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Australian Eclecticism and Theorizing in Information Systems Research

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Abstract. This paper reflects on some significant trends and achievements in Information Systems (IS) theorizing in Australia. Important themes identified as typifying Australian eclecticism are (i) the influence of socio-technical thinking; (ii) design and action approaches; (iii) critical theory research; (iv) emphasis on theory and theoretical foundations; and (v) some unusual approaches to theory. These themes are seen as emerging from Australia's background as an isolated, distant country with a low population density, and its identification as a masculine, peaceful, democratic, and equalitarian society that is also multi-cultural and technologically advanced. The Australian IS community is seen to have some commonality with Scandinavia in that both are to some extent "outsiders" in comparison with more prominent and powerful research communities in Europe and North America. Value is seen in researchers in both Scandinavia and Australia being able to "think differently", taking lessons from a number of traditions and being willing to find a new path and pioneer new directions.

Keywords: Information systems, Australia, theory, eclecticism, socio-technical, design theory, critical theory.

1 Introduction

In this paper we provide a taste of Australian theoretical concerns in Information Systems (IS) research. As our title suggests, we see eclecticism¹ as a key feature of the Australian theoretical landscape. We argue that one influence on this eclecticism is the position of Australia as a small (in population) country, distant and somewhat isolated from the mainstream of Western thought. This is a position that Australia shares with Scandinavian countries, but there are also some major differences, based on geography, history, culture, language and philosophy.

The paper is based on the reflections of the authors and their judgment as to what are some significant trends and achievements, rather than being a comprehensive survey of theorizing in Australia. We illustrate our argument both historically and with contemporary examples, in passing linking to activities or researchers in Scandinavia. The aims of the paper are first, to show how some key work in IS has developed in Australia and how Australian researchers have interacted with the rest of the world—both influencing and being influenced, and second, to draw some conclusions about the nature and characteristics of theorizing in IS in Australia.

The choice of five key themes for discussion has arisen from the judgment of the authors as to themes that provide important illustrations of the range and depth of Australian thought. These themes are: (i) the influence of socio-technical thinking; (ii) design and action approaches; (iii) critical theory research; (iv) emphasis on theory and theoretical foundations; and (v) the unusual, taking a different approach to theory.

Our choices reflect our own interests and experience so it is useful to provide some of our relevant background. Our team of authors is almost a microcosm of what can be expected in a team of IS researchers in Australia, reflecting the country's multi-cultural background, except that we do not have a team member from Asia or an indigenous Australian. Three of our team members were born in Australia and have Anglo-Celtic backgrounds and two have come to Australia from Europe. Gregor has a Scottish-English background and is fourth-generation Australian along at least two lines of her family tree. She has spent almost half her life in Rockhampton, Queensland, a large regional city in the tropical north of Australia, which led in later years to applied research work with the beef industry. Her original training was in mathematics and psychology at the University of Queensland. Just over ten years in the information technology (IT) industry in the 1970s and early 1980s followed, as a programmer, project leader and consultant in Melbourne, Glasgow, London and Brisbane. Subsequently a career as an academic was begun, with a Masters degree in artificial intelligence and a PhD supervised by Professor Ron Weber at the University of Queensland. She worked at the University of Central Queensland in Rockhampton for many years and is now Head of the School of Accounting and Business Information Systems at the Australian National University in Canberra, Australia's national capital. Gregor has retained an interest in applied research that has practical relevance, as well as looking at how a better understanding of the special type of theory that underlies action can be developed.

Bunker is of Irish background mainly and third generation Australian. She originally trained as an historian and became an IS professional by way of work methods. She has extensive consulting experience in the finance, insurance, transport and government sectors. Her PhD was in IS at the University of Wollongong and she has been active in pioneering research in the philosophical foundations of IS as well as the IFIP 8.6 (Technology transfer, diffusion and innovation) working group. Her primary expertise is in the use of phenomenology in the IS discipline as a base for epistemology.

Underwood is mainly of Anglo background and also studied pure mathematics originally. After attempting a PhD in Mathematics, and a time as a school teacher, he worked for four years as a programmer/analyst and consultant in a number of IT firms in Sydney. In late 1970 he moved to the tertiary

sector at Canberra College of Advanced Education (CAE) where he taught, amongst others, many of the students in the government's programmer-in-training scheme in Canberra. In 1988 he moved to the Department of Information Systems at the University of Technology, Sydney. He completed his PhD at the University of Wollongong (Australia) in 2001. His thesis investigated misunderstanding between IS designers and users using the theories of Foucault and Latour.

The other two authors are more recent arrivals.

Originally from the former Yugoslavia, Cecez-Kecmanovic draws from the European tradition in IS research which, throughout the 1970s and 1980s, was significantly influenced by Scandinavian approaches to IS and IS development. Early in her career, as an academic at the Sarajevo University Faculty of Electrical Engineering (where she co-founded an Informatics Department in 1974), engaged in developing IS in industry and government organisations, she became concerned with social and economic implications of IS based on information and communication technology (ICT). Transition to Australian academic life and in particular to commerce and management academic environment (Griffith University, University of Western Sydney (UWS) and now University of New South Wales (UNSW)), encouraged her to explore further her social concerns in IS deployment and use, which in turn led her to critical social theorizing of ICT and IS in organizations and society.

Metcalf is a classic Australian immigrant, the son of a British Air Force officer whose childhood included living in outposts of the closing British Empire in the post-WWII period. Metcalf worked for 15 years in the Merchant Navy and the construction industry as a planner before entering academia. His academic interests are in the design of problem solving and decision making systems and emerged at a time when the microcomputer was being developed. His involvement in information technologies still is not with technology as the core but rather with problem solving. His interest in argument stemmed from its creative problem solving abilities in the design of research reports. Metcalf responded to the eclecticism in the Australian environment by developing argumentation theory as a way to sense-make this creative atmosphere.

The backgrounds of the authors are diverse, but we have in common an interest in acquiring and disseminating knowledge, theory and methods that are applicable to real world problems. Our backgrounds, coupled with our situation in Australian society as characterized below, have influenced our choice of research themes. Our interest in bettering the human condition, where possible, underlies the choice of the socio-technical and critical perspectives for discussion, as these both have a concern for the importance of human and ethical implications when developing IT systems. The design and

action approaches and the eclectic approaches to theorizing address the problem of how knowledge is acquired and developed so that it can be used in practice, again a concern with the application of knowledge in human and organizational contexts. We reflect on this choice of themes again in our conclusions. But first we discuss the Australian context and each of the themes separately in the following sections.

2 The Australian Background

Some background to the history and character of the Australian people places our discussion of Australian research in IS in context².

Australia is a large country geographically with a low population density of two inhabitants per square kilometer³. Today Australia has a robust economy, a Western-style democracy and a population of around 20 million. Its people are ethnically diverse and multi-cultural. Price (1999) estimates that, in round figures, the ancestry of the population can be placed at 70% Anglo-Celtic, 18% European, 7% Asian, and 1.5% Aboriginal. However, about 60% of the population has mixed ethnic origin and 20% has at least four distinct ancestries.

