (KPIs) as a means of measuring their success. At an individual level, policy and strategies were integrated into key performance indicator and appraisal systems. At the organisational level, measurement and evaluation of organisational practices were still mechanistic; initiatives were treated as projects, with evaluation normally occurring on completion and success judged largely in by quantitative measures such as number of HRD or KM activities, number of participants, and staff satisfaction with activities. Gold (2012) proposes that measurement and evaluation of learning and development should go beyond that of the mechanistic as it seeks to improve the quality of work practices. Organisations should integrate evaluation fully into work processes, to ensure staff are committed to self-development, and continuous improvement, in addition to ensuring integration of learning and development into their operations.

Conclusions

The proposed model addressed four main aspects. Empirical data from the doctoral study reveals that academic libraries face problems in establishing the meaning of the learning organisation. Using Garvin’s 3 Ms framework, we examine Meaning (M1) in this context by investigating definitions of the learning organisation in a library context, explore how the concept is developed into library vision and policy and strategies, and how libraries communicate and instil awareness of such initiatives amongst staff. Management (M2) is the core component of the model, focusing on an examination of managerial practices in relation to HRD and KM, together with determining the extent to which these may be categorised as functioning at either a mechanistic or integrated level. Data obtained from a related fieldwork study is plotted in the diamond-shape model divided into four quadrants to exemplify and demonstrate how the model operates. Measurement (M3) is then produced and based on data derived from the first two aspects, to assess their current status and identify any specific changes required for future development. A fourth aspect ‘Critical Success Factors’ (CSF) is added to Garvin’s 3 Ms framework, highlighting the need to examine organisational practices in parallel with organisational context, identifying related factors which may facilitate or inhibit the development of a learning organisation. Identifying CSFs enables organisations to understand and remove potential blockages and problems caused by these factors to effect organisational transformation.

This proposed model provides a new framework for investigating and understanding these two key interrelated concepts, HRD and KM, in terms of how they may be combined to support building a learning organisation, in addition to addressing attempts to transform relatively low, mechanistic levels of practice into higher, more integrated levels, to produce organisational transformation into a fully-fledged learning organisation. By this means, the model promotes a holistic understanding; identifying necessary practices as well as possible factors which may
impede transformational change into a learning organisation. The results of the study may thus be used to propose actions to transform organisations into true learning organisations.

References


A proposal for the development of individual virtual competences

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Abstract
This paper proposes a framework for the development of individual virtual competence (IVC) in undergraduate students so they can act more effectively in organizations that develop global projects. IVC has three dimensions – virtual self-efficacy, media skills, and virtual social skill – and the proposed framework for IVC development has four main stages. In the first stage, the participants develop technical skills. The second stage addresses social skills. In the third stage, the participants study emotional aspects related to virtual teams. Finally, in the last stage, the participants develop a project in cooperation with students from other universities. Students from different universities, countries, time zones and cultures will be divided into virtual teams and assigned specific deliverables that will compose a final product. The idea is to create an environment that simulates a project with virtual teams. It is also a problem-based learning (PBL) approach in which students face a situation that can be properly managed in several different ways. The students have to find solutions to situations while respecting the objectives of the project and their own organizational conditions.

Introduction
With the intensification of international alliances and the development of information technology (IT) for contactless communication, an increasing number of people currently work in virtual contexts where geographically dispersed individuals communicate and collaborate with each other through electronic means to perform their activities (Warkentin and Beranek, 1999). Virtual teams are composed of professionals who work in coordination despite being geographically, organizationally and culturally dispersed.

Virtual teams suggest that it is possible to increase an organization’s flexibility. However, it is necessary to pay special attention in structuring and managing such teams, because their nature (i.e., the dispersion cited above) brings more complexity to the group collaboration challenge (Short et al., 1976; Daft and Lengel, 1986; Chidambaram, 1996; Jarvenpaa et al., 1998; Jarvenpaa and Leidner, 1999; Maznevski and Chudoba, 2000; Powell et al., 2004; Martins et al., 2004; Lin et al., 2008; Huang et al., 2010).

One way to approach this challenge is to study the set of knowledge, skills and attitudes individuals need for the establishment of an effective communication process through electronic means. Wang and Haggerty (2009) call this set of individual competences Individual Virtual Competence (IVC). According to these authors, IVC has three dimensions: virtual self-efficacy, media skills, and virtual social skill.

This paper proposes a framework for the development of IVC in undergraduate students so they can act more effectively in organizations that develop global projects.

The article has four sections. Section 2 presents and discusses the main concepts used in the study. In section 3 the model for IVC development is presented. Finally, Section 4 offers some final remarks.
Theoretical Review
A search in Web of Science with key words “virtual team” or “virtual teams” found 781 articles as of December 4, 2015 (Figure 1). Since 1993, the number of articles published in this area has grown steadily. This shows that this issue is scientifically relevant.

Figure 1  Number of published articles by year

As shown in Figure 2, the largest number of articles originates from the US (58%). Other European countries (only those appearing in Figure 2) account for another 40%. The research area with the largest number of articles about virtual teams in Web of Science is business economics with 373 articles, followed by computer science, psychology, engineering and information and library science with, respectively, 219, 176, 151 and 151 articles. Some journals belong to more than one research area, which is why the sum of the numbers of Figure 3 is more than 781.

According to Hayworth and Leidner (2000), the knowledge and experience of members of virtual teams in the use of various communication technologies mediated electronically is a basic individual competence. The results of their study suggest a positive relationship between the competence of the members of virtual teams in the use of various communication technologies and the success of the virtual team. Powell, Piccoli and Ives (2004) say that the technical expertise of the members of virtual teams impact the individual satisfaction of the team members with the virtual experience.

Larsen and McInerney (2002) also highlight the importance of specific individual skills for the performance of virtual teams. Among the main individual skills, they cite the ability of individuals to teamwork and the ability to adapt to rapid change. The importance of these skills is justified by the speed with which virtual teams are formed and disbanded. According to these authors, although the literature suggests that a higher degree of performance of traditional teams is usually achieved when its members have already shared a past experience of working together, the transience typical of virtual teams makes it impossible for team members to establish work relations for long periods of time and, therefore, emphasizes the need for rapid adaptation of team members to obtain satisfactory performance of virtual teams.
According to Rutkowski et al. (2007), the creation of virtual teams based only on skills and knowledge is not sufficient to achieve superior performance. The personalities and aptitudes of the team members, including cognitive, concentration and time management abilities, should be considered. Such characteristics can influence the ability of virtual teams to coordinate, as well as how members adapt the electronic media to their work, resulting in greater or lesser productivity of teams.

As stated above, IVC has three dimensions: virtual self-efficacy, media skills, and virtual social skill. The first dimension, virtual self-efficacy refers to individuals’ beliefs about their abilities in terms of virtual environments, the use of IT tools and execution of collaborative tasks. Individuals with higher virtual self-efficacy tend to seek multiple mechanisms to overcome any difficulties and persist through several attempts before the establishment of effective
communication using computer technology. Moreover, virtual self-efficacy also motivates individuals to mobilize efforts for non-technical issues, such as dealing with the development of work without face-to-face contact with other parties. To have confidence in dealing with both the technical and non-technical challenges of virtual work, individuals develop more effective communication, thus contributing to the improvement of knowledge transfer processes (Wang and Haggerty, 2009).

The second dimension of IVC is proficiency with virtual media. This ability is defined as the individual's ability to use and exploit the technologies of communication and information, making use of their full potential to facilitate communication. Wang and Haggerty (2009) emphasize that virtual media skills go beyond mere knowledge and use of electronic media and are more related to the understanding of its potential to facilitate collaborative activities in virtual environments. This ability is fundamental to complementing the limited information available without face-to-face contact.

The third dimension of IVC is virtual social skill, which is defined as the ability of individuals to build relationships with other individuals in virtual contexts. Given the technological limitations of virtual media in facilitating social interactions, virtual social skill is an important element to enhance cohesion and common understanding between individuals – elements that, in turn, facilitate communication (Wang and Haggerty, 2009).

**Figure 4** Constituent dimensions of IVC. Adapted from Wang and Haggerty (2011)
Table 1  Relationship between the practices suggested in the literature and the IVC dimensions

<table>
<thead>
<tr>
<th>IVC Dimension</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual self-efficacy</td>
<td></td>
</tr>
<tr>
<td>(Wang; Haggerty, 2009)</td>
<td>Formal training on proper use of IT tools (Staples et al., 1999).</td>
</tr>
<tr>
<td></td>
<td>Formal training on effective methods of working in virtual contexts (Staples et al., 1999).</td>
</tr>
<tr>
<td></td>
<td>Explicit work practices and virtual supervision by management (Staples et al., 1999).</td>
</tr>
<tr>
<td></td>
<td>Infrastructure and technical support for the development of virtual work (Staples et al., 1999).</td>
</tr>
<tr>
<td>Media skill</td>
<td></td>
</tr>
<tr>
<td>(Wang; Haggerty, 2009)</td>
<td>Formal training focused on the use of computational tools of communication (Carlson and Zmud 1999).</td>
</tr>
<tr>
<td></td>
<td>Formal training in techniques of using electronic media aimed at enriching the information content (Warkentin and Beranek, 1999).</td>
</tr>
<tr>
<td>Virtual social skill</td>
<td></td>
</tr>
<tr>
<td>(Wang; Haggerty, 2009)</td>
<td>Virtual environments for collaborative learning E-learning (Wan et al., 2012)</td>
</tr>
<tr>
<td></td>
<td>Socialization through observation of distribution lists of emails (Ahuja and Galvin, 2003).</td>
</tr>
<tr>
<td></td>
<td>Formal training on socialization techniques and codes of etiquette used in virtual contexts (Warkentin and Beranek, 1999).</td>
</tr>
</tbody>
</table>

Among the formal procedures that organizations can adopt to develop virtual self-efficacy, Staples et al. (1999) mention the possibility of formal training addressing techniques for effective development work in virtual environments – establishing clear roles and goals, efficient use of time, access to business partners, effective evaluation of information – or the correct use of IT. The justification lies in the fact that the relevant training provides a set of information about past performance similar to what would be obtained from actual successful experiences to which the individual would be subjected. Therefore, the relevant formal training tends to contribute to the self-judgment of individuals about their own ability to use technology to communicate and work remotely, increasing virtual self-efficacy. Another method for developing virtual self-efficacy suggested by Staples et al. (1999) takes place through observation of work practices and virtual management developed by the leadership and management on a daily basis. According to these authors, by observing the best practices adopted by leaders and co-workers, individuals develop self-confidence in performing work or tasks in virtual environments. Thus, they suggest that the use of explicit elements by managers, such as rules for conducting virtual meetings, or rules aimed at ensuring availability of remote employees, can assist in constructing individuals’ virtual self-efficacy. Furthermore, Staples et al. (1999) also mentioned the importance of the organization having adequate technical infrastructure and support to meet the technology needs of staff in the development of work in virtual contexts, elements that assist in reducing negative psychological effects on individuals’ ability to communicate and complete tasks remotely and therefore elevate their virtual self-efficacy.

