
**THE PRACTICE OF WEB
INFORMATION ARCHITECTURE IN
LARGE ORGANISATIONS**

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CERTIFICATE OF AUTHORSHIP

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Charles Sturt University or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by colleagues with whom I have worked at Charles Sturt University or elsewhere during my candidature is fully acknowledged.

I agree that this thesis be accessible for the purpose of study and research in accordance with the normal conditions established by the Executive Director, Library Services or nominee, for the care, loan and reproduction of theses.”

PUBLICATIONS

Publications resulting from this research:

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Burford, S. 2010, "Knowing the Practice of Web Information Architecture in Large Organisations", *IADIS International Conference: e-Society 2010*, eds. P. Kommers & P. Isaias, IADIS Press, Porto, Portugal, p. 437.

Burford, S. 2008, "Understanding how Organisations Achieve Effective Web Information Architecture using a Grounded Theory Approach", *The 14th Australasian World Wide Web Conference*, ed. A. Ellis, Southern Cross University, Ballina, NSW.
<http://ausweb.scu.edu.au/aw08/papers/refereed/burford/paper.html>.

ABSTRACT

This thesis outlines a research endeavour to better understand the way that large organisations organise information on their websites and to gain insights into the situated nature of this practice. The structure and design of the information on any website, its information architecture (IA), is an important criterion in the successful use of the online environment – for both an organisation and its clients. Whilst there is now a well-defined process for designing the information structures of information-rich websites (Morville & Rosenfeld 2006), less is known about its everyday practice.

A theory of *The Situated Practice of Web IA* that draws on practice-based theory (Gherardi 2006) is proposed. This fluid, integrated theoretical framework for the work of web IA in large organisations has a central construct of *practising web IA* that portrays web IA as a fledgling practice with great variability in its shape and the profile of its practitioners. Underpinning constructs of *knowing, enacting, owning and negotiating web IA* reveal a conceptual picture of the broad, yet detailed, activities of web IA. A deeper understanding of the complex social processes involved and how they might become more effective is achieved.

Grounded theory and multi-case study methodologies are used to study the social environments in which web IA outcomes are achieved. In grounded theory tradition, theory has emerged from the reality of how organisations approach, support and attend to the development of an IA for their public-facing website. Research methods of group narrative, semi-structured interview and document analysis have enabled the collection of data in keeping with the grounded theory tenet of theoretical sampling.

The practice of web IA is characterised by unpredictability, multiple perspectives and a need for responsiveness, agility and negotiation. Web IA occurs in a complex environment and this thesis examines the practice as a complex adaptive system. Using this metaphor, dominant and traditional thinking about information organisation is challenged. A documented, deliverable, stable information design for the web, achieved via structured methodology, is of limited value. A new paradigm that embraces the social complexity of web IA must be acknowledged.

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1 CHAPTER ONE INTRODUCTION

1.1 Overview

This chapter introduces the study and situates the practice of web information architecture (IA) in a broader context of organisational and societal use of information and the web. The chapter includes an explanation of the research problem and addresses the aims of this research. An outline of the significance of this thesis and the benefits of this research is presented. With the web in use for many purposes and in the employ of multiple paradigms, this chapter provides a delimitation of the scope of the research. It also provides an outline of the thesis.

1.2 Background and context

This research is situated in a developing and maturing era of organisational use of the internet to inform and communicate. At the forefront of an organisation's use of the internet is its official website, which represents a digital information channel of increasing significance and audience demand. The corporate website presents the opportunity for rapid publishing of extensive amounts of information to a global audience.

The phenomenon of the internet and its capacity to deliver information via the web is itself located within a now accepted truism, the information age. The world has entered an information era and economy – as distinct from one based on industry or agriculture (Davenport 1997). Some characteristics of the information age that typically affect organisations are the increase in the quantity and complexity of information; more services and products being virtual and information based; dependency on technology to provide a powerful and speedy flow of information; information qualities such as accuracy, currency, precision and relevance being increasingly important; and a higher percentage of people now being more actively involved in knowledge and information work (Evernden & Evernden 2003a, p. 15).

Information on the web is a subset of the full complement of information that an organisation must produce, organise and manage. With increasing use and reliance on information within all modern organisations, scholars claim that information should be managed as a distinct and valuable resource and that doing so is critical to the survival of the modern organisation (Evernden & Evernden 2003a, p. 8; Mahon & Gilchrist 2004; Orna 2005, p. 61). With the value of information in organisations ever increasing, due attention must be paid to its organisation and management within the enterprise. A website is one of many information products (Orna 2005, p. 14) within an organisation and should be recognised as an essential element of the suite of organisational information assets.

Alongside the growing importance of information in our society over the last half century, we have seen the emergence of the technologies of the world wide web and their rapid adoption in many spheres. The interdependencies of these two phenomena are strong. The need to inform on a global basis fuels the development and expansion of the web and its associated protocols and technologies. Simultaneously, the availability of web technology enables and feeds the supply of and demand for information.

The internet and its associated protocols were not an envisioned nor planned technology. Rather they emerged as scientists and technologists incrementally responded to worldwide information and communication needs and demands. Although the initial protocols and technologies of the internet were developed earlier, their use for a simple, yet global hypertext system of information presentation on the web emerged around 1990 within the Conseil Européen pour la Recherche Nucleaire (CERN). The web was then placed in the public domain and further developed in the commercial world. By 1995, simultaneous improvements to the hypermedia code and browser functionality and the availability of internet service providers formed a growing global capability to use the world wide web as a medium for information provision and retrieval. Since 1995, the growth in the use of the internet and the web in multiple and diverse contexts of human endeavour has been phenomenal and pervasive.

1.2.1 Using the web for information delivery

From humble beginnings, the world wide web has emerged to become a major communicating and informing medium that every organisation is compelled to incorporate as part of its interface to the world. The web is important to organisations in their quest to meet their business goals (Morville 2005), and effective structuring and design of online information is needed to support the business endeavour. Web IA is a term that is used to describe both the information design process and the outcome of that process.

Intrinsic to the nature of hypertext, a website will have an information structure regardless of whether an organisation consciously implements a process for web IA and structures their web information with awareness and expertise. Hence every website provides organised information – be it optimal for its audience or a frustrating and unsuccessful experience that will detract from the organisation’s business goals. Information structures are a front on which ‘the struggle for commercial supremacy through information is being fought’ (Evernden & Evernden 2003b, p. 95). Effectively structured information on websites that readily enables business communication is a vital organisational asset.