For many years Australia's economy rested primarily on exports of raw materials, including wool, meat, gold, coal and iron ore. However today Australia is also technologically advanced and compared with other OECD countries Australia's ICT uptake from the mid-1990s has been strong. Australia had the third highest investment in ICT in 2001 as a share of total GDP, up from ninth position in 1980 (Productivity Commission 2004). Australia's productivity surge in the 1990s is attributed in large part as due to the effective adoption of ICT (Parham, Roberts and Sun 2001).

While we cannot give anything like a detailed account of Australian history and the formation of the Australian character, the influential work by the historian Geoffrey Blainey, *The Tyranny of Distance* (2001), gives some insights. Blainey advances a particular thesis: that distance and isolation are one of the moulds that has shaped Australian history and its people.

Distance is as characteristic of Australia as mountains are of Switzerland. By sealanes or airplanes most parts of Australia are at least 12,000 miles from western Europe, the source of most of their people, equipment, institutions and ideas. The coastline of Australia also stretches for 12,000 miles and the coast encloses as much land as the U.S.A, excluding Alaska (Blainey 2001, p. ix).

Distance illuminates the reasons why Australia was for so long such a masculine society, why it became a more equalitarian society than North America, and why it was a relatively peaceful society (Blainey 2001, p. x)

Distance and isolation means that Australia has a unique history. When European settlers arrived in 1788, Australia was one of few regions around the globe where agriculture had not developed. Aborigines, as far as is known, came to Australia over land bridges from Asia from about 50,000 years ago. Subsequently Australia and Tasmania became islands and the agrarian practices that grew up elsewhere did not reach Australia.

Other important traits of Australian culture arise from its convict origins (Keneally 2005) and a strong rural tradition. Australia's distance from centres of civilization has meant that until recently it has not been a particularly attractive destination for migrants. The first European settlement in Australia occurred because Britain needed a new destination for convicts from overcrowded British prisons and a supply of strategic raw materials, especially flax and timber (Blainey 2001). Transportation of convicts to mainland Australia continued until 1840. Many of the convicts were English criminals, with some from Ireland and Scotland and a small number were Irish political prisoners, pioneer trade unionists and rebels against new technologies that threatened their jobs (Blainey 2000, p. 30). The country remained very sparsely settled with exploration and settlement of a harsh interior occurring only gradually through the 19th century. People remained concentrated in the cooler south-east corner. Blainey (2000, p. 73) has an unusual analogy: "It was like a Europe where Scandinavia possessed nearly all the towns and wealth".

An insight into the Australian character is perhaps revealed by its choice of heroes. Sporting heroes are plentiful. One seemingly improbable icon is Ned Kelly, a bushranger who was hung in 1880 for the murder of a policeman. Manning Clarke describes Kelly as:

A hero, as a man through whom Australians were helped to develop their national identity. A man who had savaged policeman in the old convict tradition, ranted against the blacks and denounced the brutal barbarism of those who clothed their sadism towards the common people in the panoply of the law. (Cathcart 1987, p. 390)

Another folk hero who is perhaps more deserving of a place in Australian history was Harry Readford, alias Captain Starlight, who drove a mob of 1200 stolen cattle in a 1000 km journey from Longreach to outback South Australia in 1870, across land which Burke and Wills had died exploring just nine years before (McCarthy 1987). When Readford came to trial he was controversially acquitted—possibly a reflection of the jury's regard for his abilities and character. "Harry represents the archetypical Australian. He was a true individual;

an accomplished bushman and likeable larrikin; a stockman and outback legend who never carried a gun.” (Burdon 2006, p. 53)

Politically, Australia is a democracy and can boast the first Labor (socialist) Party in the world to win power—in Queensland in 1899 for 6 days! Blainey (2000, p. 127) sees the success of the Labor Party as a ‘sign of the egalitarian, levelling spirit’ strong in Australia throughout much of the 20th century. “In Australia it was widely agreed that there was a strong role for government in regulating work, industry and social life”.

This brief background leads us to a number of descriptives to summarize the Australian condition. Australia is an isolated, distant country with a low population density and an economy largely reliant on agriculture and the export of raw materials. Its history featured a non-agrarian culture until relatively recent settlement by Europeans and the tradition of pastoral settlement by hardy pioneers in the ‘bush.’ Historically it has been a masculine society, peaceful, democratic, equalitarian and with an underlying socialist leaning. A certain disrespect for authority and dislike of ‘tall poppies,’ perhaps traceable to the convict origins, can also be distinguished. Today, this background underlies a modern Australia that is decidedly multi-cultural and technologically advanced.

3 Overview of Information Systems in Australia

Again only a relatively brief history of IS in Australia is provided, but it touches on some of the more salient points.⁴

Caulfield Institute in Melbourne appears to have had the first related department in 1965, named “Electronic Data Processing”. A number of early courses at this and other institutions were offered to satisfy a need for computing staff in the Australian public sector, through a “Programmer-in-training” (PIT) scheme. One of the authors (Gregor) undertook this program in 1971 and studied quite a wide range of topics—from three programming languages through hardware to systems analysis and design and general systems theory. A significant number of people who are still active in Australia in academia and industry owe their training to the PIT courses. Our current IS discipline builds on this background and courses that emerged in accounting schools. For example, in 1967-1969, the University of New South Wales offered courses to Commerce students to enable them to understand computers and software development.

The first annual Australian Conference in Information Systems at Monash University, Melbourne, Victoria, in 1990 helped established an identity for IS, as did the appearance of a specialist journal, the Australian Journal of Information Systems, in 1994 at the University of Wollongong.

Clarke (2006) offers the opinion:

Given Australia's c. 0.3% of the world's population and c.1% of world GDP, Australia tends to 'punch above its weight' in many fields. The impact of the 250-700 IS academics has been noticeable, but it has been dwarfed by the energy of the U.S.A. (Clarke 2006, p. 13)

Two more points about the Australia academic scene are of interest. First, in Australia it is not common to study philosophy, either at secondary school or at a tertiary level unless one elects to pursue it from personal interest. Programs at tertiary institutions are mostly specialist from the first year, following the British tradition, rather than requiring introductory generalist study across a range of disciplines as in the United States. This background means that Australian IS researchers in general cannot be assumed to have a strong philosophical grounding from which to argue when questions of ontology and epistemology arise. If our researchers have studied philosophy, they are likely to have received a view on philosophy of a certain type, and this will not have been in the Continental European tradition. For example, when studying philosophy at the University of New South Wales in the 1960s, one was expected to read Plato, Descartes, Locke, Berkeley, Hume, Ayer and Ryle (as Underwood did). Kant was regarded as rather difficult and slightly irrelevant, so that when modern European philosophers were encountered in later life as an IS researcher, there was a lack of awareness of the problems they were trying to solve.

The most distinctive Australian philosophers are John Anderson, who is said to have developed "a distinctively Australian style of philosophy, one that focuses almost exclusively on materialism, naturalism and realism", his student John Passmore, who specialised in the history of ideas and 'applied philosophy' (Campbell 1985), and the ethicist Peter Singer (1990). Of course, as the demographics of Australia show, we have continuously gained people from overseas, from continental Europe as well as Britain and Asia, so a number of our IS academics have been trained in different traditions (for example, Metcalfe and Cecez-Kecmanovic). Overall, one could argue that Australians are philosophically pragmatic, that is "they try to interpret each notion by tracing its respective practical consequences" (James 1991, p. 23).