Formal training can also be helpful in developing skill with virtual media. According to Carlson and Zmud (1999), perception of the richness of electronic media used for communication is related mainly to the knowledge base that individuals have about the technology used by the individuals with whom they are communicating and the organizational context in which the communicative activity develops. These authors also state that the technological knowledge base has a greater influence on the perception of the richness of the communication channel in the early stages of the communicative process. In this sense, this calls for training to initially support individuals in developing knowledge of computer communication tools to build a base of
technological knowledge that will provide "richness", or the maximum potentiality of the medium upon future use.

Warkentin and Beranek (1999) also present a formal method for enrichment of electronically mediated communication through techniques aimed at reducing response time in using asynchronous media, personalized text messages, adding richness through textual resources and increasing accuracy of information by reducing dubious content. They proposed that these practices tend to assist individuals in developing their skills with virtual media.

With respect to virtual social skills, the literature highlights a number of practices that can help individuals develop mechanisms to facilitate virtual social interactions. The use of e-learning in organizations is one of them. Wan et al. (2012) define e-learning as a virtual learning environment where interactions among students, learning materials and instructors are mediated through IT. This environment often involves collaborative learning activities such as discussion groups, requiring students to collaborate and establish good relationships with each other (Wan et al., 2008). Group processes developed through e-learning, thus, may enable the development of virtual social skill.

Another mechanism for the development of virtual social skill is the use of social media in the organizational context (Wang and Haggerty, 2011). The use of such media is an emerging trend that tends to support the construction of virtual social skills while supporting social contacts and exchange of information amongst individuals effectively. Therefore, the encouragement of its use, even for external work contexts can act as a mechanism to develop social skills in virtual enterprises.

Focusing on the socialization of new members in virtual teams, Ahuja and Galvin (2003) highlight the practice of using distribution lists for email communication with other members of the working group. Thus, individuals witness various behaviours and attitudes occurring in the message exchanges and benefit from a socializing effect similar to direct observation in traditional groups. It is, therefore, a passive practice that potentially contributes to the development of virtual social skill.

Warkentin and Beranek (1999), in turn, showed that while the processes of socialization in virtual contexts are hampered due to the limitation in the "wealth" of social information that can be transmitted through computer communication technologies, work teams can be trained to increase the content of social information in this form of communication. They suggest, for example, techniques to promote social presence and interaction in virtual meetings, use of writing techniques to share information and presentation of social codes and social etiquette inherent in a virtual context.

**The proposed model**

The idea is to create an environment that simulates a project with virtual teams. It is also a problem based learning (PBL) approach where students face a situation that can be properly managed in several different ways. The students will have to find solutions to situations, while respecting the objectives of the project and their own organizational conditions. Thus, students from different universities, countries, time zones and cultures will be divided into virtual teams and assigned specific deliverables that will compose a final product. The characteristics of each university, such as course discipline, scheduled classes and evaluation system will simulate the organizational diversity of companies that use virtual teams.
The main objective of the project that students will develop depends on the profile of universities and faculties involved. A project suitable for mechanical engineering students could be inappropriate for marketing students. Therefore, the professors and coordinators of this initiative must design a project and a problem consistent with the nature of the courses and schools involved.

The general proposal for IVC development has four main stages, as showed in figure 5.

**Figure 5 Proposal stages for IVC development**

In the first stage – development of technical skills – the participants will learn how to use tools, products and technologies that support virtual work. The media skills dimension addressed by Wang and Haggerty (2009) is developed here. The participants will learn how to use the communication tools and workgroups software. In that stage, distance-learning environments could be used and the participants of all faculties would get the same content.

The second stage will address social skills. The participants will be prepared to communicate with people from different cultures in a professional and ethical manner. All professors and coordinators from the faculties involved must be engaged in the elaboration of this stage’s content, which should include themes such as cultural habits, professional etiquette, jargon and local customs.

In the third stage, the participants will learn how to handle situations that can be emotionally stressful and manage sources of stress, anxiety and conflict. This could be done with a face-to-face approach such as dynamic groups and role-playing techniques.

Finally, in the last stage the participants will develop a project in cooperation with students from other universities. They will apply all the abilities developed in the previous stages to reach the project objectives.

The evaluation of participant performance will be done by the local coordinators as well by foreign partners. This last assessment is particularly useful because it is based on cultures and values that participants are attempting to know better.
Final Remarks

The increasing adoption of virtual teams by firms is a recent phenomenon, although related scientific articles have been published since 1993, at least. Individual virtual competence is an important indicator of the virtual team’s performance and has three dimensions: virtual self-efficacy, media skills, and virtual social skill.

This paper presented a proposal for the development of individual virtual competencies through joint action among universities from different countries. The development of these competencies will occur through a four-stage process that includes distance and face-to-face learning that address both technical and attitudinal aspects. In the last stage, participants from different countries are grouped into teams and develop a project in a virtual context. The project must meet its own objectives and the participants have to obey the restrictions and rules of the organizations from which they came.

Others possibilities could be explored in the context of this project, such as the influence of teams’ characteristics (for example, leadership skills, degree of virtuality and transience) on project development and performance. This idea, i.e., the project as a research field for issues concerning virtual teams, could accommodate different research interests of researchers involved in the project.

References


Chidambaram, L (1996) "Relational development in computer-supported groups". MIS Quarterly, 20, 143-165.


Social networking sites and employment status: an investigation based on Understanding Society data

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Introduction
This paper provides an analysis of secondary data derived from the 2012 Understanding Society: The UK household longitudinal study related to the use of social networking sites (SNSs) amongst 16-21 year olds. The key purpose is to determine the relationship between employment status and the use of SNSs. However, other key variables cited in the extant literature pertaining to the adoption of SNSs are also considered. The results of the analysis are then used as a basis to discuss future research on the information seeking behaviours of young jobseekers in the UK, using social media tools such as SNSs.

Background
In the UK, youth unemployment levels currently reside at 14.8% (McGuinness, 2015) – 9.4 percentage points above the national average of 5.4% (Trading Economics, 2015). Evidence suggests that the more time young people spend estranged from the labour market at an early age, the more susceptible they become to long-term ‘scarring’ effects such as further bouts of unemployment and below-average earnings later in life (Bell and Branchflower, 2010; Scherer 2004; Steijn et al., 2006). In addition to this, the individual experience of unemployment is often associated with a multitude of negative health outcomes including illness, mental stress, and an increased risk of committing suicide (Bell and Blanchflower, 2010, pp.11-12). Given such trends, it is of paramount importance that young people can increase their employability levels in order to establish themselves in the labour market - an imperative which has been recognised by the UK Government, and incorporated into its policy objectives (Gov.uk, 2012).

The structure of social networks, and the ability to use network contacts effectively during job search, is considered a key contributor towards social inclusion and the employability of individuals in the labour market (Calvo-Armengol and Jackson, 2004; Falcón, 1995; McQuaid and Lindsay, 2005, p.210; Skills Development Scotland, 2012, p.7). The dissemination of useful job information throughout social structures has often been used as an explanation for the impact of interpersonal relationships on labour mobility (Granovetter, 1973, 1974, 1983, 1995; Lin, 1999, 2002). Granovetter’s (1973) conception of the “strength” of ties is particularly important in this regard. Herein, it is posited that “weak” ties (i.e. acquaintances) propagate the flow of novel information throughout network structures, as they are more likely to reach into different areas of the social system. Conversely, “strong” ties (e.g. family and close friends) tend to overlap and create dense network clusters which can strangulate the flow of information. Despite this, strong ties can also be beneficial to individuals, as evidence suggests that such contacts are more likely to wield greater influence on their behalf (Brown & Reingen, 1987).

Mobilizing network contacts for informational purposes is recognised as a key method of job search in the job search literature, wherein it is posited that jobseekers are faced with two primary sources of information whilst looking for employment: (1) formal sources (e.g. online search engines, recruitment agencies); and (2) informal sources (i.e. network contacts such as...
friends, family members and acquaintances) (Saks, 2005; van Hoye et al., 2013; Wanberg, 2012). The process of utilising informal sources is known as “networking”, and has been described as individual actions by the jobseeker directed towards contacting associates to attain information and advice about getting a job (Wanberg, Kanfer & Banas, 2000, p.492). Networking is also recognised as a fundamental information seeking activity in information science research, and has been found to involve activities such as building and maintaining close relationships in order to gather and share information (Foster, 2003; Meho and Tibbo, 2003).

Whilst networking during job search has been addressed in the job search literature (see for example, van Hoye et al., 2013; Wanberg, 2012), such work has not taken into consideration the potential impact of digital technologies on this process. The bearing is likely to have been significant, given that the expansion of social media technologies, coupled with widespread access to mobile and other “wearable” devices, has facilitated access to “information gathering capacities that dwarf those of the past” (Rainie and Wellman, 2012, p.11). The different functionalities of certain social media tools have also played a central role in how such platforms are used for informational purposes. For example, SNSs allow users to construct public or semi-public profiles within a bounded system, through which they can articulate a list of connections with other users (boyd and Ellison, 2007; Stenger and Coutant, 2009). By facilitating communication between users with connected profiles, SNSs such as Facebook lend themselves primarily to the practice of sharing and networking (Ouiridi et al, 2014, p.121). They have also been associated with higher levels of social capital, by providing a channel through which both weak and strong ties can be accessed (Burke and Kraut, 2013; Ellison et al., 2007).