In a typical account of the history of an organisation’s website, King and Jannik (2005) describe the growth of a large website from its inception. The Georgia Tech Library, in Atlanta, Georgia, first created a website in the early 1990s, which was initially designed and maintained by the library staff of the time. In the late 1990s a web developer was employed and a committee was formed to manage and redevelop the site. At this time, the site continued to grow by adding information pages and resources. ‘The focus was more on quantity instead of quality - content was added to the site with no overall vision for how it would impact the users and their quest to find the information’ (King & Jannik 2005, p. 236). The authors describe the management of the information on the site at this time as an ‘informal, unorganised methodology’ (King & Jannik 2005, p. 236). Input to evaluating the effectiveness of the site was only gleaned by internal library staff who used the website regularly and were deemed to be expert users.

By 2002, the organisation became aware of the need for change. In order to create a more robust IA for the site, the library used a consulting firm to create an entirely new IA. A new website of restructured, rewritten content was created and launched in 2003. As the parent body moved to change its visual design in 2004, the library's website was again under redevelopment. The decision was made to test the website on typical users and significant usability testing was outsourced. As a result, the IA was again refined. In 2005, King and Jannik conclude by saying that usability testing and web IA renewal was an ongoing process for the library's website. This organisation, over 15 years, has matured in its sense of responsibility, investment and professionalism in attending to a high demand, increasingly complex website. It is typical of the evolving and increasing attention by many large organisations to the information structures that comprise their website.

Coupled with a strong competitive impetus to provide and organise information on websites is the rising expectation of an organisation's client base to be able to find relevant information on the web to support many aspects of interaction with the organisation. Customers increasingly expect to meet their information needs via the web. This provides a strong incentive for organisations to assemble easily accessible and relevant information on their website. With the era of web delivery of information now in its second decade, younger members of society have not experienced information seeking without the web as a delivering medium.

Considerable management challenges are encountered in the many facets that go to make up an organisation's website – including its information structures. The emergent nature of the web's growth and development and the ease of participation in website publishing by business stakeholders introduce management complexities. These complexities occur in a new information environment without an established and proven set of practices. The early days of the web saw little focused management of its use for information provision, and enthusiasts were able to take up the novelty of creating an organisation's web presence. The rate of change and innovation has also contributed to the challenge of managing the web and its information structures. Relentlessly, the technologies and use of the internet evolve at a pace that challenges

organisations to plan effectively and provide processes for all aspects of its use and management.

Gradually the centrality and importance of the organisational website as an informing and communicating medium has been established, and the web has become embedded in organisational life (Wodtke & Govella 2009, p. 281). This has demanded coordination, management and planning of the online environment. The web is no longer a novelty. Yet because its use has evolved over the last two decades in an often unplanned and ad hoc manner, it is understandable that the management of the web in organisations has been confused and remains immature (Cox 2007b).

The use of the web as a medium to deliver information has not been without its critics. Michael Gorman, a past president of the American Library Association, describes the web in 1995:

The net is like a huge vandalised library. Someone has destroyed the catalog and removed the front matter, indexes, etc. from hundreds and thousands of books and torn and scattered what remains... 'Surfing' is the process of sifting through this disorganised mess in the hope of coming across some useful fragments of text and images that can be related to other fragments. The net is even worse than a vandalised library because thousands of unorganised fragments are added daily by the myriad cranks, sages, and persons with time on their hands who launch their unfiltered messages into cyberspace (Gorman 1995, p. 34).

This colourful reaction highlights that the web can be a chaotic information space. The unruliness of the web is a reality. The web is an open platform with few boundaries or limitations on who can publish and contribute to the vast, distributed and varied information space. The corporate website as an information platform is frequently outside the control of information professionals (Morrogh 2002a, p. 99). Enabled by the open technology and ready access, web publishing is often in the hands of the masses as well as the experts.

1.3 Research problem and its scope

1.3.1 The problem

Against a backdrop of rhetoric about the importance of the web as the major platform for information provision for the clients of large organisations (Wang 2007; Wodtke & Govella 2009, p. 281), it is also noted that some organisations are not constructing websites with effective information architectures (Orna 2005, p. 36; Morville 2005, p. 12). The situation has improved since Gorman's (1995, p. 34) description of the web as 'worse than a vandalised library'. There is now a growing intent within organisations to provide websites with effective information structures. Yet a disconnect remains between the desire to inform effectively using the web and the demonstrated ability of organisations to achieve this outcome (Wodtke & Govella 2009, p. xiv).

An evolving methodology for the practice of web IA, pioneered by information professionals Rosenfeld and Morville (1998), is widely acknowledged in the literature, in education and by individuals in the field. It is accompanied by various guidelines and checkpoints developed by organisations and their parent bodies to improve the outcomes of web IA. Variations of the Rosenfeld and Morville (1998, 2002) methodology have been explored by other scholars (for example, Large, Beheshti and Cole 2002; Sinha & Boutelle 2004).

But little is known about the utilisation of these design methods, guidelines and best practice checklists within the realities and complexities of large organisations. It is not known if, or how, they are being used. Their appropriateness and maturity to support organisations in developing corporate websites remains unclear. It is not known how well these recommended approaches survive within the contextual specifics and constraints of organisational life. The best practice recommendations require empirical examination in an organisational context.

Furthermore, the extent to which the internal environment of a large organisation may deter or contribute to success in effectively structuring online information remains unclear. Internal issues and priorities may block the path to effective web IA. These

factors should be identified so that organisations can define and move toward a more beneficial environment.

The problem extends to the immaturity of the practice of web IA itself. Whilst best practice in IA methodology is proffered by leaders in the field, few management models exist for adopting it. IA enabling factors and strategies such as skills required, best practice in staffing, organisational structure and resourcing levels are generally not embedded in organisational corporate knowledge. A key question for organisations is determining which business unit should take responsibility for web management in general, and web IA more specifically. Organisations must also decide if the skills of IA are best located in external consultancies or in-house specialists. Bringing professionalism, sophistication and best practice into the delivery of information on the web is an ongoing learning journey in organisations. These circumstances provide a backdrop and impetus for this research enquiry.

1.3.2 Scoping the research

The web as an information and interaction space is diverse and varied and requires containment or scoping for the purpose of this research. Whilst in some ways an unrealistic divide, this thesis focuses on the web as a hypertext information space and a platform for information delivery. It disregards the specific interface and interaction design needed to use the web for applications or transaction systems. It is acknowledged that this is an artificial approach and that a web environment is sometimes developed as a hybrid of the two paradigms.

The research investigates public-facing websites and sets aside the intranet environment. Whilst all intranet sites are in need of information architecture, the constraints and design issues are different from those of the internet. The intranet audience is likely to be more homogenous, and organisational norms, vocabulary and focus are more likely to be brought to bear on the IA.

The traditional mode of web publishing whereby the owner of information publishes it to the web to be read largely by clients has, in recent years, been augmented by a user participatory mode of informing and communicating using the web. Users not

only read what is on the web but are also given a chance to be co-creators of web information – a conversational platform is emerging. The term Web 2.0 is used to describe this significant shift in using the web. O'Reilly (2005, p. 3) describes Web 2.0 as having an 'architecture of participation'. Web 2.0 is based on social internet tools where users generate and organise content rather than simply consume it; in so doing they give spontaneous shape to the organisation of information through the actions of the group. The web takes more of a peer-to-peer shape than its previous top down, authorised presentation of information. Because this paradigm is more recent, less established and differs significantly from traditional web publishing, it will not be considered in this research project.