Second, the employment conditions in Australian universities reflect its political history of socialism and active trade unionism (although significant changes in industrial conditions are occurring at the time of writing in 2006).

Australian universities do not have the tenure system as practiced in the U.S.A. The industrial awards under which academics are employed mean that most academics are given ongoing, tenured positions from when they begin employment. For many years it was also difficult to attract sufficient staff in IS, and a number of staff have come to academia from industry and from varied fields (as have the authors). This situation means that IS academics have not had an extreme pressure to publish as in some other countries, and if they are active researchers, are relatively free to choose the style and area of research that they embark upon.

4 Illustrative Themes

The remainder of the paper focuses on the key areas in Australian theorizing in IS identified in the Introduction.

4.1 Influence of Socio-Technical Thinking

One theme in Australian thinking early on was that of the socio-technical approach. Amongst those who were teaching the new courses in data processing or business computing in the 1970s, usually in non-university tertiary institutions, there was a need for theoretical bases other than the mathematics or electronics that supported computer science. The need was for theories that would suggest ways of overcoming perceived difficulties in the early use of computers in Australian organisations: incompatibility of different file systems, dependence on techniques and models unique to particular hardware suppliers, and the collection and dissemination of large volumes of data (known as management information) which were neither understood nor used. One response to this need was to turn to relatively sophisticated models of data structures and processes, including the work of Börje Langefors (1966) and Bo Sundgren (1973). Particularly important was Langefors' theoretical distinction between the datalogical and infological modeling of IS which was reflected in the IS development methodology ISAC - Information Systems work and Analysis of Change (see Lundeberg et al. 1981). Such models tended to be used to provide an introduction and hopefully a theme for courses that then moved into more practical topics such as linked lists and file structures. Australian organisations seldom fully adopted such models, seeing them as too abstract and impractical. By the late 1970s the availability of large disk drives and the triumph of the relational data model meant that both academia and industry shifted their focus back to the technical aspects of data.

Another response to the need for theory was to look for models of how information was used in organisations, particularly by management. A popular theory among IS academics in this area in the 1970s and early 1980s was the socio-technical model. Stafford Beer's (1985) Viable Systems Model, the first socio-technical model adopted by IS researchers, shared its cybernetic foundations with Langefors' infology. Its popularity was due to its (unrealisable) promise to provide a measure of the usefulness of information, its advice to drastically reduce the volume of useless management information and its recursive structure which suggested how to support complex organisations with relatively simple computing systems. Beer's model is more technical than social, so Australian IS researchers next turned to Checkland's Soft Systems Methodology (SSM) (Checkland and Scholes 1990; Checkland and Holwell 1998), which has been so influential in the IS discipline in Britain. SSM reminds IS developers that systems need to support human activities, that systems objectives are negotiated by the participants, and that systems implementation must start from where we are now. Since SSM was originally developed to guide management change rather than computer systems development, it has been used in Australia as an inspiration rather than a technique.

The Australian sociologist Fred Emery was a member of the Tavistock Institute where the socio-technical model was originally developed (Emery 1977). Emery established a reputation in Norway with his work on technology and industrial democracy (Emery and Thorsrud 1976). Unfortunately his following in Australia (Wikipedia 2006) was quite small (though enthusiastic) but his work on systems and turbulent environments (Emery et al. 1974) seems particularly relevant in the 21st century.

The move towards social and psychological issues led to a wide variety of authors such as Richard Gregory (1966), Oliver Sachs (1985) and the gestalt psychologists (Perls 1951). Interest here centred on the existence of different views of reality and the role of interpretation in the transition from data to information. In the last decade Australian researchers with an interest in human activities within organisations have drawn considerably on structuration theory (Urquhart and Sawyer 2000), actor-network theory (Underwood 2001), activity theory (Er and Underwood 2004; Whymark and Hassan 2005), co-evolution (Kay and Cecez-Kecmanovic 2001) and phenomenology (Bunker 2005; Bunker and Campbell, 2005).

4.2 Design and Action Approaches

Further evidence of a practical and pragmatic bent among Australian researchers is present in work on theorizing about design work and action research

methods. The aim here is to develop prescriptive-type theory and guidelines (Gregor 2006) or “methodological rules” (Van Aken 2004) to guide further action.

Weber recognized questions concerning a ‘theory of artifacts’ as a paradigmatic base for IS research (Weber 1987). He indicated the difficulties with some instances of design work and saw the “lure of design and construction” as one of three factors inhibiting the progress of IS as a discipline.

The conundrum posed by design research for progress in a discipline emerges clearly when a paper describing such research must be evaluated for publication in a learned journal. What are the quality standards the reviewer must apply to decide upon its acceptability? Typically the paper contains no theory, no hypotheses, no experimental design, and no data analysis. Traditional evaluation criteria cannot be used. The paper’s contribution inevitably requires an inherently subjective evaluation (Weber 1987, p. 9).

Other Australian writers paid further attention to the problems of building IS and associated tools and methods and describing this work so that it is recognized as a valid form of research. Cecez-Kecmanovic gave a keynote speech at the ACIS conference in 1994 on the problems of ‘engineering-type’ research (Cecez-Kecmanovic 1994). Gregor (2002a, 2002b, 2006) argued for theory for design and action as a special type of theory that says ‘how to do something,’ as opposed to other types of theory where the primary purposes are analysis, explanation or prediction. Gregor (2006) and Gregor and Jones (2004) make the argument that our incomplete understanding of how design theory in IS should be formulated is a significant problem, as design theory is of particular importance in a discipline that is concerned with the construction of mutable artifacts where complexity arises from the interaction of humans with information technology.

Design approaches can also be found in Scandinavia under the heading of ‘constructive research.’ For example, Iivari (1983) distinguished theorizing at a prescriptive level early on, using the term ‘systemeering’, a word coined for ‘systems work’ to match the Swedish word ‘programmering’ for programming. Further developments can be found in (Kasanen et al. 1993; Iivari et al. 1998 and Jarvinen 2004).

Until recently, work in this vein in North America was sparse. An exception is Nunamaker, Chen and Purdin (1991), who provided a multi-methodological approach to design work that included the steps of theory building (conceptual frameworks, mathematical models and methods), systems development (prototyping, product development and technology transfer), experimentation (computer simulation, field experiments and laboratory experiments) and observation (case studies, surveys and field studies). How-

ever, interest in IS as artifacts and design research has grown significantly in recent years among North American authors. The term ‘design science’ has been popularized in IS by March and Smith (1995) and Hevner et al. (2004), who argue for the complementarity of design and natural science with respect to IS. The ISWorld web site now has a section on design research with a current overview provided by Vaishnavi and Kuechler (2004/5).

Action research is seen as one method that is particularly appropriate for the development of design knowledge as argued in a paper by Burstein and Gregor at the 1999 ACIS conference, which treats systems development research as action research (Burstein and Gregor 1999). Bunker and Campbell (2005) argue that by combining design science concepts of intelligent design and choice with a perspectival, phenomenological approach (tool maker, tool, use, scholar/inheritor) that Punctuated Perspectival Action (PPA) strategies emerge that allow for many different approaches to the creation and use of IS. The use of action research in Australia is seen as part of a move towards methodological pluralism.