This paper is part of a larger project which considers the information seeking behaviours of young jobseekers during the job search process, regarding their use of both offline and online social networks to source job information. The wider study uses Wilson’s (1997) general model of information seeking behaviour to analyse relevant concepts taken from information behaviour theory, job search theory, network theory and social media theory, including those mentioned above. Issues such as information literacy in the use of SNSs during job search are also addressed at length. Findings from the wider study will be disseminated in due course.

Employment, social exclusion and the use of SNSs

Social networks have an empirically demonstrable impact on the mobility of labour markets. For example, Granovetter (1974) found in a study of professionals and technical workers in Boston, US, that 56% of the sample reported that they found their then current position through a network contact. More recently, Franzen and Hangartner (2006, p.357) found that in a study of 27 different countries, the variation in jobs sourced via interpersonal relationships ranged from a low of 25.77% in Finland, to a high of 82.85% in the Philippines. The figure in the UK was found to be just under a third, at 31.06%. Web-based technologies have the capacity to extend such networking opportunities for jobseekers, and can act as valuable information seeking tools (Foster, 2003; Meho and Tibbo, 2003). This can be explained by the loosely-knit social circles that technologies such as SNSs can help to generate across geographical boundaries. These also facilitate membership of multiple networks and a more diverse set of relationships than would have been feasible in the past (Rainie and Wellman, 2012).

Given the social and informational affordances of ICTs, early “digital divide” research focused on the physical access individuals have to computers. However, research has since shown that in developed countries like the UK, such basic access (whether at home, school, or elsewhere)
is near ubiquitous, particularly amongst young people (Livingstone and Helsper, 2007; van Dijk, 2006). Indeed, evidence shows that 96% of children in the UK live in households with an internet connection (ONS, 2014). Due to such a prevalence of ICT use, it may be expected that there be no significant difference in SNS membership between 16-21 year olds who are in paid employment, and those who are unemployed. To this end, the following hypotheses were tested as part of the study reported in this paper:

**Hypothesis 1a**: Employment status is associated with membership of SNSs.

Vs.

**Hypothesis 1b**: Employment status is not associated with membership of SNSs.

Despite the contention outlined above, research has also shown that as a direct result of having greater home access, middle-class children use the Internet more frequently than their working-class counterparts (Livingstone and Helsper, 2007). Such a distinction could be crucial as evidence indicates that there is a link between higher levels of Internet use and educational attainment (Chowdry, 2010). Additionally, more frequent online activity, greater online skills and self-efficacy have been found to encourage young people to take up opportunities found on the Internet (Eastin and LaRose, 2000; Livingstone and Helsper, 2007). Given this evidence, it would be anticipated that whilst membership of SNSs will not be associated with employment or social exclusion, frequent use of SNSs will be closely associated with employment status. Therefore, the following hypotheses were tested:

**Hypothesis 2a**: Employment status is associated with frequency of SNS use.

Vs.

**Hypothesis 2b**: Employment status is not associated with frequency of SNS use.

In addition to the above, evidence has also suggested that whilst there is a relationship between unemployment and social exclusion - in that unemployment increases the risk of poverty (which in turn, is strongly associated to exclusion) - they cannot necessarily be equated (Atkinson, 1998; Gallie et al., 2010, Canduela et al., 2015). So other economic, social and cultural factors have a bearing on whether individuals become socially isolated, and this is not necessarily related to their employment status. To this end, it was expected that there would be no direct association between the number of close friends individuals have and their employment status. This leads to the hypotheses:

**Hypothesis 3a**: Employment status is associated with number of close friends.

Vs.

**Hypothesis 3b**: Employment status is not associated with number of close friends.

**Age and the use of SNSs**

Younger generations entering the labour market for the first time have been termed “digital natives”. This is due to the embeddedness of information and communication technologies (ICTs) in their lives (Bennett et al., 2008). Indeed, much of the extant research on the adoption
and usage of social media tools has focused on young people. For example, within the field of information behaviour, there has been a focus on how students use social media tools to satisfy their information needs (Sin and Kim, 2013; Kim et al., 2014). In education research, attempts have been made to decipher the necessity of incorporating ICTs such as social media tools into modern teaching methods, in order to disseminate information to students in ways they would find accessible (Ko, et al., 2014; Palfrey and Gasser 2013). The careers guidance sector has also recognised the need to adapt its services for modern clients via the inclusion of social media tools, and attempts have been made to gauge the attitudes of careers professionals towards such ICTs (Kettunen et al., 2015; Kettunen et al., 2013). In light of this, it was expected that the analysis reported here would show that younger people are more likely to be members of SNSs than their older counterparts. This leads to the following hypotheses:

**Hypothesis 4o:** Age is not associated with membership of SNSs

Vs.

**Hypothesis 4a:** Age is not positively associated with membership of SNSs.

**Sex and the use of SNSs**
Sex has been found to be a key variable in the adoption of social media tools. For example, males tend to use a broader range of social media tools in order to complete tasks which involve sourcing information (Sin & Kim, 2013; Kim et al, 2014). This reflects research which pertains to general Internet use, wherein it has been found that males engage in a broader range of activities online, and use the Internet more frequently than females (Li & Kirkup, 2007; Fallows, 2005; Jones Johnson-Yale, Millermaier & Perez, 2009). However, evidence suggests that females are more likely to use SNSs for social rather than task-oriented purposes (Lin & Lu, 2011). Additionally, whilst males tend to use social media tools to generate new social contacts, females use them to build upon existing relationships (Muscanell & Guadagno, 2012). Given such fundamental differences in approach to the use of ICTs, it was expected that females would engage in more frequent use of SNSs, leading to the following hypotheses:

**Hypothesis 5o:** Sex is not associated with the use of SNSs.

Vs.

**Hypothesis 5a:** Sex is associated with the use of SNSs

**Method**
Having identified five hypotheses related to SNS, employment status, age and gender, a secondary data analysis was conducted using data sourced from *Understanding Society: The UK household longitudinal study*. The purpose of the survey is to understand 21st century life in the UK, and the nature of people’s social and economic circumstances, as well as their attitudes and behaviours (Understanding Society, 2015). The survey allows cohorts to be followed over time, thus permitting longitudinal analysis. Specifically, the data for this study was taken from Wave 6 of the *Innovation Panel*, which was conducted in 2012, and consists of a sample of 2,760 addresses in the UK.

Wave 6 of the *Innovation Panel* asked questions on the use of SNSs amongst 16-21 year olds resident at the interviewed households. This produced a sample of 3,616, of whom 52.5% were
female, 24.0% employed, 11.0% unemployed, and 65.0% students. Additionally, 90.8% were members of SNSs, whilst the average number of friends reported by the sample was 6.3. In terms of intensity of social media use, 26.9% of the sample used SNSs for under one hour per day, 13.3% seven hours or more per day, and 38.7% from one to three hours per day.

The hypotheses outlined in the previous section were tested using Chi square analysis and independent t-tests. To understand multivariate effects and to control for gender and age, a binary logistic regression model was fitted to determine the relationship between both SNS membership and number of close friends, to employment status. The results of the analysis are detailed in the following section.

Results

Hypothesis 1 addresses the relationship between employment status and membership of SNSs, and asserts that there is no association between employment status and membership of SNSs. An alternative hypothesis 1a is also provided, this asserts that there is a relationship between employment status and membership of an SNS. The data from the survey show that a higher proportion of those who were in paid employment in 2012 were members of a SNS (92.0% as compared to 83.2% of those who were unemployed), whilst the rate of not being a member of an SNS amongst those who were unemployed (16.8%) was double that of those in paid employment (8.0%). Using a Chi Square test the association was found to be statistically significant (p <0.001), thus providing support for hypothesis 1a (see Table 1).

In Table 1, the association between employment status and intensity of SNS use is documented, as measured by hours per day interacting with friends. A significant association is found (p=0.02), which confirms hypothesis 2a, that there is an association between frequency of SNS use and employment status. This result was achieved by performing an independent t-test. However, the relationship is a complex one; whilst proportionately more unemployed participants reported spending no hours per day using SNSs than those in paid employment, conversely, significantly more unemployed participants reported using SNSs for one hour or more per day (72.50% as compared to 65.30% of those who were in paid employment). Therefore, the relationship between frequency of SNS use and employment status is not a linear one.

To test hypothesis 3o - that a greater number of close friends is not positively associated with being in paid employment - an independent t-test was performed. In doing so it was found that the mean number of friends of those in paid employment was 6.05, compared to 5.88 for those unemployed. This difference was not found to be statistically significant (p = 0.674), and as such the null hypothesis is accepted: there is no association between employment status and number of close friends. However, it is notable from the analysis that males reported having significantly more close friends than females (7.22 compared with 5.47; p <0.001).
Table 1 The relationship between paid employment and membership and use of social websites (n=3,616)

<table>
<thead>
<tr>
<th>Economic Status</th>
<th>Member of SNS</th>
<th>Hours per day spent interacting with friends through SNSs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Employed</td>
<td>92.0%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>83.2%</td>
<td>16.8%</td>
</tr>
<tr>
<td>Student</td>
<td>91.6%</td>
<td>8.4%</td>
</tr>
<tr>
<td>All respondents</td>
<td>90.8%</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

For the age demographic, it was found that members of SNSs had a younger mean age (18.34 years) than those who were not members of SNSs (18.68 years) amongst the 16-21 year old sample. This difference is statistically significant (p=0.001), meaning that hypothesis 4a - age is not positively associated with membership of SNSs - is accepted. For the demographic variable of sex, females were found to be proportionately higher users of SNSs than males (90.1% compared to 88.1%). This difference is also statistically significant (p=0.001). Additionally, females were found to be more frequent users of SNSs than males, with 33.0% spending more than three hours per day, and only 28.0% of males spending over 3 hours per day interacting with friends online. This difference is also statistically significant (p<0.001). As such, both hypothesis 4a - age is not positively associated with membership of SNSs - and 5a - sex is associated with the use of SNSs - are accepted.