Recognising a continuum between 'telling' and 'selling', Orna (2005, p. 14) distinguishes between organisations that create information products such as websites to 'support the products and/or services which they are in business to offer' and that 'embody substantial information content which aims to allow users to do something they need/want to do' and those that evoke feelings in order to market or advertise. This research focuses on the use of the web for 'telling' or informing to support business goals rather than to persuade, advertise or sell.

This research will be conducted in Australia and the practice of web IA in large Australian organisations will be investigated.

1.4 Purpose of the research

The purpose of this research is to better understand the practice of web IA in the context of a large organisation. The phenomenon of organisations providing information on the web is less than two decades old, during which time it has grown in importance – a trend that is set to continue in our society. The focus on the skill and professionalism of the process of web IA is even more recent and was first conceptualised around 1995 (Morville 2004). The 'real-life context' of web IA is the key research focus – how IA is actually carried out in organisations is explored, as opposed to an idealistic or best practice process for the work of web IA. The way that IA is carried out is tightly coupled to an organisational context; many

organisational factors and variables that are not known, defined nor controllable are explored in this research.

The inquiry seeks to identify and reveal successful strategies and environments that organisations create and employ in their pursuit of effective web IA. The interplay between documented good practice and organisational contexts will be made clearer, as will other successful activity that may not yet have been made explicit in the literature. The research aims to identify the difficulties and obstacles that may occur in structuring the information on a large organisational website.

More specifically, this research aims to produce a substantive theory, defined by Charmaz (2006, p. 189) to be ‘a theoretical interpretation or explanation of a delimited problem in a particular area’. It seeks to provide a detailed and theoretical account of how organisations are structuring information on their websites. This study will construct a conceptual picture of the complexities, processes and interrelationships that exist in organisations in their quest to organise and structure information on the web.

In providing a grounded theoretical framework of the organisational realities of attending to web IA, this research seeks to produce outcomes that will resonate with those trying to achieve effective IA in organisations and support the practical work of IA. This research aims to provide meaningful insights and directions that will steer the work of web information architects and their managers. In doing so, it will guide the practice of IA in large organisations.

The strengthening of the existing knowledge and research base in this field is a major goal of this research. In providing a substantive grounded theory that positions the practice of web IA within the complexity of an organisational context, the study strives to contribute to and begins to fill the knowledge gap at the nexus of organisational reality and prescribed IA good practice.

This research provides a basis from which, with further research, greater understandings and theories can be developed in the management of the practice of

IA. It will inform, or form the basis of, further investigation and the emergence of a more formal theory.

1.4.1 Research aim

The aim of this research is to better understand how large organisations carry out web IA.

1.4.2 Research objectives

Specifically this research seeks to:

- Determine how organisations use existing design methods, guidelines and best practice in the work of web IA
- Reveal aspects of the organisational environment in which web IA might flourish
- Provide a theoretical framework to describe the situated practice of web IA.

1.4.3 Research questions

Research questions were formed to further focus this research endeavour and to direct the course of the research activities.

Key question

How is web information architecture carried out in large organisations with public-facing, information-rich websites?

Sub-questions

- How useful are the established design methods for structuring web information in large organisations?
- What are the optimal characteristics of the environment in which web IA takes place?

1.5 Significance of this study

The significance of this research is in establishing a deeper understanding of the organisational environment necessary for web IA to flourish. Charmaz (2006, p. 126) describes the outcome of the practice of constructivist grounded theory as interpretive theory which ‘calls for the imaginative understanding of the studied phenomenon’. The resulting grounded theoretical framework from this research will serve to provide new insights and understandings of the social practices of achieving effective web IA in large organisations.

Significantly, this research addresses a current and universal phenomenon. As the importance of the web as an informing media increases, the delivery of information in an effective and accessible way becomes of paramount importance. In examining existing practices in web IA design and the organisational environment within which it is achieved, this research will make explicit the issues and processes that organisations may currently be struggling to define and enact. As a result, organisations will be able to make positive changes in the way that they manage the practice of web IA.

Increasingly, an organisation’s website is an essential aspect of the business, and the level of intention of many large organisations to use the web to inform their clients is ever increasing. ‘Today, the web is not a novelty or a toy’ (Wodtke & Govella 2009, p. 281). As society’s engagement with the web on a global basis continues to grow, the investigation of the phenomenon of an organisation’s ability to develop information structures for their websites becomes paramount.

1.6 Outline of the thesis

Chapter one situates this study in the growing organisational uptake of and dependency on the web to deliver information to clients. The aim of this research is outlined and the research problem is made specific. Diverse utilisation of the web in organisational life requires a clear scoping of the research boundaries – they are described in chapter one.

Chapter two reviews the literature that is relevant to this research. It considers the current professional and theoretical literature that surrounds the work of web IA including systematic approaches to the practice. This chapter attends to the literature of surrounding information practices and how it has informed the developing theories of web IA. The situated nature of web IA and its environment are considered. Relevant theories that have been incorporated into the conceptual output of this research are described, and a need and call for research of this nature is identified.

Chapter three describes the design of this research undertaking. Adopting a framework from Crotty (1998) that includes epistemology, theoretical perspectives, methodology and methods, this chapter outlines the choices made in the first three areas and the rationale for those research decisions.

Chapter four continues the discussion of the research approach in discussing the process and criteria for selecting case studies and describing the methods that were used to gather data. It describes generally the grounded theory processes of analysis prior to a sequential presentation of the phases of analysis that were undertaken in this study.

Chapter five introduces the theoretical framework that is the result of this research. It then focuses on the four foundational constructs that underpin a central, integrating construct. These underpinning constructs are discussed in detail and are supported by research data.

Chapter six continues to build the levels of abstraction in the theoretical outcomes of this research. It first discusses a central and integrating construct and its properties. Combining this core concept with the four foundational constructs discussed in chapter five, a substantive grounded theory is presented. This constructed theory is examined through a lens of complexity and implications are drawn, both theoretically and for practitioners and their organisations.

Chapter seven concludes the thesis, firstly reviewing the research aims and considering their achievement. The limitations around this research and its outcomes

are noted prior to a summary of the thesis. Future directions and possibilities for expansion of this study are described.

2 CHAPTER TWO LITERATURE REVIEW

2.1 Overview

This chapter discusses the bodies of literature that have informed this research. Much of the extant literature examining web IA is written by practitioners in the field and thus forms a professional base rather than a significant body of research output. The research literature that does exist is primarily in the design work and processes of IA and frequently focuses on a specific component of web IA.