Scandinavian IS researchers have been engaged in action research at least since the early 1970s (Bjerknes and Bratteteig 1995; Nygaard 1996). Progress in Australia may have been more difficult because of less comfortable relationships among business and academia. Informal observation suggests that in Australia it is less common than in Europe for academics to ‘to-and-fro’ between working in academia and working in industry. There is also perceived to be a lack of recognition in industry of the worth of academics and their work, possibly a reflection of our egalitarian society and the ‘tall poppy’ syndrome. Progress is now being made based on more applied research and a clearer analysis, based on epistemology and level of participation, of different types of action research. Examples of published action research studies by Australians include (Gregor and Jones 1999; Moody 2002, McKay and Marshall 2001; Smith et al. 2006 and Stein 1995).

4.3 Critical Theory Research

A further area where the application of knowledge is a paramount issue is in critical theory, with critical IS researchers inhabiting a peculiar niche in the Australian IS research landscape. Although tiny this niche is recognizable by its concerns with instrumental rationality, the technological determinism and managerial ideology that often underpin IS design, deployment and use, as well as IS research. These concerns were raised early on by proponents of the socio-technical IS approach in the UK (Mumford and Weir, 1979; Mumford, 2000) and most notably by Scandinavian researchers such as Hedberg (1980),

Kyng and Mathiassen (1982) and Ehn and Sandberg (1983). By applying ‘participatory design’ and ‘collective resources approach’ in developing and deploying computer applications, IS professionals were encouraged to consider different, often conflicting, interests and to ensure that democratic values are incorporated. Such a distinct Scandinavian approach to IS development involved trade unions as a key guarantor that workers’ interests were incorporated in the process of technological change. While the socio-technical approach to IS put on the agenda workers’ interests, quality of working life and workplace democracy, it did not challenge the status quo and was eventually subsumed within a managerial discourse (McGrath, 2005).

A more distinctly critical approach to IS was influenced by critical social theorists of the Frankfurt School, including Horkheimer, Adorno, Markuze, Fromm, Benjamin, and Habermas. Lyytinen and Hirschheim (1985) and Lyytinen and Klein (1985), for instance, proposed the application of Habermas’ critical theory as an alternative conceptual framework in the study of IS. Critical IS research has since been widely recognized as a legitimate research approach—separate from positivist and interpretivist approaches (Orlikowski and Baroudi 1991).

Similar to Scandinavian critical IS research, the early works with a critical perspective in Australia drew mostly on the critical social theory of Jürgen Habermas (1968, 1976, 1984, 1987). For example Habermas’ theory of communicative action was applied as a basis for IS case study research revealing forms of domination and control disguised by the appeal of seemingly democratic public electronic discourses in a university (Cecez-Kecmanovic 2001a). Furthermore, the concepts of systems rationality and communicative rationality (Habermas 1984, 1987) were used to explain and theorize rationalization processes enacted or strengthened by the implementation of IS in organisations (Cecez-Kecmanovic et al. 2002). In the University of South Australia, for example, Heng and de Moor (2003) applied Habermas’ Theory of Communicative Action to develop and implement GRASS (Group Report Authoring Support System) that enables and supports electronic communication and conflict resolution resembling ‘ideal speech situation’. This research represents a rare case of Critical Theory informing technological development. These and more recent contributions to the critical methodology and the critical theoretic foundation for IS research (Cecez-Kecmanovic, 2001b; 2005a; 2005b) suggest that the critical niche in the Australian IS research landscape may be gaining momentum. This has also been reflected in Australian international contributions to the promotion and advancement of critical IS research at AMCIS 2003 and 2005 (with mini-tracks on Critical IS Research, initiated and co-chaired by Cecez-Kecmanovic, Australia, and Janson ,USA), at CMS 2003 (a track on Critical IS research proposed and co-chaired by Brooke, UK,

Cecez-Kecmanovic, Australia, and Klein, USA, and a special issue of the Information Systems Journal to be published in 2008 titled “Exploring the Critical Agenda in IS Research” co-edited by Brooke, Cecez-Kecmanovic and Klein.

It is important to note that critical IS researchers are still struggling to demonstrate legitimacy of their approach in academic circles. Ultimately, critical IS research aims to provide a new basis for IS praxis in organizations, which is less governed by instrumental rationality, managerialist ideology or technological determinism. Critical IS researchers take issue with the undue influence of instrumental rationality and technological determinism on current management and work practices, in particular if this influence is unreflected or even purposefully concealed by ideology and vested interests. Critical IS researchers extend their gaze to IS research practices as well: they criticize a positivist conception of IS as tools that serve solely managers’ goals and efficient control of processes and resources. They also criticise interpretivists’ passive watching and ‘impartial’ documenting of experiences of IS practices. Critical IS researchers claim that by avoiding value judgements and by relying on informants’ subjective views and experiences regarding IS development and use—coupled with the absence of historical accounts and deeper insights into the material conditions and social structures that shaped their views and experiences—the interpretive IS researchers inadvertently legitimate the dominant power structures and managerialist ideology embedded in IS design, implementation and use. Critical IS researchers, however, are yet to demonstrate that being critical makes a difference in both IS research and practice.

This leads to the key questions Australian critical IS researchers share with their predominantly European colleagues regarding the relationship between theory and practice and how knowledge is produced and used. While critical IS theorizing aims at revealing and explaining hidden forms of instrumental rationality and unjustified managerial domination and control (to be) achieved by the use of IS, a sceptic would rightly ask: So what? Does it make any difference and for whom? For critical theorizing it is perhaps even more important than for any other to gain validity in practice—whether and how it engenders transformation of IS practices. Does knowledge produced motivate, empower and give ammunition to actors who struggle against the domination of instrumental rationality in IS development aiming to break managerialist hold over the content and objectives of IS? Does (can) a theory inform or assist practical action (such as IS development and implementation) leading to emancipatory social change? Learning from critical management studies or critical studies of education (both far more advanced than critical IS) IS researchers may consider a particular notion of validity—catalytic validity—defined as the degree to which research informs and enlightens those it stud-

ies, assists them in gaining self-understanding and self-direction and enables them comprehend and change the world (Lather 1993; Kincheloe and McLaren 2000; Cecez-Kecmanovic 2001b). Critical IS researchers in Australia have yet to come to terms with such a notion of validity and their own responsibility in changing IS practice.

4.4 Emphasis on Theory and Theoretical Foundations

A further identifiable trend in Australian research is a focus on the nature of theory itself and the need for strong theoretical foundations in our discipline.

Weber has been a pioneering influence. His collaborative work with Yair Wand led to the Bunge-Wand-Weber (BWW) theory of representation, an attempt to develop strong theory that was identifiably peculiar to the IS discipline. Weber gives an account of this theory and its development in his monograph *the Ontological Foundations of Information Systems* (Weber 1997). In the introduction he describes how he struggled to get acceptance of his ideas early on in IS outlets and had to publish an early view in an accounting-IS journal. Weber's work continues to be characterized by a concern for strong theory, theory that is characteristic to IS, recognition that the phenomena of interest to us are systems and of the significance of general systems theory. It is interesting that Weber's chief original collaborator in this work was the Canadian-based researcher Yair Wand, also outside the US and Europe. A group of Australian researchers continues to work in this tradition with work on ontology and modelling, as seen in Green and Rosemann (2005), Milton and Kazmierczak (2004) and Shanks et al. (2004).