Four of the key variables considered in this study – (1) membership of a SNS, (2) number of close friends, (3) age, and (4) sex - were applied within a logistic regression model to predict the likelihood of being in paid employment. In this analysis students were removed from the sample leaving only those who were employed and unemployed. This model successfully predicted 96.6% of those in employment but only 8.4% of those who were unemployed. For all respondents, 68.8% were correctly predicted. The coefficients of the model are displayed in Table 2. This test confirms the association of being a member of a SNS and being unemployed. The number of close friends appears as insignificant and young females and younger people are less likely to be unemployed.

Table 2 Logistic regression model of the likelihood of being unemployed (n=2,350)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member of social media website</td>
<td>-.896</td>
<td>.192</td>
<td>.000</td>
<td>.408</td>
</tr>
<tr>
<td>Number of close friends</td>
<td>-.011</td>
<td>.010</td>
<td>.295</td>
<td>.989</td>
</tr>
<tr>
<td>Age</td>
<td>-.198</td>
<td>.045</td>
<td>.000</td>
<td>.820</td>
</tr>
<tr>
<td>Female</td>
<td>-.339</td>
<td>.129</td>
<td>.009</td>
<td>.713</td>
</tr>
<tr>
<td>Constant</td>
<td>4.027</td>
<td>.912</td>
<td>.000</td>
<td>56.109</td>
</tr>
</tbody>
</table>

Discussion

As demonstrated above, there is a statistically significant association between being a member of a SNS and being in paid employment amongst 16-21 year olds in the UK. This finding runs
contrary to the assertion proffered earlier in the paper that such an association does not exist. This hypothesis was based on the near ubiquity of ICT use amongst younger people in developed nations (Livingstone & Helsper, 2007; ONS, 2014). However, the proposed hypothesis takes for granted the association between use of ICTs and membership of social media tools such as SNSs. As explained by van Dijk (2006, p.223-230), material access to innovative ICTs is only one of a number of successive “access” factors which can impinge upon the usage of digital innovations such as social media tools. These factors also include motivational access and skills (e.g. instrumental skills, digital skills) access. From the analysis put forth in this paper, it appears that material access alone is not enough to encourage membership of SNSs amongst younger people.

Given the association between membership of SNSs and being in paid employment, it could be argued young people are increasing their likelihood of encountering new information online which is conducive to the generation of employment opportunities. Indeed, the available evidence suggests that effective use of social media tools can provide informational opportunities to users (Panahi et al., 2015). Awareness of such an issue could substantiate a clear educational or training directive for schools and careers guidance bodies in the UK, to target those who may not possess adequate digital skills to use SNSs effectively. However, further research is required to determine the specific barriers or enablers experienced by young people when using social media tools, and how employment information is sourced via such platforms. This need is exemplified by the finding of this study which shows that unemployed young people are significantly more likely to spend more than one hour a day using SNSs. The nature of such use needs to be investigated in a similar fashion to previous research, wherein clear distinctions have been drawn between social and task-oriented use of SNSs (Lin and Lu, 2011).

The results presented in this paper also suggest that the number of close friends young people have is not associated to employment status. However, the secondary data does not provide an opportunity to analyse the broader social network of the participants. It is possible that young people who are unemployed are stymied by dense social networks wherein strong ties are dominant, with fewer weak ties acting as bridges into other social circles. Indeed, research in Glasgow - Scotland’s largest city - has shown that social networks which are confined to small geographical areas characterised by high levels of worklessness can have a deleterious impact on the employment opportunities of individuals residing in those areas (Quinn and Seaman, 2008). To this end, the informational benefits of SNSs could provide a valuable outlet to young jobseekers.

Another interesting finding from this study is the association between both age and sex, and the use of SNSs. As hypothesised, age was negatively associated with membership of SNSs. This suggests that emerging generations are increasingly adopting new digital platforms for interaction, and exemplifies the need for information literacy to be integrated into education to assist learners navigate information online (Bruce, 2004; Fitzgerald, 2005). In terms of sex, it is notable that females use SNSs more frequently than males, and that young females (and younger people generally) are less likely to be unemployed. Again, this reinforces the potential relationship between the use of SNSs and being in paid employment, and highlights the need for further research in this area.
Limitations

Despite the inferences derived from the results outlined above, there are a number of caveats that must be acknowledged. Firstly, the questions posed by the Innovation Panel regarding the use of SNSs do not specify individual digital platforms. As such, the responses would have been based on the respondents’ own definition of SNSs. Additionally, given the use of secondary data, it is impossible to fully determine the causal factors which influence the results. For example, whilst the data imply that membership of SNSs is beneficial for employment outcomes, it is feasible that young people are more likely to join SNSs after securing employment. Also, the original survey was reporting circumstances from 2012. Given the continual advances in technology and adoption rates it is possible that there has been a significant shift in that time, which would affect the outcome of a similar study with contemporary data. Finally, wealth is a potentially important variable which has not been controlled for in this study. It is plausible that personal or family wealth predicts the use of SNSs over and above employment status.

Conclusion

This paper provides clear evidence of a link between the use of SNSs and employment status amongst young people in the 16-21 age group. By utilising data sourced from the Understanding Society study, it also highlights the value of using secondary data for such purposes, and how the results from such projects can be used as a basis for conducting further research. For example, the outcomes of the current study provide a useful platform from which to investigate the adoption of social media tools during job search, and the barriers or enablers young people face when using such technologies to source relevant job information. It also underlines the importance of demonstrating the means by which social media tools such as SNSs are used by young jobseekers, and which specific functions they use for that purpose. This knowledge will be particularly relevant to education careers guidance providers, in assisting jobseekers in an increasingly networked environment. Such work is currently being undertaken as part of the wider study cited earlier which is funded by the ESRC (grant no. ES/J500136/1) and Skills Development Scotland.

References


Unauthorised Disclosure of Organisational Information through Social Media: A Policy Perspective

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Abstract
The unauthorised disclosure of organisational information through social media has become an issue. This has resulted in the need for organisations to re-evaluate ways of minimising the risks of information loss and disclosure via social media. The implementation of social media use policies can inform employees’ social media behaviours and ultimately lead to the creation of an organisational culture of awareness. Although organisations may have a social media policy in place, the issue of unauthorised disclosure of organisational information has not been given due attention. Hence, a pilot study of content analysis was conducted to explore how organisations address the issues relating to the unauthorised disclosure of organisational information via their social media channels. The findings of this pilot study revealed some emergent themes that are important for addressing the issue of information disclosure by comparing five different sectors. These emergent themes could guide researchers and practitioners in understanding and informing the organisational use of social media technologies.

Keywords: Unauthorised Disclosure, Organisational Information, Social Media, Social Media Policies.

1. Introduction
Social media has increased the organisational risk of information disclosure, a risk that continues to grow (Gaudin 2009; Wilson 2009). Recent incidents where employees leaked confidential personal or sensitive business information or competitive knowledge on social media either inadvertently or mistakenly uninformed, are becoming more common. For example, the chief technologist of Hewlett-Packard unintentionally revealed the plans for their upcoming cloud computing, networking and storage services and shared management services on his LinkedIn page, in advance of the company’s official press release in 2011 (Hickey, 2011; Rosoff, 2011). The inappropriate use of social media by employees may result in tangible and intangible losses to the organisation causing reputational damage, financial loss, productivity loss, competitive disadvantage, potential lawsuits, legal penalties, loss of customer confidence and possible malware risks (Colwill, 2009; Gudaitis, 2010; Yayla and Hu, 2011; Young, 2010).

The unauthorised disclosure of organisational information occurs when information such as client confidential details, company secrets, competitively sensitive knowledge, corporate strategies, internal policies and production processes are revealed prior to official announcements or product launches (Anand and Rosen, 2008). Leading to frustration and speculation about whether such disclosures were leaked to unauthorised parties either deliberately or accidentally. Traditionally face-to-face conversations, documents, files, servers, printing facilities were known to be the primary channels of information disclosure but the widespread use of social media channels have now added new electronic platform for the information disclosure that is easily accessed (Ahmad et al., 2005; CISCO, 2008; Molok et al., 2011; Nuha and Molok, 2011). It can be argued that social media is the most powerful and potentially damaging channel of accidental disclosure in contrast to the other traditional disclosure channels due to unique capabilities of real-time access and the interconnection of social networking sites (Molok et al., 2011; Nuha and Molok, 2011). As a consequence,
unauthorised information disclosure through social media is becoming a major concern for all business organisations in the era of social media (Gaudin, 2009; Wilson, 2009).

Typically organisations rely on technical and legal controls, information security policy, education, training and awareness for minimising the risks of information disclosure (Molok et al., 2011). Academic literature suggests that organisations should provide social media guidelines as a way of managing employees’ use of social media (Hekkala et al., 2012; Husin and Hanisch, 2011a; Husin and Hanisch, 2011b; Schein, 2010). In particular, information systems security management literature proposes policy development as a behaviour changing control mechanism that could minimise the risk of unauthorised disclosure, compared to technical and legal controls (Bulgurcu et al., 2010; Theoharidou et al., 2005; Workman and Gathegi, 2007).

To date, little research has been undertaken investigating the unauthorised disclosure of organisational information via social media. Although, organisations do implement social media policies, the issue of unauthorised information disclosure, risk management and mitigation approaches is not being explicitly addressed in those policies. As an extension of a previous study (see Pallegedara and Warren, 2014), we observed that there is a lack of understanding within organisations concerning how to address the issue of unauthorised disclosure in a social media policy. Therefore, this research paper explores how unauthorised disclosure of organisational information is being addressed in the social media policies within different business sectors of Australia.

Initially through, a review of literature is undertaken into unauthorised information disclosure and why social media is considered to be a challenging channel of disclosure compared to traditional channels. Then the research methodology and subsequent data analysis from the pilot study undertaken is discussed. Section 4 reports and presents the results of the pilot study’s content analysis undertaken of twenty five Australian business social media policies, to identify the gaps in their organisational social media use policies. Finally, the discussion and the conclusion highlight the implications of this research.

2. Unauthorised Information Disclosure and the role of Social Media

Disclosure of information in organisations has been identified as a significant security concern (Ahmad et al., 2005; Yayla and Hu, 2011; Bhattacharya and Guriev, 2006; Molok et al., 2012). Information disclosure refers to a breach of confidentiality of information, through disclosure of internal information into the public domain or to unauthorised third parties (Molok et al., 2010). Information disclosure can occur deliberately due to the malicious intention of a disgruntled employee or inadvertently by non-malignant insiders, but this is more difficult to control and manage (Hoecht and Trott, 1999). As highlighted by (Colwill, 2009), inadvertent disclosure has just as greater potential to cause significant damage as any malicious insider attacks.