Consideration is given for the place of literature in the grounded theory process. As the environments and processes for creating an effective web IA were explored within an organisational context, contributing bodies of literature proved supportive to the emerging analysis. Theoretical backgrounds and perspectives have been examined as they were seen to support and explain the preliminary analysis. A review of that supportive literature is included in this chapter.

This chapter highlights the immaturity and diversity of the variety of perspectives and concepts in the field of web IA and its sometimes fragmented nature. The paucity of literature and empirical studies in web IA that explore and explain this emerging phenomenon in its situated organisational context is noted.

2.1.1 Literature and grounded theory

Grounded theory approaches to research position the role of literature differently to research that adopts a deductive paradigm. The quest in grounded theory is to develop a new theoretical framework to describe a phenomenon, and Strauss and Corbin (1990, p. 49) point out that it makes no sense to be constrained or impeded by existing theories. Rather the existing knowledge base of theories and concepts should be consulted along the way to contrast, to validate or incorporate elements into the emerging grounded theory. Elements of existing theory should only be utilised 'as they prove themselves to be pertinent to the data gathered' (Strauss & Corbin 1990, p. 50).

Charmaz (2006, p. 165) agrees that ‘received theory’ or existing concepts should not influence grounded theory research, but finds the suggestions of Glaser and Strauss (1967, p. 37) and Glaser (1978, p. 31) to avoid reading and reviewing the literature until after the analysis too simplistic. She notes that a researcher’s theoretical sensitivity is enhanced by prior theoretical knowledge. Strauss and Corbin (1990, p. 42) agree that a knowledge of the phenomena under consideration, often achieved by consulting the literature, can improve a researcher’s abilities and insights when carrying out the research. Charmaz (2006, p. 165) supports Henwood and Pidgeon’s (2003, p. 138) term ‘theoretical agnosticism’ as a productive stance for grounded theorists. Instead of avoidance, extant theory is held at a distance and considered with a critical lens throughout the research.

In this research, much of the existing knowledge base in the design processes and methods of web IA was familiar to the researcher prior to the conduct of this inquiry. It was comprehensively reviewed early in the investigative process. Yet a major goal of this research was to investigate the activities of web IA in the context in which they occur and to explore the organisational environment and its influences on the work of designing information structures for the web. Thus not all of the relevant literature presented in this chapter was comprehensively reviewed prior to the conduct of the research. It has been incorporated during the iterative nature of the data collection and analysis, and as concepts and their relationships emerged in the analytical process. It offers theories and insights that aid the understanding of the situated practice of web IA. This contributing literature can be seen as earning its way into the emergent theory and thus into this literature review (Strauss & Corbin 1990, p. 50).

2.1.2 Literature outlined

The bodies of literature reviewed in this chapter are now listed to introduce their role and contribution to the thesis:

- Firstly web IA is defined and described to clearly position the phenomenon under investigation. The structuring of web information as an activity of design is considered and the use of the ‘architecture’ metaphor is discussed.

- Those methods or prescribed processes for web IA that have been developed and published as abstracted knowledge of this work were reviewed prior to examining their place in an organisational context. Structured methodologies, frameworks and guidelines that inform the work of web IA are discussed.
- Where the literature has addressed web IA in its organisational context, it is reviewed in this chapter. The positioning and managing of the web and its information structures and the politics involved are relevant to this study.
- The contributions and connections of other information practices are examined to position web IA within a broader organisational concern with information and to link web IA to prior and influencing traditions. Relevant literatures from information systems, library and information studies, web information retrieval and business use of taxonomies are reviewed.
- The preliminary analysis of collected data called for the review of knowledge in organisations, especially knowledge in activity or knowing. Theories of enactment, organisational learning and mindfulness all showed relevance in the outcomes of the analysis.
- The literature on practice-based studies, which takes its reader very close to the nature of work, also earned its way into this study in the final stages of analysis, as did the notion of situatedness.
- Finally, with the theoretical framework of this research in place, there was value in viewing the practice of web IA as a complex adaptive system and the relevant literatures and theories of complexity were reviewed.

2.2 What is web information architecture?

2.2.1 Definitions and descriptions

White (2004, p. 219) has the opinion that ‘there is no accepted definition of information architecture, and that is a good thing at this stage of its development’. He draws parallels with the term *information science*, which dates from the mid-1950s and still has no agreed definition in the wider community. Resmini, Bystrom and Madsen (2009, para. 16) agrees saying ‘the IA community does not have to agree on a definition because there is more to do’. White (2004, p. 219) predicts that web

IA will be, like information science, ‘a set of tools and approaches that can be used by professionals from a wide range of backgrounds to solve an equally wide range of information management problems’.

Despite the difficulty and dubious wisdom in attempting to define web IA, Resmini et al. (2009) note that many have tried over a ten year period. The unending debates and varied perspectives are due to the youthfulness of the discipline. It is a discipline of multiple layers that are ‘constantly confused in conversation’, yet have the potential to be interchangeable (Resmini et al. 2009, para. 6).

The term IA in its origin, scope and definition is widely and conflictingly used. In 2002, the *Journal of the American Society for Information Science and Technology* published a special edition on IA and in introducing the edition, Dillon (2002) proposed a broad definition of IA. His stated aim in keeping it broad was to avoid the exclusion of any information professional with creative new ideas. ‘IA is the term used to describe the process of designing, implementing and evaluating information spaces that are humanly and socially acceptable to their intended stakeholders’ (Dillon 2002, p. 821). Dillon (2002) sees business and organisational aspects of IA encompassed by human and social acceptance.

Intentionally avoiding the pitfalls of language and representation, Morville and Rosenfeld (2006) consistently offer the set of four descriptive and defining statements about IA that they first proposed in 1998. Morville and Rosenfeld (2006, p. 4). suggest that this approach serves multiple perspectives and approaches to IA itself and that the ensuing discussion of these statements is what truly conveys the meaning of IA:

1. The combination of organisation, labeling, and navigation schemes within an information system.
2. The structural design of an information space to facilitate task completion and intuitive access to content.
3. The art and science of structuring and classifying websites and intranets to help people find and manage information.
4. An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.

Using the term IA in a very expansive way, Evernden and Evernden (2003a) consider all of an organisation's electronic information as information in need of architecting. They are describing enterprise IA and report the field of information architecture as one that has been in existence for some decades. Evernden and Evernden (2003a, p. 1) summarise the term IA in several ways:

Information architecture is a term that is applied to the structure and organisation of information, and is therefore a key part of managing corporate information.

Information architecture is a foundation discipline describing the theory, principles, guidelines, standards, conventions and factors for managing information as a resource. It produces drawings, charts, plans, documents, designs, blueprints and templates, helping everyone make efficient, effective productive and innovative use of all types of information.