Gregor has continued in this tradition to some extent by focusing on the structural nature of theory in IS itself (Gregor 2006), a problem that has been little addressed in North American outlets. Gregor's article indirectly criticizes the North American tradition of equating logical positivism with scientific thought – something that had been argued against in Europe and philosophy of science from at least Popper in the 1930s—and shows a willingness to step outside the prevailing orthodoxy. The type of theory that is to be built is considered as a more fundamental question than an inflexible adherence to a specific epistemological position. Five inter-related types of theory are distinguished: (i) theory for analysing; (ii) theory for explaining, (iii) theory for predicting; (iv) theory for explaining and predicting; and (v) theory for design and action. A contribution of the paper is that it shows that multiple views of theory exist and it is suggested that the type of theory under develop-

ment can influence the choice of an epistemological approach. The building of integrated bodies of theory that encompass all theory types is advocated.

Views on the structural nature of theory can also be found in Scandinavia, with Iivari (1983) distinguishing three levels of theorizing for IS: (i) a conceptual level, at which the objects of enquiry are defined; (ii) a descriptive level, at which the explanatory conjectures and hypotheses are generated and tested; and (iii) a prescriptive level, at which methods for constructing systems are put forward, with recommendations for their practical use.

The need for strong theory has continued to be highlighted at the workshops on Information Systems Foundations in Australia. The late Kit Dampney organized the first workshop at Macquarie University in 1999. The second and third workshops were held in Canberra at the Australian National University in 2002 and 2004 (Gregor and Hart 2002; Hart and Gregor 2005). Papers at these workshops have addressed theoretical bases, the links between IS and practice and some unusual reference theories.

Internationally, Bunker is a key member of the international Philosophical Foundations of IS (PFIS) group that is associated with the Americas Conference on IS (AMCIS). It brings researchers from many different cultures and backgrounds together to explore the philosophical underpinnings of the discipline. The prevailing view of this group is one of epistemological and methodological pluralism that facilitates and enhances the multidisciplinary nature of IS.

4.5 The Unusual—A Different Approach to Theory

The eclectic Australian environment, and its distrust of rules and authority, nurtured a search for ways to justify knowledge claims from IS researchers that impose the minimum of restraint. The argumentation theory literature offered an obvious starting point. The establishment of a doctoral school at the University of South Australia in the late 1990's allowed the opportunity to develop that idea pragmatically: first in the design of PhDs. At the core of this approach is the idea that Information Systems research did not need a rigorous measurement methodology but rather a reflexive community of people capable of multiple perspectival critique (Rorty 1989; Habermas 1968): a community that can critique knowledge claims in terms of their strength of argument regardless of the methodology or perspective taken and reflexive in the sense of also being able to turn constructive critique into creative research design (Gage 1996).

For argument to motivate and yet offer common ground to eclecticism it has to be accepted as a replacement to the endless ontology and epistemology

debates. It has the credentials to achieve this role. Argument has been the quiet core of Western thinking (Haack 2003) for over 2000 years. Knowledge claims are seen as conjectured arguments (Popper 1963) to be justified with supporting evidence. Anticipating this, constructive critique can be used to design future research that will end in a well justified knowledge claim; it is creative (Bailin 2003). It provides explanation and thus the need for theory (Terence & Glidden-Tracey 1999), something the anti-intellectual element in Australia has long distrusted. Argument is ethical (Churchman 1971), social (Habermas 1987), an inquiry design (Crosswhite 1996; Eemeren 2002), pragmatic (Churchman, 1971) and it is compatible with the reasonable epistemologies (Rehg 1998). Churchman also explains what is required to justify an argument. Indeed some believe 'Everything is Argument' (Lunsford and Ruszkiewicz 1999), and not just men quarrelling (Tannen 1991).

Argument, or wit-craft as Bailin calls it (Billig 1996), has been used to explain the diffusion of technology (Green 2004), to design IS systems (Metcalf, 2002), to design civil societies (Habermas 1976), to provide therapy (Billig 1996) to understand decision making (Terence and Glidden-Tracey 1999) including innovative decisions (King and Jose 2000), to settle dispute (Eemeren 2001), to bind groups, (Niederman and Desanctis 1995) to provide business arguments, to forecast (List and Metcalfe 2004) and to design computerised agents (O'Hare and O'Grady 2002).

By rallying around reflexive argument, eclecticism can be given a fair go, changing the focus to critiquing knowledge in terms of the supporting evidence not only the measurements used. Argument offers a pragmatic unity to eclecticism, to our doubts about the usefulness of measuring human attitudes and to recounting de-contextualised experiential stories. It is thought to be the simplest form of rules, an Australian icon, to ensure eclecticism does not turn to relativism (Metcalf 2006).

5 Discussion and Conclusions

Researchers in both Australasia and Scandinavia have been willing to address some of the fundamental issues underlying IS research in ways that are quite different from those adopted elsewhere. Some work that indicates this originality is noted here, although as a historical account the paper does not claim to be complete. We see attention to foundational issues for our discipline, to ontological issues and the structural nature of theory, to different types of theory, and to theory relating to the design and construction of technological artefacts.

Egalitarian spirit, democratic values and an underlying socialist leaning seem to have prevented the disciplining of IS in Australia into a scientific mold or a ‘positivist’ paradigm that has been and still is dominant in the main stream IS community in the USA. Whether it is Australia’s remoteness from the IS research centers of power or its disregard for authorities – it is hard to say—but the Australian IS research landscape exhibits a considerable variety and richness in both research approaches and research methods. In addition to the viewpoints shown in this paper, even a brief examination of the Australasian Conference of Information System (ACIS) and the Australian Journal of Information System (AJIS) suggests openness to different philosophies and epistemological positions as well as adoption of a wide-range of quantitative and qualitative research methods⁵. The term ‘eclectic’ can well be applied to IS research in Australia, in that it does not hold rigidly to a single paradigm or set of assumptions. This eclecticism is encouraged under a ‘fair go’ culture where alternatives (including IS methodologies) are given space to grow as they want (live and let live) in the same way as there is support for minorities and religious freedom. Fair go also means opposition to elites (journals, academics, institutions) and authoritarian rules (methodologies).

The themes reviewed here have implications for practice. The focus on design approaches to research and action research are indicative of a desire to develop knowledge that can be used to solve practical problems for individuals, organization and industry. The socio-technical and critical research themes show a desire to also address human values and ethics when addressing problems in practice. The focus on underlying strong theory is done with practical applications in mind, in accordance with Lewin’s dictum that “nothing is so practical as a good theory” (Lewin 1945).

To sum up, it appears there has been a noted tendency amongst at least some researchers in both Scandinavia and Australia to look at research in IS from different angles, not constrained by the prevailing paradigms in the US and Europe. The two regions of interest are to some extent ‘outsiders’ in comparison with more prominent and powerful research communities in Europe and North America. Researchers in both Scandinavia and Australia can stand apart to some extent from what is happening elsewhere and ‘think differently,’ taking lessons from a number of traditions and being willing to find a new path and pioneer new directions.