Sensitive information can be stored as hardcopies, soft copies or as tacit knowledge embedded inside human minds (Ahmad et al., 2005). There are risks associated with other disclosure channels such as paper based materials, discussions, emails, portable data devices and cloud computing but the pervasiveness of social media brings new unique challenges for organisations (Molok et al., 2011). Therefore, social media is now considered as the most challenging media channel for mitigating unauthorised information disclosure (Colwill, 2009; Gudaitis, 2010; Leitch and Warren, 2009).
According to (Molok et al., 2010), information disclosure through social media channels is fundamentally different to the traditional channels of information disclosure. Social media usage by the employees is higher compared to other disclosure channels so the risk exposure is higher (Molok et al., 2010). Anybody in any age group can access social media due to its simplicity, ease of use and compatibility (Everett, 2010; Molok et al., 2010; Molok et al., 2012). The information disclosed through social media can be accessible by many people due to the network-effect compared to face-to-face conversations where the information is restrained to those who heard the conversation (Molok et al., 2010). Another disadvantage of social media is that the information disclosed on social media sites can be retrieved, indexed by Google, archived for a long time and may exist virtually and be permanently accessible (Schneier, 2009).

Although, as identified by (Molok et al., 2011; Nuha and Molok, 2011), information disclosure through social media is generally more accidental than intentional due to the ubiquitous usage of mobile devices to access social networks. Mobile devices and their design capability for instant access to social media make it more challenging for organisations to monitor employees’ social media misuse due to the portability of using mobile devices (Young, 2010; Molok et al., 2010; Everett, 2010). Emerging social media applications (including mobile devices) used at work and home create difficulties for the employees to determine or establish a true boundary between work and home life (Molok et al., 2011; Nuha and Molok, 2011; Colwill, 2009). Hence, unauthorised information disclosure through social media is a unique and challenging area requiring further investigative research.

3. Research Methodology

In this pilot study a content analysis research method was used to evaluate the qualitative aspects of twenty five publicly available Australian social media policies. Typically, the qualitative content analysis allows the researcher to combine the analysis of the frequency of codes with analysis of their meaning in context (Joffe and Yardley, 2004). Here, the content analysis method was applied for the reason that these social media policies consisted of large volumes of texts and it is difficult to understand or interpret the content through casual observation. The qualitative content analysis approach was chosen to identify the patterns relating to the specific themes in the social media policies.

In this study, five policy samples were chosen from the Australian Federal Government, Australian State Government, Australian Emergency Services, Australian Universities and Australian Stock Exchange organisations (Top 100 Australian organisations). The objective was to examine how information disclosure had been addressed in social media policies for different sectors, in order to explore the variations within different industry sectors. Five organisations were chosen for each of the sample and the social media policy documents were obtained from the organisational website. NVivo, a qualitative data analysis software package was used for the text-based data analysis. Depending on the information covered in each social media policy, these key themes were identified based upon the authors’ assessment. The percentage coverage indicates how much of the policy content is coded to a key theme area. The assessment can be found in Table 1. The key themes that the authors developed for the analysis were:

1. **Confidentiality** - Social media policies insist that employees must maintain confidentiality at all times and they must not disclose non-public information (Confidential information including personal information, internally sensitive or
proprietary information) to social media unless required by their duties and permitted by the relevant policies.

2. **Rules of Engagement** – The intent of social media policies is to raise employee awareness by providing specific guidelines on how to be responsible when associating with social media.

3. **Information Classification** – Social media policies clarify what the organisation defines as confidential information with examples (i.e. financial information, future business performance, business plans, procedures, trade secrets etc.).

4. **Personal Opinions** – Personal opinions or statements about matters that are subjective have been included in some social media policies.

5. **Organisational Reputation** – Many of these organisations point out the need to be mindful of embarrassing or damaging the organisation’s reputation, commercial interests or bringing the company into disrepute, when making any comment or post on social media.

6. **Unauthorised Accounts** – Creation of unauthorised organisational social media accounts is not allowed in some social media policies and relates to impersonating or using the identity of another employee, a contractor, a business partner or a competitor either knowingly or unknowingly.

7. **Permission to Engage via Social Media** – Some policies mention that if employees are unsure as to whether information is confidential, they should assume that it is confidential until clarified by the authorised person.

8. **Misinformation** – Disinformation or divulging untruthful information is prohibited in some social media policies because the distortion and misrepresentation of information is regarded as a serious breach of the policy.

**Table 1** Percentage coverage for the key theme areas

<table>
<thead>
<tr>
<th>Key Theme Areas</th>
<th>Percentage Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Confidentiality</td>
<td>62.21%</td>
</tr>
<tr>
<td>2. Rules of Engagement</td>
<td>61.91%</td>
</tr>
<tr>
<td>3. Information Classification</td>
<td>45.48%</td>
</tr>
<tr>
<td>4. Personal Opinions</td>
<td>9.85%</td>
</tr>
<tr>
<td>5. Organisational Reputation</td>
<td>9.47%</td>
</tr>
<tr>
<td>6. Unauthorised Accounts</td>
<td>8.09%</td>
</tr>
<tr>
<td>7. Permission to Engage via Social Media</td>
<td>6.35%</td>
</tr>
<tr>
<td>8. Misinformation</td>
<td>5.90%</td>
</tr>
<tr>
<td>9. Other Themes</td>
<td>4.11%</td>
</tr>
</tbody>
</table>

**4. Content Analysis Results of Unauthorised Disclosure of Information Practices across Different Sectors**

The social media policies were analysed against the key criteria that were developed in the previous section (see Table 1) and this section presents the results of the content analysis. A
‘✓’ symbol indicates if the policy has addressed the key theme component to a satisfactory level depending on the information supplied. A ‘?’ denotes if the policy has just mentioned by the name of the key theme component only, without providing additional explanatory information. Finally, if the policy has not mentioned anything related to the criteria, a ‘-’ symbol is given. These findings are presented in Table 2 as follows.

### Table 2 Analysis Results of the Social Media Policies

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Confidentiality</th>
<th>Rules of Engagement</th>
<th>Information Classification</th>
<th>Personal Opinions</th>
<th>Organisational Reputation</th>
<th>Misinformation</th>
<th>Permission</th>
<th>Unauthorised Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australian Federal Government</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. of Human Services</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Dept. of Finance and Deregulation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Australian National Botanic Gardens</td>
<td>'?'</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>National Library of Australia</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dept. of Agriculture, Fisheries and Forestry</td>
<td>'?'</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Australian State Government</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW Dept. of Education &amp; Training</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>NSW Government</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VIC Dept. of Health</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>VIC Dept. of Justice</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>VIC Dept. of Human Services</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Australian Emergency Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW Police Force</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>VIC Police</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Queensland Police</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NSW Ambulance</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Country Fire Authority</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Australian Universities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Melbourne</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Monash University</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Deakin University</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>University of Western Australia</td>
<td>'?'</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>University of Newcastle</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Australian Stock Exchange</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telstra</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>National Australia Bank</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>SunCorp</td>
<td>'?'</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>JR Hi-Fi</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coca Cola Amatil</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

When considering the samples and how each sector addresses the issue of unauthorised disclosure. Under the Australian Federal Government sample, the Department of Human Services and the Department of Finance and Deregulation have addressed the six themes relating to the emerged information disclosure themes except for the Misinformation and Unauthorised Accounts. The Australian National Botanical Gardens Social Media Policy does not seem to be focused on any of the eight characteristics that have emerged through the other social media policies. In the sample of the Australian State Government, the Department of Health in Victoria and the Department of Human Services in Victoria covered six aspects of the emerged themes. In the Australian Universities sample, the Monash University is the only...
university that addressed most of the emerged themes. The Telstra in the Australian Stock Exchange, is the only social media policy that covered seven themes relating to the key areas of information disclosure.

Focusing on the five policy samples, twenty one policies addressed the aspect of confidentiality in a fairly descriptive manner. For example, these policies state that employees must not disclose confidential information to the public. This was the only statement where some policies mention the term “confidentiality” or “unauthorised disclosure”. In terms of the rules of engagement, most of the social media policies mention the need to take appropriate actions to protect information. Out of the twenty five social media policies, eighteen of them discussed what the organisation considers as classified information. Among them, few policies noted that staff members must not post any material that might otherwise cause damage to the organisation’s reputation or bring the company into disrepute. Opinions, misinformation, permission and unauthorised accounts were the least addressed aspects in these five samples. Addressing the unauthorised disclosure of information in a social media policy varies from one sector to another.

The social media policies of the emergency services sample highlighted unique approaches regarding the issue of unauthorised information disclosure via social media. In particular, the VIC (Victoria) Police had addressed all the key areas of the themes followed by the NSW (New South Wales) Police Force with seven key aspects covered. The NSW Police and the VIC Police consider unauthorised disclosure of confidential information as being amongst the most significant risks in relation to the use of social media and has serious ramifications for any employee who commits an unauthorised disclosure. Hence, these policies define the term confidentiality comprehensively with relevant examples. The NSW Police and the VIC Police outline key rules for staff members who are authorised to post on social media. They must assess the risk before publishing because the information can be reproduced or exist permanently in a virtual sense, even if deleted at the source.

In relation to the information classification, the NSW Ambulance Services, the Queensland Police, the NSW Police and the VIC Police have included the examples of what should not be disclosed on social media. The CFA (Country Fire Authority) in Victoria, the NSW Police and the VIC Police employees are advised to be mindful of their safety, reputation and the organisational reputation when using social media. The CFA, the NSW Ambulance Service, the NSW Police and the VIC Police expect that their employees should take all reasonable measures to ensure that online content is factually accurate and not misleading as information and views can be recommmunicated extensively and can be subject to distortion and misrepresentation. Prior approval is required when disclosing any confidential, internal or sensitive information. It can be observed that the Australian Emergency Services sector was the most proactive sector regarding unauthorised organisational information disclosure as opposed to the other sample sectors.