Evernden and Evernden (2003a, p. 24) then suggest the term 'the webbist movement' to situate IA for the web in this larger picture, listing it among other IA styles such as 'the datists', 'the modellers' and 'the objectists'. Likewise, the Information Architecture Institute (<http://www.iainstitute.org/>) uses the term information architecture to describe the structural design of a shared information environment without any specific reference to websites.

Van Dijck (2003, p. 12) claims that IA is a new field in web design, implying that it is web focused and no more than 15 years old. Morville (2004) agrees and suggests that although the term IA was proposed by Richard Wurman in 1976, it was then not true IA but information design. He claims that he and colleagues of Argus Associates were instrumental in the emerging use of the term for website information around 1996.

Wurman (1996, p. 18) does claim to have introduced the term information architecture in 1976 and does not use the term exclusively for digital information. Information in any media is in need of structural design with the intention of making it more understandable. He describes the practice of IA as the provision of information in a way that enables information seekers to access it without incurring a state of 'information anxiety' (Wurman 1989). Wurman (1996, p. cover jacket), himself an architect, proposes the following descriptions of the role of an information architect:

1. The individual who organises the patterns inherent in data, making the complex clear
2. A person who creates the structure or map of information which allows others to find their personal paths to knowledge
3. The emerging 21st century professional occupation addressing the needs of the age focused upon clarity, human understanding, and the science of the organisation of information.

In its focus on the needs of the user, web IA draws on the philosophies of user-centred design. User-centred design is ‘based on the needs and interests of the user, with an emphasis on making products usable and understandable’ (Norman 1990, cited in Morrogh 2002a, p. 112). Dillon (2002) argues that organising information for websites is only one aspect of the practice of web IA and that considering the user experience of the information space is also essential. Many large websites suffer from an organisational-centric approach to the structuring of information (Morville & Rosenfeld 2006, p. 57). Internal divisions of the organisation are used as a basis to present web information to the user. Morville and Rosenfeld (2006, p. 57) note that in the practice of web IA ‘labeling and organisation systems are intensely affected by their creator’s perspectives’ and that every effort must be made to design information structures that are meaningful to those who use them. ‘A user-focused design discipline such as information architecture can help maximise the value of new technologies and minimise the negative effects’ (Morrogh 2002a, p. 97).

The definitions of IA abound and are varied, revealing the inexact nature of the field and the multiple and differing perspectives amongst experts, practitioners and scholars. Yet they are valuable because in considering the variety of definitions, they provide a rich description of the term IA. The quest to define web IA points to the newness of the field and the desire for clarity.

In integrating and summarising these evolving definitions and perspectives, this thesis takes web IA to mean the process and outcome of designing information structures for the web that enable users to find the information that they require. IA for the web involves structuring, organising and labeling content so that it is suitable for the online information space. Navigation and search systems that support the discovery of the categorised content must then be integrated. This constructed

definition of web IA allows a clear understanding of the nature and scope of the practice for the purposes of this research.

2.2.2 Design and information architecture

The literature reveals a debate around the differences between information design and information architecture. Both Mok (1996) and Wurman (1996) claim the activity of structuring information as an act of design. Mok (1996) sees design as an important and empowering activity of business. ‘Design, in its broadest sense, is the enabler of the digital era – it’s a process that creates order out of chaos, that renders technology usable to business’ (Mok 1996, p. 3). Morrogh (2002a, p. 108) notes that given the amount of online information that is to be made available, a new ‘design profession’, that of web IA, is much needed.

Batley (2007) sees two ways of approaching the work of web IA. One aspect of IA that she identifies is design – user-centred design that enables easy and intuitive access to information for users of websites. Morrogh (2002a), Morville and Rosenfeld (2006), Orna (2005) and Nielsen (2004) support Batley’s assertion that IA is largely a design activity. Alongside the creative work of structuring information, Batley (2007) considers the core information management functions of indexing, categorising, classifying, recording and organising information. The main focus of IA is the design of information environments, and Morrogh (2002a, p. 109) notes that ‘information architecture design problems are complex’.

Good design work should be largely transparent and unobtrusive, allowing ease and ‘flow’ in access to website information (Morville & Rosenfeld 2006, p. 390).

Information design becomes noticeable when it is ineffective and people cannot find the information that they seek. In his discussion of web IA, Spool (2009, para. 5) tells us that ‘the better the design, the more invisible it becomes’. It becomes visible when it is most problematic and blocks a seamless user experience. ‘We attend to things that aren’t working properly more than we attend to things that are’ (Spool 2009, para. 8).

There is little dissent from the claim that IA is an act of design. Yet an ongoing quest to differentiate visual or aesthetic design from structural design continues. Wurman (1996, p. 18) reports that he purposely used the term information ‘architecture’ at the American Institute of Architects National Convention in 1976 to avoid the connotations that ‘design’ had in decorating and making things look good. Graphic designers, claims Wurman (1996, p. 18), make design decisions that can make ‘information less understandable’.

Garrett (2003, p. 131) sees information design as the two-dimensional presentation of information - for example, designing forms and web pages - and considers IA as the total structure of the information space. Louis Rosenfeld, when interviewed by Carliner (2008, p. 104), admits to an oversimplification of the situation when describing ‘information design as the design of two-dimensional information spaces (e.g., web pages), and information architecture as the design of multi-dimensional information spaces (eg. websites)’. Mok (1996) sees a sequence in which information architecture is followed by information design. With ‘information structures defined in the architecture phase’, the ‘project acquires a look and feel’ in the information design phase (Mok 1996, p. 58).

Whilst some (Mok 1996; Garrett 2003; Evernden & Evernden 2003a; Rosenfeld in Carliner 2008) would contract the definition of information design to be the presentational aspects of information such as typography, colour and formatting, Orna (2005 p. 17) broadly defines information design as:

everything we do to make visible our knowledge and ideas (which by the definition used here live invisible inside individual human minds, and have to be put into the outside world before others can gain access to them), so that those who need them can enter into them and use what they learn from them for their own purposes.

Evernden and Evernden (2003a, p. 32), however, state that presentation or two-dimensional information design is a key component of all good IA, implying that it is a subset of IA.

Wurman (1996) has purposely introduced the metaphor of architecture to focus in on the structuring of information to provide purpose and meaning. Metaphor, claims

Nonaka (1991), is a means of knowledge creation. ‘Through metaphors, people put together what they know in new ways and begin to express what they know but cannot yet express’ (Nonaka, 1991, p. 100). He notes that metaphors set up a connection ‘between two things that seem only distantly related’ (Nonaka, 1991, p. 100). Information, Wurman (1996, p. 16) claims, is better served by the metaphor of architecture than one of style and beauty. Architecture as metaphor, allows information designers to focus on structure and leave the choice of colour to those with expertise in aesthetic design. In merging two separate and dissimilar ideas into one metaphor, a valuable discrepancy or conflict is created claims Nonaka (1991). Knowledge is gained as the inconsistency is examined and analysed. This has been Wurman’s achievement in using the metaphor of information architecture.