In the spirit of eclecticism, and the avoidance of an overly dominant school of thought, there seems to be a dialectic role for IS academic in both Australia and Scandinavia. Tolerance for well argued alternative views on what is IS, on its core competence, appropriate definitions of knowledge, who it is for, and what constitutes important issues can only serve to improve the thinking of all

parties. Australia and Scandinavia may separately not have a loud enough voice to provide a convincing alternative. They might if united together with other like European voices. As well as providing a more socially inclusive perspective on the consequences of unplanned technological enthusiasm, Scandinavia and Australia might encourage a dialectic epistemology. We both seem to appreciate the power of dialectic to inform empiricism. Explaining IS in terms of unresolvable contradictions rather than seeing a well-ordered whole, seems a worthwhile joint quest.

Notes

1. Eclecticism is defined as “selecting; choosing (what is true or excellent in doctrine, opinions, etc.) from various sources or systems; as, an eclectic philosophy” (Merriam-Webster, 2005).
2. This discussion overall draws on material from Cathcart (1987), Blainey (2000) and Blainey (2001).
3. Compared with Taiwan 636, United Kingdom 243, Sweden 20, Finland, 15, Norway 14, Iceland 2 (Wikipedia 2006).
4. The historical material here draws on Roger Clarke’s “A retrospective on the Information Systems Discipline in Australia” (2006).
5. In this respect one could draw some interesting parallels with the Scandinavian Conference and the Scandinavian Journal of Information Systems (which is outside the scope of this paper).

References

- Bailin, S., “Is Argument For Conservatives? or Where So Sparkling New Ideas Come From?” *Informal Logic*, (23:1), 2003, pp. 3-18.
- Beer, S., *Diagnosing the System for Organisations*, Wiley, Chichester, 1985.
- Billig, M., *Arguing and Thinking: A Rhetorical Approach to Social Psychology*, Cambridge: Cambridge University Press, 1996.
- Bjerknes, G., and Bratteteig, T., “User Participation and Democracy: A Discussion of Scandinavian Research on System Development,” *Scandinavian Journal of Information Systems*, (7:1), 1995, pp. 73-98.
- Blainey, G., *A Shorter History of Australia*, Vintage, Milsons Point, NSW, Australia, 2000.
- Blainey, G., *The Tyranny of Distance How Distance Shaped Australia’s History*, (21st Century edition). McMillan, Sydney, Australia, 2001.

- Bunker, D. J., "A Non-Reductionist Approach to ITS Management Research: Integration/Reconciliation of Subject/Object from a Phenomenological Perspective," *3rd Phenomenology, Organisation and Technology Workshop*, Lyon, France, September 2005, pp. 231-243.
- Bunker, D. J., and Campbell, J., "A Perspectival Punctuated Action (PPA) Approach to Policy Development in Information Technology and Systems (ITS)," *Proceedings of the 16th Australasian Conference on Information Systems*, 29 Nov – 2 Dec 2005, Sydney: paper ID 187 on CD.
- Burdon, A., "The Strzelecki Track," *Australian Geographic*, (82), April-June 2006, pp. 42-57.
- Burstein, F., and Gregor, S., "The Systems Development or Engineering Approach to Research in Information Systems: An Action Research Perspective", *Proceedings of the 10th Australasian Conference on Information Systems*, B. Hope and P. Yoong, (eds.), Victoria University of Wellington, New Zealand, 1999, pp. 122-134.
- Campbell, K., "John Passmore and Hume's Moral Philosophy," *Hume Studies*, (11:2), November 1985, pp. 109-124.
- Cathcart, M., *Manning Clark's History of Australia*, Penguin Books, Ringwood, Victoria, Australia, 1987.
- Cecez-Kecmanovic, D., "Engineering Type Information Systems Research: A Discussion on its Position and Quality," *Proceedings of the 5th Australian Information Systems Conference, Department of Information Systems*, Monash University, Caulfield, Victoria, Australia, 1994, pp. 767-770.
- Cecez-Kecmanovic, D., "Organisational Discourse via CMC: What Enables and what Prevents Knowledge Sharing," *The Journal of Systems and Information Technology*, (5:1), 2001a, pp. 115-133.
- Cecez-Kecmanovic, D., "Doing Critical IS Research: the Question of Methodology," *Qualitative Research in Information Systems: Issues and Trends*, E. Trauth (ed.) Idea Group Publishing, 2001b, pp. 142-163.
- Cecez-Kecmanovic, D., "Basic Assumptions of the Critical Research Perspectives in Information Systems," in *Handbook of Information Systems Research: Critical Perspectives on Information Systems Design, Implementation and Use*, D. Howcroft and E. Trauth (eds.), Edward Elgar Publishing, Cheltenham, UK, 2005a, pp. 19-46.
- Cecez-Kecmanovic, D., "Critical Approach in Information Systems Research: The Differences that Matter," *Proceedings of the 16th Australasian Conference on Information Systems (ACIS)*, 2005b, Sydney, Australia.

- Cecez-Kecmanovic, D., Janson, M., and Brown, A., "The Rationality Framework for a Critical Study of Information Systems," *Journal of Information Technology*, (17:4), 2002, pp. 215-227.
- Checkland, P., and Howell, S., *Information, Systems and Information Systems*. Wiley, Chichester, 1998.
- Checkland, P., and Scholes, J., *Soft Systems Methodology in Action*, Wiley, Chichester, 1990.
- Churchman, C. W., *The Design of Inquiring Systems*, New York: John Wiley, 1971.
- Clarke, R., "Key aspects of the history of the Information Systems Discipline in Australia," *Australasian Journal of Information Systems*, (14:1), Nov 2006, pp. 1-18.
- Crosswhite, J., *The Rhetoric of Reason*, Madison: University of Wisconsin Press, Madison, 1996.
- Eemeren, F. H. van (ed.), *Crucial Concepts in Argumentation Theory*, Amsterdam University Press, Amsterdam, 2001.
- Eemeren, F. H. van, Grootendorst, R., and Henkemans, F., *Argumentation*, New Jersey: Lawrence Erlbaum Assoc., 2002.
- Ehn, P., and Sandberg, A., (1983) "Local Union Influence on Technology and Work Organization: Some Results from DEMOS Project," in *Systems Design for, with and by Users*, U. Briefs, C. Ciborra, and L. Schneider (eds.), North Holland, Amsterdam, 1983, pp. 427-437.
- Emery, F., *The Emergence of a New Paradigm of Work*, Centre for Continuing Education, ANU, Canberra, 1978.
- Emery, F., *Futures We are in*, Leiden: Martinus Nijhoff, Leiden, 1977.
- Emery, F., and Thorsrud, E., *Democracy at Work*, Martinus Nijhoff., Leiden, 1976.
- Er, M., and Underwood, J., "Activity Support with Mobile Technology : the Path to Adoption," *Proceedings of the ISCAR Regional Conference*, International Society for Cultural and Activity Research (ISCAR) Regional Conference Application of Activity Theory to Education, Information Systems and Business , University of Wollongong , Wollongong, Australia , 2004, pp. 63-70.
- Gage, J. T., "The Reasoned Thesis: The E-word and Argumentative Writing as a Process of Inquiry," in *Argument Revisited; Argument Redefined: Negotiating Meaning in the Composition Classroom*, B. Emmel, P. Resch and D. Tenney (eds.), Sage Publications, Thousand Oaks, Calif., 1996.
- Green, P., and Rosemann, M. (eds.), *Business System Analysis with Ontologies*, Idea Publishing Group, 2005.