5. Discussion

The intent this research was undertaken an initial pilot study to ascertain how organisations in Australia address the unauthorised organisational information disclosure in their respective social media policies. Based on the findings, from twenty five organisations in Australia, there emerged eight theme areas for consideration when addressing unauthorised information disclosure, namely: Confidentiality; Rules of Engagement; Information Classification; Personal Opinions; Organisational Reputation; Misinformation; Permission and Unauthorised Accounts.
via Social Media. Other themes that emerged in only a very few policies were, engagement with third parties, rules after leaving the employment, post actions after an unauthorised disclosure, cross reference with other policies and the collation of pieces of disclosed information to gather intelligence.

The majority of organisational social media policies highlighted the significance of ensuring confidentiality when using social media in an official capacity. For most organisations, confidentiality may mean not disclosing non-public or sensitive information. Interestingly, some organisations included and regarded all information relating to the organisation obtained by employees in the course of their employment, as confidential. However, an important question arises as to whether the organisation has already defined the term ‘confidentiality’ from an employee’s perspective in the policy document. The definition for confidentiality may vary depending on the employee’s personal and official use of social media. A common observation identified in these policies is that the term confidentiality is contextually undefined except within the emergency services sample. The policies in the emergency sample define the term confidentiality in their context, providing steps to follow when a disclosure incident occurs. Thereby making employees aware of the consequences of breaching confidentiality. As a result, the need for an information classification scheme becomes a necessity for an organisation when defining confidential and sensitive information in their specific context. Information asset classification processes may assist employees with distinguishing between sensitive and non-sensitive information assets. This reflects the level of impact to the organisation if confidentiality or integrity is compromised. However, it is arguable whether to contextually classify the information in a social media policy or in a separate information classification schema.

Under the category of Rules Engagement, it was observed that the majority of the policies failed to provide employee guidance about how to minimise the unauthorised disclosure of information, specifically through the channel of social media. In most cases, the rules are generic for all the media types. Therefore, rules of engagement should provide guidelines about how to protect an employees’ own personal privacy and also the privacy of others when using social media. Providing personal opinions may result in employees inadvertently disclose confidential information and it is questionable if employees are aware their personal opinion can impact the organisation or their fellow employees. Apart from information disclosure, it could result in reputational damages to the organisation and its employees. It was observed that emergency services organisations are relatively strict in this area. The level of information provided in order to prevent such incidents is very high in these policies. The reasoning relates to the potential impact and effect these organisations can have on national security. Hence, the balance between the freedom of speech of individuals and organisational obligations for the employees need to be considered when developing guidelines.

Misinformation or giving false or misleading information is another form of information that can be disclosed to unauthorised parties. It is imperative for organisations to ensure that the content employees publish, is factually accurate and complies with relevant policies, particularly those relating to confidentiality and disclosure. Although this is a concern, there is little evidence to support this aspect in social media policies analysed, except the emergency services sample. Impersonating or falsely representing other people is another avenue which information disclosure can take place. Obtaining permission or seeking advice from an authorised person is a preventative solution for mitigating some of these information disclosure. Organisations in the emergency services sample follow an authorisation process prior to disclosing confidential or
sensitive information. This procedure is comprehensive compared to other policies where employees are held responsible for what they write on social media based on their own personal judgement.

Findings from this research indicate that traditional policy development components are not appropriate for social media policy development pertaining to the issue of unauthorised information disclosure. Despite the fact that there are social media policies in place, this empirical analysis provides evidence that the majority of these policies from five different sectors in Australia, do not satisfactorily address the necessary components to assist organisations in social media policy development. Simultaneously, it emerged that the similarities and differences across different sectors in Australia when addressing unauthorised organisational information disclosure. Also revealed was the variable descriptive sophistication of the social media policies within this pilot study varies from one sector to another depending on the potential social media risks that the organisation may encounter. Another key observation is that the sophistication of the social media policies relies on the level of sensitivity of the information that the organisation has to deal with in their daily operations. Nevertheless, social media policies in the Australian Emergency Services managed to incorporate distinctive, contextual and proactive approaches with the intention of minimising the risks of unauthorised organisational information disclosure.

6. Conclusion and Future Research

The ubiquity and proliferation of social media usage by employees indicates the need for social media policies to be implemented into organisations. This requires the management and the policy makers to recognise the importance and need for improved social media policies to protect confidential and sensitive information from being disclosed to unauthorised parties by employees. This pilot study has identified that only the Australian emergency services sample provided contextual based definitions and practical examples to build employee awareness and provide guidance in order to minimise the risks of unauthorised disclosure of information. As evident in this pilot study, there are a number of areas within unauthorised information disclosure that social media policies have failed to address. Therefore, it is recommended that organisations should concentrate on addressing the gaps relating to the disclosure theme aspects through a comprehensive social media policy analysis and lessons learnt.

This paper outlines several key theoretical and practical contributions. First, it emphasises the necessity for understanding the risk associated with the unauthorised organisational information disclosure and the need to address this in social media policies. Second, the key emerging factors identified in this research will guide researchers and practitioners towards informing and enhancing their social media policies, specifically addressing the issue of unauthorised disclosure of organisational information. Although this pilot study is based in Australia, there are implications for organisations outside Australia to consider when developing social media policies. Despite its preliminary nature, this pilot study contributes to research through the prism relating to unauthorised information disclosure via social media. We aim to obtain further professional and organisational views towards assessing the key theme areas identified here in ongoing and future research.
7. References


Ambulance Service of New South Wales 2009, Guidelines on the use of social networking websites such as Facebook, MySpace, YouTube, Flickr, Twitter and blogs, retrieved 06.02.15 2009, <http://www.ambulance.nsw.gov.au/Media/docs/guidelines_on_the_use_of_social_networking-ebec996b-56c0-49b1-b4e0-3acb5f986997-0.pdf>.


CISCO 2008, Data Leakage Worldwide: Common Risks and Mistakes Employees Make, Cisco Systems Inc, San Jose, CA.


NAB 2011, Social Media Guidelines - How to present yourself online, NAB, retrieved 25.08.13 2011,


NSW Department of Education and Training 2011, Social media guidelines, retrieved 16.02.15 2011,

NSW Government, Social Media Policy, NSW Government, retrieved 01.09.13 2013,

NSW Police Force 2011, Official Use of Social Media Policy NSW Police Force, retrieved 05.09.13 2011,

NSW Police Force 2011, Personal Use of Social Media Policy and Guidelines NSW Police Force, retrieved 05.09.13 2011,


Olson, P 2006, AOL Shoots Itsself In The Foot, Forbes, retrieved 19.09.13 2013,

Queensland Police Service 2011, Disaster Management and Social Media - a case study, retrieved 06.02.15 2011,


Schein, EH 2010, Organizational culture and leadership, vol. 2, John Wiley & Sons.

Schneier, B 2009, Special Report: Industry experts debate social networking risks Security Asia retrieved 08.04.2013,
<http://security.networksasia.net/content/special-report-industry-experts-debate-social-net working-risks>.

Suncorp 2011, Code of Conduct, Suncorp Group Ltd, retrieved 13.09.13 2011,

Telstra, Telstra's 3 Rs of Social Media Engagement, Telstra retrieved 25.08.13 2013,


Young, K 2010, 'Policies and procedures to manage employee Internet abuse', *Computers in Human Behavior*, vol. 26, no. 6, pp. 1467-71.
Personal online reputation: the development of an approach to investigate how personal reputation is evaluated and managed in online environments

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Edinburgh Napier University

Introduction

The research presented in this paper is concerned with the development of a framework to investigate how online information is used in the creation, building, and evaluation of personal reputations. In this context term “personal reputation” refers to the reputation of private individuals rather than corporate identity and brand.

There are two broad research themes of the larger study:

(1) The means by which people evaluate or assess the personal reputations of others from the online evidence available to them.

(2) How people manage their own personal reputations through their use of online information, and to what extent those behaviours are intentional.

These themes are contextualized with reference to the broader information science literature on information behaviour and use. The information practices explored in this work are situated in everyday interactions with social media. Thus of particular interest to both the theme and research methods for this study is prior work on everyday life information seeking (ELIS) (Savolainen, 1995). In addition, aspects of bibliometric research that focuses on citation practice are relevant here.

This paper provides an overview of prior research into the evaluation of reputation from online sources. The main discussion is concerned with the design of a pilot study. Here we considered a possible method of investigation, as well as the appropriateness of the chosen methods for a larger doctoral investigation. This has resulted in the development of a research approach.

Literature review: Prior research into the evaluation of reputation from online sources

Evidence from the academic literature on the evaluation of personal reputations is weak, and reports of investigations into how individuals use online information to evaluate the personal reputations of others are scant. There is some evidence that the social media ‘footprints’ of individuals are evaluated from a human resources or employer perspective (Kluemper & Rosen, 2009; Labrecque, Markos, & Milne, 2011; Madera, 2012). Such approaches, however, are not systematic, nor comprehensive.

While the existing evidence considers specific aspects of individuals’ reputations such as professional personas (Fieseler, Meckel, & Ranzini, 2014) there are gaps in the knowledge regarding the larger, ‘whole-person’ picture. For example, it is unclear how individuals:

• Identify sources of online information that may be useful in establishing the reputation of others
• Collect information from these sources
• Rate or evaluate the online information sources accessed
Personal online reputation: the development of an approach to investigate how personal reputation is evaluated and managed in online environments

• Validate the online information sources accessed, including the taking into account the quality of online information collected
• Use this validation to evaluate the reputations of others on the basis of the information collected from online sources
• Combine evidence from online sources with other evidence in such evaluations

Although there is no discussion in the extant literature of the extent to which individuals manage their own online presences to actively protect their own personal reputations, there is evidence that individuals self-regulate their activities by managing the information they share across different platforms (Ollier-Malaterre, Rothbard, & Berg, 2013; Uski & Lampinen, 2014). It is also known that individuals curate their professional and private connections with the intention of managing their personal reputations (Fieseler et al., 2014). In addition, it can be seen that prior research has been conducted in areas related to personal reputation management and online information use, even if these empirical studies have not been conceived as such. These include:

• Investigations into the practice of seeking anonymity and/or using pseudonyms for the purposes of seeking information for medical or mental health issues (Greidanus & Everall, 2010; Mesch & Beker, 2010)
• Studies of how sexual and/or gender identities and socially stigmatised activities are hidden by individuals in online activities (Duguay, 2014; Lingel & boyd, 2013)
• Explorations of the use of pseudonyms to experiment with different personalities and identities (Vaatst, 2007; van Dijck, 2013)
• Evidence that individuals seek official or legal avenues to manage, edit, and/or delete information about themselves (Ausloos, 2012; Finocchiaro & Ricci, 2013)

However, this body of literature does not address a number of important questions. These include:

• To what extent are individuals concerned about how others can evaluate their reputations using online information sources?
• How do individuals manage combined professional and private reputations (for example, a formal presence of LinkedIn combined with another less formal one on Facebook) as one ‘personal’ reputation?
• How do individuals negotiate the management of information sources that hold material about them in both online and offline formats as the distinctions between online and offline worlds become blurred?
• To what extent do individuals actively monitor their online footprints for the purpose of reputation management?