Wurman (1996, p. 18), an architect himself, describes architecture as the science and art of creating an ‘instruction for organised space’. He views the process of gathering, organising and presenting information as closely analogous to the problems that architects face in designing a building that will serve the needs of its occupants. Designing a building must also be concerned with the flow between material and people and must meet the needs of the occupants (Wurman 1996).

Morrogh (2002a, p. 3) gives good reason and background for the use of the metaphor, stating that metaphors, at large, help us to explore new ideas using concepts of familiar domains. This particular metaphor capitalises on the fact that architects are professionals dealing with complexity and are concerned with spatial relationships between components. It emphasises a concern for users’ understandings and expectations.

However, Morrogh (2003a) points out that the limitations of the metaphor should not be ignored. Information is an intellectual, conceptual material – unlike the physical nature of building material. Information can be used simultaneously in many different ways unlike more tangible resources. Information is more dynamic and subject to rapid change in its substance and value than building material.

Hinton (2009) believes that hypertext has given information a new dimension and that IA is about shaping the contextual experiences of the online user. Hinton (2009)

and Weinberger (2002) add to the architecture metaphor with the allied concepts of space and travel. Unlike other information contexts, information on the web is a place to which we travel. We visit information on the web. Thus IA, like physical architecture, ‘is a shaping of contextual experience through creating boundaries and connections’ (Hinton 2009, p. 42). Extending the metaphor further, Hinton (2009, p. 47) says that ‘IA is about using information as raw material in the service of architecture for a new contextual reality’. But this promotion of architecture and the suggestion of information as servant risk the removal of people from the centre of the picture. Both information and its architecture remain in the service of the website user.

These conversations and perspectives are useful for distinguishing and understanding, yet irresolvable and time-consuming semantics are at play. This thesis will consider the practice of web IA as design work and use information architecture and information design interchangeably. It will, however, be referring to the organising and structuring of information and not the aesthetic design that surrounds and embeds those structures.

2.3 Systematic approaches to web IA

2.3.1 Toward a design method for web IA

The practice of IA according to Dillon (2002) and Morville (2004) is a value-based craft discipline and as such has its weaknesses. Consistent results and outcomes are not assured in a predictable timeframe and those that work in this area use heuristic knowledge and skills that cannot always be made explicit. But Morrogh (2002a, p. 109) argues that all designed products are the outcome of a conscious, problem-solving process and that design processes which may begin as skills-based craft traditions can be supported by evolving design methods, which are more theoretical and scientific in nature. Web IA is seeing the shift described by Friedman (cited in Morrogh 2002a, p. 147) as the ‘transition from design as ‘craft’ to design as ‘knowledge profession’” involving knowledge-intensive processes. Morrogh (2002a, p. 110) defines a design method thus:

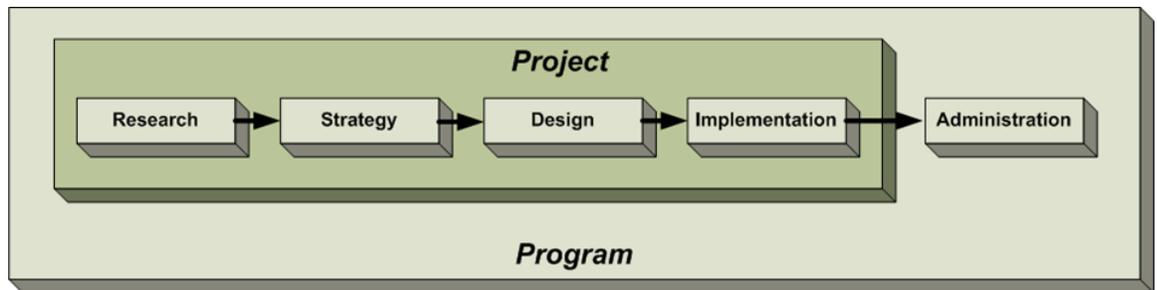
A structured design process – a method – introduces control or discipline into the design process. Design methods are concerned with principles and processes of design based on the nature of design and how designers identify problems and generate and evaluate solutions. The overarching goal of a design method is to improve the efficiency and effectiveness of design activities.

2.3.1.1 A structured methodology

Because organisational use of the web for providing vast quantities of information has become mainstream, significant efforts have been made to define and optimise a design method or systematic approach for the design of online information spaces (Rosenfeld & Morville 1998, 2002; Morville & Rosenfeld 2006; Garrett 2003; Wodtke 2003; Batley 2007). As a result, a maturing design method and practice of web IA has emerged (Hider, Burford & Ferguson 2009). Rosenfeld and Morville's book for practitioners, *Information Architecture for the World Wide Web*, first published in 1998 and now in its third edition, is described as a 'milestone' in the development of web IA processes and as the 'bible' for the practice of web IA (Dillon & Turnbull 2005, p. 1).

Rosenfeld and Morville (1998, 2002) and Morville and Rosenfeld (2006) propose and document a series of phases that form a structured design method for the practice of web IA. They consider web IA as a project with the sequential stages of research, strategy, design and implementation, as shown in Figure 1. The project of web IA concludes with an acknowledgement of continuous evaluation and change that Morville and Rosenfeld (2006, p. 232) entitle 'administration', again depicted in Figure 1. Their approach is top-down, 'conceiving the full product and its human or organisational impact' (Dillon and Turnbull 2005, p. 2). Prior to outlining this methodology, they deconstruct an IA into the component systems of organisation, labelling, navigation and search, as well as any controlled vocabulary and metadata that may be used. Morville and Rosenfeld (2006, p. 52) acknowledge that much of this work is not visible to the website user or the organisation's management. They present a formulaic, sequential approach where research, strategy and design outcomes and deliverables are implemented via a 'structured development process' (Morville & Rosenfeld 2006, p. 231).

Figure 1 A structured methodology for web IA



Source: Adapted from Rosenfeld and Morville (2006, p. 232)

Morville and Rosenfeld's text, in all of its three editions, promotes this systematic approach and has proved a pivotal work in defining an IA methodology and a seminal textbook in IA education. The book is extensively used as a text for IA tertiary curriculum, which has the resulting effect of influencing and establishing a methodology for the practice undertaken by future web information architects. It is prescribed as the major resource in the teaching of web IA at the University of Canberra, the University of South Australia and Charles Sturt University in Australia and Kent State University, the University of Texas and the University of Baltimore in the USA, to name just a few of the tertiary institutions that teach the design methods proposed by Morville and Rosenfeld.

2.3.1.2 Other systematic approaches

Other approaches to a systematic process for web IA have been explored and reported. Claiming in 2004 that 'there is no generally accepted methodology for the design of user-centered IA', Sinha and Boutelle (2004, p. 349) explore a 'rapid information architecture prototyping' methodology. Noting the variety of user research methods in use and how difficult it can be to move from research outcomes to design activities, Sinha and Boutelle (2004) simplify the process by being prescriptive about the specific and iterative tasks involved.