- Green, S. E., "A Rhetorical Theory of Diffusion," *Academy of Management Review*, (29:4), 2004, pp. 653-669.
- Gregor, S., "A Theory of Theories in Information Systems," in *Information Systems Foundations: Building the Theoretical Base*, S. Gregor and D. Hart, (eds.), Australian National University, Canberra, 2002a, pp. 1-20.
- Gregor, S., "Design Theory in Information Systems," *Australian Journal of Information Systems*, Special Issue, 2002b, pp. 14-22.
- Gregor, S., "The Nature of Theory in Information Systems," *MIS Quarterly*, (30:3), 2006, pp. 611-642.
- Gregor, S., and Hart, D., (eds.), *Information Systems Foundations: Building the Theoretical Base*, Australian National University, Canberra, 2002.
- Gregor S., and Jones, D., "The Formulation of Design Theories for Information Systems," in *Constructing the Infrastructure for the Knowledge Economy: Methods and Tools, Theory and Practice*, H. Linger et al (eds.), New York, Kluwer Academic, 2004, pp. 83-93.
- Gregor, S., and Jones, K., "Beef Producers Online: Diffusion Theory Applied," *Information Technology & People*, (12:1), 1999, pp. 71-85.
- Gregory, R., *Eye and Brain: The Psychology of Seeing*, Weidenfeld and Nicolson, London, 1966.
- Haack, S., *Defending Science*, New York: Prometheus Books, 2003.
- Habermas, J., *Communication and the Evolution of Society*, London: Heine-
mann, 1976.
- Habermas, J., *Knowledge and Human Interests*, Boston: Beacon, 1968.
- Habermas, J., *The Theory of Communicative Action – Reason and the Ration-
alisation of Society*, (Vol I), Beacon Press, Boston, MA, 1984.
- Habermas, J., *The Theory of Communicative Action – The Critique of Func-
tionalist Reason*, (Vol II), Beacon Press, Boston, MA, 1987.
- Hart, D., and Gregor, S., (eds.). *Information Systems Foundations: Construct-
ing and Criticizing*, Australian National University, Canberra, 2005.
(URL: http://epress.anu.edu.au/info_systems_citation.htm)
- Hedberg, B., "Using Computerized Information Systems to Design Better
Organizations and Jobs," in *The Human Side of Information Process-
ing*, N. Bjorn-Andersen (ed.), North Holland, Amsterdam, 1980, pp. 19-
33.
- Heng, M. S. H., and de Moore, A., "From Habermas's Communicative Theory
to Practice on the Internet," *Information Systems Journal*, (13:4), 2003,
pp. 331-352.
- Hevner, A., March, S., Park, J., and Ram, S., "Design science in Information
Systems Research," *MIS Quarterly*, (28:1), 2004, pp. 75-105.

- Hirschheim, R., and Klein, H. K., "Realizing Emancipatory Principles in Information Systems Research: The Case for ETHICS," *MIS Quarterly*, (18:1), 1994, pp. 83-109.
- Hirschheim, R., Klein, H. K., and Lyytinen, L., "Exploring the Intellectual Structures of Information Systems Development: A Social Action Theoretic Analysis," *Accounting, Management. & Information Technology*, (6:1/2), 1996, pp. 1-64.
- Iivari, J., Contributions to the Theoretical Foundations of Systemeering Research and the Picoco Model, Institute of Data processing Science, University of Oulu, Oulu, Finland, Acta Univ. Oul. A 150. 1983. Cybern. 1.
- Iivari, J., Hirschheim, R., and Klein, H. K., "A Paradigmatic Analysis Contrasting Information Systems Development Approaches and Methodologies," *Information Systems Research*, (9:2), 1998, pp. 164-193.
- James, W., *Pragmatism*, Prometheus Books, Buffalo, 1991.
- Järvinen, P., *On Research Methods*, Opinpajan kirja, Tampere, Finland, 2004.
- Kasanen, E., Lukka, K., and Siitonen, A., "The Constructive Approach in Management Accounting Research," *Journal of Management Accounting Research*, (5), Fall 1993, pp.241-264.
- Kay, R., and Cecez-Kecmanovic, D., "IS - Organisation Coevolution and Competitive Advantage: Learning from the Field," *Proceedings of the 12th Australasian Conference on Information Systems*, Coffs Harbour, NSW, Australia, 2001.
- Keneally, T., *The Commonwealth of Thieves*, Random House, Sydney, 2005.
- Kincheloe, L. J. and McLaren, P., "Rethinking Critical Theory and Qualitative Research," in *Handbook of Qualitative Research*, N.K. Denzin and Y.D. Lincoln (eds.), 2nd ed., SAGE, London, 2000, pp. 279-313.
- King, R. W., and Jose, L. K., "The Impact of Rhetorical Strategies on Innovation Decisions: An Experimental Study," *Omega - The International Journal of Management Science*, (28:5), 2000, pp. 485-499.
- Kyng, M., and Mathiassen, L., "Systems Development and Trade Union Activities," in *Information Society for Richer, for Poorer*, N. Bjorn-Andersen (ed.). North Holland, Amsterdam, 1982, pp. 247-260.
- Langefors, B., *Theoretical Analysis of Information Systems*, Studentlitteratur. Lund, 1966.
- Lather, P., "Fertile Obsession: Validity after Poststructuralism," *Sociological Quarterly*, (34:4), 1993, pp. 673-693.
- Lewin, K., "The Research Centre for Group Dynamics at Massachusetts Institute of Technology," *Sociometry*, (8:2), 1945, pp. 126-135.

- List, D., and Metcalfe, M., "Sourcing Forecast Knowledge Through Argumentative Inquiry," *Technological Forecasting and Social Change*, (71:5), 2004, pp. 525-535.
- Lundeberg, M., Goldkuhl, G., and Nilsson, A., *Information Systems Development*, Prentice-Hall, Englewood Cliffs, 1981.
- Lunsford, A. A., and Ruszkiewicz, J. J., *Everything's an Argument*, Boston and New York: Bedford/St Martin's, 1999.
- Lyytinen, K., and Hirschheim, R., "Information Systems and Emancipation: Promise or Threat?" in *System Development for Human Progress*, H. K. Klein and K. Kumar (eds.), Elsevier Science Publishers, B.V. North Holland, 1985, pp. 115-139
- Lyytinen, K. and Klein, H. K., "The Critical Theory of Jurgen Habermas as a Basis for a Theory of Information Systems," in *Research Methods in Information Systems*, E. Mumford, R. Hirschheim, G. Fitzgerald and T. Wood- Harper (eds.), Amsterdam: Elsevier Science Publishers, North Holland, 1985, pp. 219-236.
- March, S. T., and Smith, G. F., (1995). "Design and Natural Science Research on Information Technology," *Decision Support Systems*, (15:4), 1995, pp. 251-266.
- McCarthy, P., *The Man Who Was Starlight*, Allen & Unwin, Sydney, Australia, 1987.
- McGrath, K., "Doing Critical Research in Information Systems: a Case of Theory and Practice not Informing Each Other," *Information Systems Journal*, (15:2), 2005, pp. 85-101.
- McKay, J., and Marshall, P., "The Dual Imperatives of Action Research," *Information Technology & People*, (14:1), 2001, pp. 46-59.
- Metcalfe, M., "Argumentative Systems for Systems Design," *Information Technology & People*, (15:1), 2002, pp. 60-72.
- Metcalfe, M., *Critiquing Research*. Wales: Elgar Mellen Press, 2006.
- Milton, S. K., and Kazmierczak, E., "An Ontology of Data Modelling Languages: A Study Using a Common-Sense Realistic Ontology," *Journal of Database Management*, Special Issue on Ontological Analysis, Evaluation, and Engineering Of Business Systems Analysis Methods, (15:2), 2004, pp. 9-38.
- Moody, D. L., "Validation of a Method for Representing Large Entity Relationship Models: An Action Research Study," *Proceedings of the 10th European Conference on Information Systems (ECIS 2002)*, Gdansk, Poland, 6-8 June 2002, pp. 391-405.
- Mumford, E., "Socio-technical Design: an Unfulfilled Promise or a Future Opportunity," in *Organizational and Social Perspectives on Informa-*