Research into information related to citation practices from the domain of information science are relevant to this work. This is because citations can be used, and are read, as markers of academic identity, and thus influence academic reputations (Cronin, 1985). This prior work on the influence of formal information sources in the creation, building, and evaluation of professional reputations provides the context for this study of less formal online information sources (such as those supported by social media) and their roles as related to personal or private reputation creation, building, and evaluation.
The comparative analysis of practices that contribute to personal reputation creation, building, and evaluation with reference to (a) the deployment of citations in the academic literature and (b) social media use reveals a number of analogous activities. Importantly, however, it also uncovers key differences. In the case of citation practices, for example, many of the activities undertaken by a single academic, such as citing the work of others, appear to have a direct impact on the building of reputation (and identity) of other academics, as well as their own. The same does not appear to be the case with social media practices. Here there tends to be a common individual practice of creating content that has an impact on one’s own reputation, with a lower chance of this being impacted by content created by others.

The table below outlines similarities and differences between the citation and social media practices.

**Table 3** Similarities and differences between building and evaluating identity and reputation through academic citations and social media platforms

<table>
<thead>
<tr>
<th>As seen in citation practices</th>
<th>Related practices on social media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citing another within the main content of a paper</td>
<td>Favouring or liking a post</td>
</tr>
<tr>
<td>Making note of someone in acknowledgements or footnotes of a paper</td>
<td>Sharing or retweeting a post</td>
</tr>
<tr>
<td></td>
<td>Mentioning individuals via user names</td>
</tr>
<tr>
<td></td>
<td>Hosting or providing guest blogs</td>
</tr>
<tr>
<td>Citing well-respected authors</td>
<td>Friending, following, or otherwise connecting with individuals</td>
</tr>
<tr>
<td>Co-authoring papers</td>
<td>Use of anonymous accounts</td>
</tr>
<tr>
<td></td>
<td>Use of pseudonyms</td>
</tr>
<tr>
<td>Coercive self-citations or other citations added at the request of a publisher or editor</td>
<td>Linking to well-respected bloggers</td>
</tr>
<tr>
<td></td>
<td>Connecting with others through “mentions”</td>
</tr>
<tr>
<td></td>
<td>Re-posting content of others</td>
</tr>
<tr>
<td></td>
<td>Providing or offering guest blogs</td>
</tr>
<tr>
<td>Citing well-respected authors</td>
<td>Linking back to own content on other platforms</td>
</tr>
<tr>
<td>Following academics on networking platforms</td>
<td>Sharing content from one platform on another (for example, Tweeting a link to your blog post)</td>
</tr>
<tr>
<td>Co-authoring papers with well-respected academics</td>
<td>Using social networking platforms</td>
</tr>
<tr>
<td></td>
<td>Sharing information through social networking platforms</td>
</tr>
<tr>
<td>Self-citing or otherwise referencing previous works by one’s self</td>
<td>Reviewing social media activities of connections</td>
</tr>
<tr>
<td>Sharing through social media platforms</td>
<td>Reviewing lists of connections</td>
</tr>
<tr>
<td>Using social networking platforms</td>
<td>Reviewing lists of connections</td>
</tr>
<tr>
<td>Distributing information through social networking platforms</td>
<td></td>
</tr>
</tbody>
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**Determining the methods for data collection in a study evaluating personal online reputation**

In considering the literature around academic citation and social media practices, these individual areas of reputation building and evaluation can be drawn upon and applied to a broader study of online information’s role in reputation building and evaluation across a number of social media platforms. An investigation seeking to discover the role that online information plays in the process of building and evaluating reputation will help to further the knowledge base of online information’s role in reputation.
The methods of investigation employed most often when researching academic citations tends to favour quantitative analysis, with investigations into the overall citations counts of an author or publication. It appears that there is less research into how and why academics make citation decisions. However, there is also a limited number of studies that include at least some level of qualitative research. Included in this is Hyland’s (2003) study that investigates self-citation. Here semi-structured interviews were conducted with two researchers from each of the eight disciplines investigated to determine an “insider” understanding of preferences and practices (Hyland, 2003). The limited number qualitative of studies, including those investigating the motivations behind a citing author’s referencing behaviours, was noted as a central problem within citation analysis 15 years ago (Cronin, 2000, p. 447). However, the predominance of quantitative studies is still evident in the information science literature today.

In contrast, research methods deployed in studies on social media practices, and in ELIS are largely qualitative. They use a mix of ethnographic observation, qualitative surveys, case studies, and/or in-depth interviews. There also tends to be an element of secondary data analysis, generally through coding and interpreting online content such as forum discussions or public social networking feeds. Quantitative investigations are used to a lesser extent, often to investigate the degrees to which individuals are connected with others through “friending” or “following” others. In addition, much of the research conducted to date is concentrated on single aspects of an individual’s life, such as employment (Kluemper & Rosen, 2009; Madera, 2012; Roberts & Roach, 2008) or mental health issues (Duguay, 2014; Yue, Kan, Xiaomeng, & Zhen, 2010).

Lacking in these investigations into academic citation and social media practices is a whole-world view that considers how individuals manage their online activities and information in regards to their personal reputations, as well as how they evaluate the reputations of others based on the online evidence available to them. The larger study currently in progress seeks to address this gap in knowledge.

One of the challenges in determining robust methods of investigation for this study was to establish a way of examining both broad research themes simultaneously. It was determined that semi-structured, in-depth interviews would be an appropriate method to gather data regarding participants’ own practices in the building and creation of their personal reputations using online information. However, after engaging in early-stage conversations with potential participants, it was determined that answering questions regarding the evaluation of others was difficult when not actively interacting with the online information.

Four potential solutions were considered to create an environment where participants could interact with online information whilst talking about how they evaluate the personal reputations of others. These are outlined in the table below.
<table>
<thead>
<tr>
<th>Option</th>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>Profile mock-ups</td>
<td>Researchers create false user profiles. Profiles contain information that mimics situations discussed in the literature. Interviews are used to discuss how reputations are evaluated with the online information provided.</td>
</tr>
<tr>
<td>Option 2</td>
<td>Participant screen shots</td>
<td>Working with researchers, participants create screen shots of their own online profiles. Other participants then evaluate the reputations of each other based on the screen shots provided. Interviews are used to discuss how reputations are evaluated with the online information provided.</td>
</tr>
<tr>
<td>Option 3</td>
<td>Observation</td>
<td>During the interview, participants are invited to discuss how they use online information to evaluate others. This is done whilst the participants interact with their own social media accounts.</td>
</tr>
<tr>
<td>Option 4</td>
<td>Diaries and interviews</td>
<td>Participants are asked to keep a diary that records their evaluation practices, as well as the processes they undertake to build and create their own personal reputations. At the end of the week, participants take part in a semi-structured interview.</td>
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</tbody>
</table>

For this study, Option 1 was deemed unrealistic because of the technical and time-based challenges required to create the multiple profiles that would be needed. Further, it would have been difficult to recreate a fair representation of the types of user profiles across a number of social media platforms. Option 2 presented similar challenges, as the limited number of participant profiles would not have created the same wide profile selection available in a normal environment.

Option 3 was given greater consideration than the first two, as it would have provided participants the opportunity to be observed in their normal online environments. However, concerns were raised about behavioural changes during observation as well as the privacy of participants’ social media connections (e.g. friends or followers), whose profiles would be seen by the researcher without their consent.

Ultimately, option 4 was determined as the most appropriate method for determining how participants evaluate the reputations of others because of its practicality. Further, based on feedback from pilot study participants, it did not present a burdensome amount of work. The decision was therefore taken to use a combination of participant diary-keeping and in-depth, semi-structured interviews in the study.

In addition, there is a tradition in ELIS research where diaries are used as alternatives to interviews. It is noted that the rich data they provide are reliable sources of information and eliminate the potential for inaccurate reporting (Narayan, Case, & Edwards, 2011, p. 3). Several studies use a combination of diary-keeping and interviews (Agosto & Hughes-Hassell, 2005; Dervin, 1983; McKenzie, 2003; Rieh, 2004). Although these studies vary the way and order in which they collect data, they share a common theme in that they combine the robustness of two forms of data collection for analysis.
Implementation of the pilot study

Using Rieh’s study from 2004 and Hilligoss and Rieh’s study from 2007 as guides, a multi-step data collection process was undertaken to pilot the proposed data collection method using participant diaries and interviews (Hilligoss & Rieh, 2008; Rieh, 2004). For this pilot study participants were asked to keep a diary over the course of one week as they engaged with their social media accounts. Within one week of completing the diaries, participants took part in hour-long, semi-structured interviews.

Demographic information was not collected as a formal part of the pilot study. The ages and education levels of all participants were known to the researcher through conversations prior to the study. However, it became clear during the pilot process that a stronger understanding of the participants’ backgrounds and their past use of technology and social media would be useful. Although this additional information is unlikely to have altered the interview process, it is possible that it would have provided valuable insights for the analysis stage of the pilot study.

Sample

Eight subjects for the pilot study were PhD students based in Scotland. This group was chosen for two main reasons: (1) the relative ease of access to group members and (2) an assumption of a diverse set of backgrounds, based on personal experiences with Scottish-based PhD students. However, care was taken to ensure participants understood that this research is not specific to academic reputations, but rather about “whole self” reputation. To help with this understanding, the purpose of the research was clearly stated, and follow-up or prompting questions were devised to use during the interviews to help participants stay within the scope of the investigation. The clarification of the research purpose was deemed a success in that all participants discussed their use of social media as it pertained to both private and professional aspects of their reputations.