In a rapid, three-stage IA prototyping approach, the first exploratory stage uses short open-ended interviews with stakeholders who are grouped by their level of influence in the project. This stage also includes a 'free-listing' technique (Sinha 2003) to become familiar with and scope the information domain. The second stage is that of 'understanding', when open card sorting based on the free listing outcomes is used to

understand users' mental models and to create possible, preliminary IAs. These initial design prototypes are then tested in the third and final 'verify and refine' stage, where closed card sorting is the recommended technique. Sinha and Boutelle (2004) claim that, in this way, the business goals and concerns and the users' conceptual structures will be understood, and that the design is flexible enough to accommodate additional information.

In a significant deviation from the craft-like and creative approach to a methodology for IA, Large, Beheshti and Cole (2002) propose an IA matrix as a tool for designing IA using a logical and systematic approach. One section of the matrix, the 'framework', contains attributes based on objectives, users and content that are defined and given values by the information architect. The framework attributes control and define the 'applied information architecture' attributes for the site under development via a series of algorithms. These dependent, resultant attributes include metaphor, navigation, consistency, hierarchy and retrieval strategies, and they define the IA for the site. The proposed algorithms and their details have not been explored by the authors, but some of the rationale and reasoning that might make up such an algorithm is discussed. Despite the potentiality of such an IA matrix, its development and adoption has not been further reported in the literature.

Haverty (2002) claims that the process of developing an IA, is an inductive one. One reason for this is that 'IA is a field without theory' (Haverty 2002, p. 844).

Information architects work creatively with each new project, reusing their heuristic knowledge and skills but without formal validation from a theoretical framework.

Haverty (2002, p. 839) proposes that theory could 'shrink the space of possible solutions to those known to be appropriate for the design problem – what is left to the worker is to contextualise the theory to fit the specifics of the design problem'.

Offering a second reason for IA being an inductive process, Haverty (2002, p. 840) describes IA as supporting an emergent phenomenon, that of a user's interaction with the website.

A system exhibits emergence when a small set of building blocks, constrained by simple rules, can generate a huge number of complex

patterns. An emergent phenomenon cannot be summarised by a description of its individual parts; the whole is not equal to the sum of the parts.

Thus a specific IA and a user's interaction cannot be fully explained by an understanding of each design component – its real nature emerges when a user interacts with the information space and each interaction is unique.

Haverty (2002, p. 840) goes on to describe the entire nature of the IA design process as constructive induction, which she defines as:

a process for generating a design solution using two intertwined searches. The first search involves identifying the most adequate representational framework for the problem; the second search involves locating the best design solution within the framework and translating it to the problem at hand.

According to Haverty (2002), the first search of IA is to define the design problem and break it into smaller component design problems that require specific solutions. This process resonates with Morville and Rosenfeld's (2006, p. 233) description of research – investigating the business goals, audience needs and content domain. An information architect will then identify an appropriate representational framework – perhaps drawn from an allied discipline – that might yield a solution. Using constructive induction, the second search of IA is to design a solution within the identified framework – a search that may quickly be resolved from an information architect's experience (Haverty 2002). The design solution is then applied and integrated into an overall IA. The quality of an IA will always be how well it supports a total user experience, which Haverty (2002) describes as an emergent phenomenon.

Harvey, Robertson and Edwards (2004) empirically support Haverty's claim that IA is emergent. They claim that an IA is not pre-determined by designers, but is created afresh in each activity of each user in their interaction with the website. Harvey et al.'s (2004) aim in their research is to extend the consideration of the term IA, moving it from its design focus to include how it is lived and used. The research suggests that the representational states of online information are not fixed, but emerge in use.

Evernden and Evernden (2003a, pp. 28-29) present a conceptual framework for the work of IA in organisations and apply the term IA to any information within an enterprise that is in need of organisation and structure. They suggest a set of eight factors that need to be taken into account when developing an information architecture: Categories, Understanding, Presentation, Evolution, Knowledge, Responsibility, Process and Meta Levels. Any or all of these factors can be applied to a particular IA and thus become a 'dimension' of that IA. 'These eight factors are at the heart of all information architectures, forming a checklist of key points to make sure that important concerns are not forgotten' (Evernden & Evernden 2003a, p. 28).

These eight factors allow you to decide which bits you need as you need them. It is generally easier to start architecting with one or two and gradually introduce others when a more sophisticated approach is needed or as organisational capability develops. Unlike a pre-defined architecture, the eight factors are readily customised – by ignoring factors that you do not need, adapting them if they are not quite right, or extending them if you need something extra – before the architecture is established (Evernden & Evernden 2003a, p. 29).

Whilst Evernden and Evernden's eight factors address the need for organisations to own, manage, know and grow IA, the eight factors are presented as 'an integrating frame thought' (Evernden & Evernden 2003a, p. 40) without strong process or methodology. They provide a parallel conceptual world to the practical, procedural approach of Morville and Rosenfeld (2006). The literature does not provide a synthesis of these two models to support organisational IA.

Evernden and Evernden's (2003a) set of eight factors or framework for IA in organisational contexts makes valuable input to the practice of web IA but is not empirically based. Evernden and Evernden (2003a, p. 28) write that 'the eight factors are based on our experience in implementing and using information architecture'. The framework is not the result of planned research.

Hider et al. (2009, p. 57) summarise the status quo in web IA design methods saying:

The practice of IA has been guided by the development of a structured design process that was pioneered by Rosenfeld and Morville in 1998. Since then, the design methods of IA have been reviewed, refined, updated and

rephrased to the extent that a mature documented process for the activity of designing web information structures now exists.

Yet neither Evernden and Evernden's (2003a) framework nor the mature documented processes for web IA mentioned by Hider et al. (2009) have been informed by a significant body of research that specifically addresses the practice of structuring web information.

2.3.2 Guidelines and design patterns

In contrast to the recommendations of procedural design methods for the practice of structuring information on websites, some scholars and practitioners prefer to steer the development of effective web IA by providing guidelines. Mariage, Vanderdonckt and Pribeanu (2005, p. 689) describe guidelines as a 'set of principles specific to a given field'. Guidelines serve to consolidate the body of knowledge in optimal website development and are often developed to assist the work of the non-expert (Mariage et al. 2005).

Stewart and Travis (2003, p. 992) describe guidelines as 'recommendations of good practice that rely on the credibility of their authors for their authority' and claim that the quality and consistency of the IA of a website can be improved by the use of guidelines. They believe that good practice and a shared understanding can emerge by the use of guidelines.