- tion Technology*, R. Baskerville, J. Stage, and J. DeGross (eds.), Kluwer, London, 2000, pp. 33-46.
- Mumford, E., and Weir, M., *Computer Systems in Work Design – the ETHICS Method*, Associate Business Press, London, 1979.
- Niederman, F., and Desanctis, G., “The Impact of the Structured Argument Approach on Group Problem Formulation,” *Decision Sciences*, (26:4), 1995, pp. 451-474.
- Nunamaker, J. F., Chen, M., and Purdin, T., “Systems Development in Information Systems Research,” *Journal of Management Information Systems*, (7:3), 1991, pp. 89-106.
- Nygaard, K., “Those were the Days? Or Heroic times are Here Again?” *Scandinavian Journal of Information Systems*, (8:2), November 1996, pp. 91-108.
- O’Hare, G. M. P., & O’Grady, M. J., Gulliver's Genie: A Multi-Agent System for Ubiquitous and Intelligent Content Delivery, *Computer Communications*, (26:11), 2003, pp. 1177-1187.
- Orlikowski, W., and Baroudi, J., “Studying Information Technology in Organizations: Research Approaches and Assumptions,” *Information Systems Research*, (2:1), 1991, pp.1-28.
- Parham, D., Roberts, P., and Sun, H., *Information Technology and Australia’s Productivity Surge*, Productivity Commission Staff Research Paper, AusInfo, Canberra, 2001.
- Perls, F., *Gestalt Therapy*, Julian Press, 1951.
- Popper, K. R., *Conjectures and Refutations: The Growth of Scientific Knowledge*, Routledge, London, 1963.
- Price, C., “Australian Population: Ethnic Ancestry,” *People and Place*, (7:4), 1999 pp. 12-16, URL: http://elecpress.monash.edu.au/pnp/free/pnpv7n4/v7n4_3price.pdf, accessed 2 April, 2006.
- Productivity Commission, *ICT Use and productivity: A Synthesis from Studies of Australian Firms*, Commission Research Paper, Canberra, July 2004, URL: <http://www.pc.gov.au/research/crp/ictuse/ictuse.pdf>, accessed 2 April, 2006.
- Rehg, W., “Argumentation Theory and the Philosophy of Science since Kuhn: The Rationality of Scientific Advance,” in *Argumentation and Rhetoric*, Proceedings of the Ontario Society for the Study of Argumentation, H. V. Hansen, C. W. Tindale, and A. Colman (eds.), OSSA, St. Catharines, Ontario, 1998.
- Rorty, R., *Contingency, Irony and Solidarity*, Cambridge: Cambridge University Press, 1989.
- Sachs, O., *The Man who Mistook his Wife for a Hat*, Touchstone Books, 1985

- Shanks, G., Tansley, E., Weber, R., "Representing Composites in Conceptual Modelling," *Communications of the ACM*, (47:7), 2004, pp. 77-80.
- Singer, P., *Animal Liberation*, Random House, New York, 1990.
- Smith, S., Bunker, D. J., & Pang, V., "Does Agency Size Affect IS Security Compliance for E-Government?" *Proceedings of the 10th Pacific Asia Conference on Information Systems*, 6th-9th July. Kuala Lumpur. Malaysia: 2006, pp.99-111.
- Stein, A., "Re-engineering the Executive: The 4th Generation of EIS," *Information & Management*, (29:1), July 1995, pp. 55-62.
- Sundgren, B., *An Infological Approach to Data Bases*, University of Stockholm, 1973.
- Tannen, D., "The Argument Culture: Changing the Way We Argue and Debate", Virago Press, London, 1991.
- Terence, J. G. T., and Glidden-Tracey, C. E., "Integration of Theory, Research Design, Measurement, and Analysis: Toward a Reasoned Argument," *The Counselling Psychologist*, (27:3), 1999, pp. 299-324.
- Treleaven, L., Cecez-Kecmanovic, D., and Moodie, D., "Generating a Consultative Discourse: a Decade of Communication Change," *The Australian Journal of Communication*, (26:3), 1999, pp 67-82.
- Underwood, J., "Translation, Betrayal and Ambiguity in IS Development" *Proceedings of IFIP TC8/WG8.1 Working Conference on Organizational Semiotics: Evolving a Science of Information Systems*, K. Liu, R. J. Clarke, P. B. Andersen, and R. K. Stamper (eds), Montreal, 23 - 25 July 2001, pp. 91-108.
- Urquhart C. and Sawyer S., (eds.), *Organisations and Society in Information Systems: Intersecting Issues, Approaches and Methods down under (OASIS)*, Workshop, Brisbane, Australia, 2000.
- Vaishnavi, V., and Kuechler, W., *Design Research in Information Systems*, Association for Information Systems, Australia, January 20, 2004, last updated January 18, 2006. URL: <http://www.isworld.org/Researchdesign/drisISworld.htm> , accessed March, 2006.
- Van Aken, J., "Management Research Based on The Paradigm of The Design Sciences: The Quest for Field-Tested and Grounded Technological Rules," *Journal of Management Studies*, (41:2), 2004, pp.219-246.
- Weber, R., "Toward a Theory of Artifacts: A Paradigmatic Base for Information Systems Research," *Journal of Information Systems*, (1:2), 1987, pp. 3-19.
- Weber, R., *Ontological Foundations of Information Systems*, Coopers & Lybrand, Melbourne, 1997.

- Merriam-Webster, “Eclectic”, Online Dictionary, 2005, URL: <http://www.merriam-webster.com>, accessed 31 August, 2006.
- Whymark G., and Hasan H., (eds.), *Activity as the Focus of Information Systems Research*, Knowledge Creation Press, Queensland, 2005.
- Wikipedia, “List of Countries by Population Density”, 2006, URL: http://en.wikipedia.org/wiki/List_of_countries_by_population_density, accessed 2 April, 2006.
- Wikipedia, “Fred Emery”, 2006, http://en.wikipedia.org/wiki/Fred_Emery, accessed 8 April 2006.