The small sample size used for the pilot study meant that the theoretical saturation point (the point at which no new data is emerging) was likely not achieved (Bryman, 2012, pp. 421-426). However, the primary focus at this stage was to test the methods of study, rather than investigate the research questions. It was anticipated that this stage of the investigation would help to better determine the appropriate sample size to use for data collection in the main study.

Participants were chosen for their PhD status, rather than their gender or age. However, it should be noted that there were equal numbers of men and women, and equal numbers of members from both Generation X (born 1965-1980) and Generation Y (born 1981-1997). The latter classification is relevant as the main study aims to use generation groupings for the main sample. In that case, “Baby Boomers” (born 1946-1964) will be added as a third generation classification.

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2 Generation categories are based on definitions set by the Pew Research Center, located at http://www.pewresearch.org/files/2015/01/FT_generations-defined.png.
Edinburgh Napier University’s research integrity process was used throughout the study, including naming conventions of participants. Names were changed for the study to ensure anonymity. The study participants were as follows:

Table 5  Pilot study participants

<table>
<thead>
<tr>
<th>Participant name</th>
<th>Gender</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fay</td>
<td>Female</td>
<td>Generation Y</td>
</tr>
<tr>
<td>Brian</td>
<td>Male</td>
<td>Generation X</td>
</tr>
<tr>
<td>Casey</td>
<td>Female</td>
<td>Generation X</td>
</tr>
<tr>
<td>Helen</td>
<td>Female</td>
<td>Generation Y</td>
</tr>
<tr>
<td>Roy</td>
<td>Male</td>
<td>Generation Y</td>
</tr>
<tr>
<td>Joe</td>
<td>Male</td>
<td>Generation X</td>
</tr>
<tr>
<td>Lowell</td>
<td>Male</td>
<td>Generation Y</td>
</tr>
<tr>
<td>Gail</td>
<td>Female</td>
<td>Generation X</td>
</tr>
</tbody>
</table>

Online platforms investigated for this study

The aim of this research is to investigate general social media use and practices in the creation, building, and evaluation of personal reputation. However, it is not possible to investigate how participants use all of the elements available on the Internet at this time. For the purpose of this research investigations focus on information created, accessed, and shared through a limited number of social networking platforms and personal blogs.

The primary social networking sites to be considered are the popular tools Facebook, Twitter, Google+, Instagram, and LinkedIn. These sites were determined based on the top ten sites and apps identified in Ofcom’s 2014 Adults’ Media Use and Attitudes Report (Ofcom, 2014, p. 39). Personal blogs were also considered, including personal website or journalling system (e.g. Tumblr, Blogger, or WordPress) that individuals read or contribute to. It is recognised that some participants may use other platforms. Where that is the case, participants are encouraged to discuss all of the platforms they use within the scope of social networking sites and blogs.

Participant diaries

Participants were asked to record their thoughts and reactions regarding the reputation evaluations of others as well as their own actions (or non-actions) as they pertained to managing their own reputations. These thoughts were to be based on the information that appeared naturally during the normal use their social media accounts, as opposed to purposefully reviewing social networking profiles for the diary-keeping exercise.

The diaries were intended to act as tools to encourage participants to actively think about their engagement with social media. The expectation was that keeping a diary in this manner would give participants better recall and understandings about their own behaviours and motivations during interviews. Participants who provided hand-written diary entries submitted between 679 and 1,068 words. Three of the four participants who submitted electronic diaries provided word counts with a low of 1,828 and a high of 2,597. The lowest word count came from the participant submitting an electronic diary using Evernote, with a word count of just 270. The diaries were completed between July 3 and July 17, 2015.
Participant interviews

Interviews were scheduled with each participant to commence within one week of their completing their diaries. Prior to the interviews, diaries were reviewed and annotated. At this time, a list of follow-up questions or points of clarification were added to the interview guide for each participant. Seven of the eight interviews were conducted face-to-face, with the eighth being conducted via Skype. All interviews began with a general question about participants’ use of social media as a reputation-building tool, with follow-up questions asked as needed for clarification or expansion of an answer. The semi-structured nature of the interviews meant that some topics were covered on more than one occasion. Often, on subsequent discussions of a topic, there were more details provided, which were more relevant at that point in the discussion. For example, if a participant mentioned deleting posts whilst discussing their overall online activities, that same topic might be covered in more detail when discussing issues of regret or self-censorship.

The participants appeared willing and able to answer all of the questions posed to them during the interview. However, most participants indicated that they felt as if they were being very “judgmental” when discussing the assessment of other individuals’ reputations. Some of them seemed genuinely surprised that they had been making assessments all along without realising that they were doing so. Interestingly, despite purposefully using the terms “assessment” or “evaluation” when asking participants questions, most of them replied using variations of the term “judge”. Interviews took place between July 13 and July 28, 2015.

Findings: Suitability of the proposed approach

The purpose of the pilot exercise was to establish an approach for the larger study. The two-part data collection method was a success in that it provided two rich forms of data that could be triangulated for the data analysis stage of the study.

At the start of the pilot study, it was hypothesised that participants might not realise they were making reputational evaluations, but that the act of recording their thoughts whilst interacting with social media might make them more aware of how online information was impacting that evaluation process. This was confirmed during the interview stage when all eight participants made comments about how they felt when they realised they were making evaluations without consciously realising it. That confirmation provided further confidence that the use of participant diaries was a strong data collection tool.

As the diaries meant that participants were more aware of their actions and behaviours during the interviews, they were able to discuss the evaluation processes more easily than they might have before realising that they were evaluating the reputations of others. This therefore strengthened the quality of the data collected during the interview process. Further, the ability for the interviewer to ask follow-up questions about diary entries meant that data was strengthened even further.

When combined, the data collected from the diaries and interviews produced a robust data set for analysis. The rich data is easy to work with and can be accessed for coding and analysis with relative ease. Data coding was completed using NVivo 10. The initial coding structure was determined based on the themes that arose from the literature review. Subsequent codes were added as new themes emerged from the participant data.
Minor changes have been made to the data collection methods for the main study. These include the addition of a pre-diary survey to gather demographic data as well as participants' levels of social media use, and a stronger emphasis on electronic diaries. Further, because the main study will be UK-wide, a greater number of Skype interviews will be undertaken, as opposed to face-to-face interviews.

The proposed approach of using participant dairies in combination with semi-structured interviews is therefore a suitable approach for this study. As well as demonstrating the value of the approach, analysis of the data revealed some interesting factors that are expected to emerge more fully in the main study. These relate to obligations to other through information sharing, as well as the judgement of others on the basis of online information shared.

Conclusions
The aim of the pilot study was to determine the appropriateness of processes and methods for the main doctoral investigation. The study was a success as it provided a range of insights regarding what worked or did not work, and how those insights might impact the main study. Importantly, the pilot study revealed interesting insights by participants which have helped to re-format the interview guides and the coding system for data analysis.

Further, indications from the findings show that there are themes emerging from the data that were not uncovered in the literature review. It is possible that those themes will emerge in more detail as the study continues. We will know for certain with the implementation of the larger study.

Next stages
The study is now being scaled up for the main empirical work with a sample size of 35-45 participants. Unlike the pilot study, the main study will include a short survey at the start of the diary-keeping week. The purpose of this survey will be to gather additional demographic information (for example, age, gender, and education), familiarity with and time spent on social media, and the platforms participants use or have heard of.

It is anticipated that the main data collection will be completed by the end of 2015 with data analysis taking place in early 2016.
References


Appendix 1: Programme

Day 1 – Tuesday 12th January

10:00 Registration & coffee

10:30 Welcome to CIM Prof Tom Jackson, CIM Director

10:45 Opening Keynote Stewart Robinson, Loughborough University
Developing your Research: What I Wish I had Known when I was Younger

11:30 5 minute madness
5 minutes each for PhD students to talk about their research/poster

12:20 Information and the Intelligent Organisation John Beckford, Beckford Consulting

12:45 Lunch & poster session

13:30 ECR workshops – session 1 (sessions run in parallel)
- Writing Journal and Conference Papers Guy Fitzgerald with Ray Dawson
- Reflections on the ‘how’: Reconsidering research methods in Information Systems Bob Galliers
- Managing the Early Stages of your Academic Career John Arnold
- Writing a Funding Bid Tom Jackson

14:45 Refreshments & poster session

15:15 ECR workshops – session 2 (repeat of session 1)

16:30 Warfare in the information age: the digital transformation of defence operations in the 21st century Neil Stansfield, Defence Science and Technology Laboratory

17:00 Close

19:30 Conference Dinner and Quiz Night Burleigh Court
Day 2 – Wednesday 13th January

09:30 Registration & coffee; poster session

10:00 Keynote Danny Budzak, London Legacy Development Corporation
It’s alright in practice, but does it work in theory?

Session 1 – Information Management

10:45 Factors that influence information behaviour from psychology and information
Peggy Alexopoulou

11:05 A proposal for development of individual virtual competencies
Renato de Oliveira Moraes

11:25 Developing a model for investigating academic libraries as learning organisations
Saowapha Limwichitr and Judith Broady-Preston

11:45 Refreshments

12:00 Plenary Andrew Jack, Financial Times
Humans versus machines: the role of editorial curation in journalism

12:45 Lunch & poster session

Sheila Moorcroft and Noeleen Schenk

Session 2 – Social Media and Big Data

14:30 Aspectual Analysis as an alternative way of understanding the definitions of Big Data
Sina Joneidy and Maria Burke

14:50 Social networking sites and employment status: an investigation based on Understanding Society data
John Mowbray

15:10 Personal online reputation: the development of an approach to investigate how personal reputation is evaluated and managed in online environments
Frances Ryan

15:30 Unauthorised disclosure of organisational information through social media: a policy perspective
Dinithi Pallegedara

15:50 Refreshments

16:10 Closing Keynote Christine Borgman, University of California (UCLA)
Dataverse in the Universe of Data

16:55 Best paper / poster / 5 minute madness awards Tom Jackson

Closing remarks

17:00 Close