An exhaustive set of web development guidelines have been published by the US Department of Health and Human Services. *The Research-Based Web Design and Usability Guidelines* are inclusive of web IA and are grounded in research. They are not, however, exclusively focused on IA and integrate other aspects of design such as graphic design. Checklists for web IA such as those offered by the Australian Government Information Management Office (AGIMO) combine a simplified process and achievement approach to supporting the practice of web IA. The AGIMO Information Architecture for Websites better practice checklist, published in 2004 and updated in 2008 to support government agencies in the practice of IA, summarises a series of checkpoints for achievement and a set of in-principle objectives.

Guidelines for the practice of web IA are a broadcast means of communicating desirable design outcomes to a wide audience. They range in ambiguity, from fixed requirements that require no interpretation to broad in-principle objectives for which the person who is structuring web information should strive (Spool 2003b). They are a step toward achieving consistency and standards. The quality of the guidelines themselves, the usability of their presentation and their ability to meet the needs of a varied audience influence their usefulness (Mariage et al. 2005, p. 688). Spool (2003b) believes that guidelines are limited in their effectiveness because they fail to deliver a consideration of the context in which they are applied.

A number of scholars (Cherry, Muter & Szigeti 2006; Milne, Dickinson, Carmichael, Sloan, Eisma & Gregor 2005; Nielsen 1999b) warn of the limitations of guidelines for creative design activities such as web IA. Adherence to published guidelines does not ensure a high quality outcome for creative activity, which should be undertaken with a deeper knowledge of the practice. 'A designer is unlikely to derive the best solution for a particular scenario from a generalised guideline in isolation', according to Milne et al. (2005, pp. 565-566) who also believe that guidelines for web design as a whole should 'be complemented by a deeper understanding of the issues, rather than simple rules or instructions that should be followed blindly'. Cherry et al. (2006, p. 154) claim that the use of design guidelines for complex design is limited 'particularly because of the intractably large number of potential interactions among guidelines'. If the use of a specific guideline is in some way dependent on other guidelines, the interconnections prove intricate and more difficult to enact.

Hider et al. (2009, p. 58) note Nielsen's (1999b) distinction between surface or web interface design and deep design. A website's information organisation and structures are considered by Neilson (1999b) as aspects of deep design. Those elements of IA that occur at the surface or interface level of websites - for example, the positioning of the search function or the horizontal positioning of breadcrumbs - are the simplest design features to standardise and many web design guidelines deal effectively with this layer of IA components (Nielsen 2004). 'The confusing design elements are the bigger issues that contribute more strongly to users' ability to master the whole site' (Nielsen 2004, para. 11). Nielsen (1999b) claims that a website's

deep information structures require contextual, dedicated and creative information design activity and cannot be standardised in the form of guidelines.

Borrowing again from architectural design, the notion of design patterns is explored in the practice of web IA (Van Duyne, Landay & Hong 2007; Symonenko 2006; Nielsen 2004). Alexander, Ishikawa, Silverstein, Jacobson, Fiksdahl-King and Angel (1977) note that in the design of buildings and cities, commonly occurring design solutions are finite and can be expressed as a pattern. 'A pattern is abstract representation of a "common problem" and "effective solution" pairing' (Sasson & Douglas 2006, p. 89). Design patterns capture a proven and insightful solution in a particular domain for reuse as need arises (Van Duyne et al. 2007). Libraries of patterns are developed by compiling successful web design outcomes, abstracting the key features and communicating each pattern in a set format or pattern language and seeking widespread validation (Sasson & Douglas 2006). Design patterns are known and tested solutions to design problems that have a particular context.

Along with patterns to achieve reuse of design features, Sasson and Douglas (2006) consider the use of physical objects such as design artifacts (for example, blueprints and wireframes) and previously constructed components or outcomes of design. They suggest consistency and efficiency is achieved in this way. Nielsen (2004) and Symonenko (2006) extend Alexander et al.'s (1977) use of design patterns to include the physical object that represents the solution.

When Nielsen (2004) claims that high-level design patterns for the IA of sites in a particular domain should be possible, he is considering the physical solution as well as the abstract. Nielsen explores the domain of investor relations and has developed three similar but distinct information architectures that can be used as patterns or starting points for other websites in this domain. He suggests that high-level information design patterns can also be derived in other domains. Symonenko's (2006) preliminary research reveals that patterns exist in the structure of information within websites of distinct domains such as universities, government and libraries. He establishes that user expectations of these patterns are also prevalent.

Guidelines and design patterns offer to the work of web IA an abstract, de-contextualised starting point for a specific project. However, a number of scholars see limitations in the use of guidelines for the creative work of web IA. The actual use of pre-existing patterns of web IA in practice is not reported in the literature.

2.4 Web IA in the organisation

By the end of the 20th century, the web was an important platform for organisations to provide information to many of their clients. At that time, Nielsen (1999a, p. 67) claimed that ‘most users don’t go the web to “have an experience” or to enjoy the site design: the user interface is the barrier through which they reach for the content they want’.

Gullikson, Blades, Bragdon, McKibbin, Sparling and Toms (1999) report a typical case study of its time and a concern for accessible information at the turn of the 20th century. They examined the IA of the Dalhousie University website, which had just won an award for visual design and report on the usability testing and users’ perception of the site in finding information. Participants attempting to retrieve specific information reported ‘poor’ outcomes, and users were generally ‘dissatisfied’ with the site as a source of information (Gullikson et al. 1999, p. 300). This account is typical of the increasing focus on website information structure by many organisations around 2000, as an awareness of the importance of accessible information for the audience of websites intensified in organisations.

Despite the growing maturity in a theoretical and systematic approach to web IA (Hider et al. 2009), the information organisation processes used in organisational contexts do not always produce an ideal web information environment for users to find the information they require (Morville & Rosenfeld 2006, p. 17; Chowdhury & Chowdhury 2007, p. 187). In 2009, having agreed that IA had moved from luxury to necessity, Wodtke and Govella (2009, p. xiii) ask, ‘Why are so many of these sites so difficult to use?’.

It remains evident that many organisations do not offer easy and intuitive access to information on their websites (Warner 2004, p. 178; Orna 2005, p. 36). When

considering the ability of website users to find the information they need, Morville (2005, p. 12) states that ‘most business websites have major problems’, in which he includes the organisation of information. Despite a seemingly maturing methodology for achieving web IA, its use and efficacy is not always apparent on the websites of large organisations. Hider et al. (2009, p. 57) acknowledge that more work is required, saying that ‘the challenge continues for further refinement and articulation of the complex IA design process as a form of support for IA practitioners’.

Orna (2005, p. 17) sees the outcomes of information work in organisations as ‘information products’. She describes the transformation of knowledge held by humans in their minds to information that is explicit, visible and available to others as the creation of an information product. Websites are one such information product within an organisation. Orna (2005, p. 14) suggests that web-based ‘information products’ act as a catalyst to highlight the importance of all information products in organisations and expands their role to ‘meta-information products’ as a result. Organisations that generally attend to information as an asset and are more ‘information orientated’ are more likely to be able to provide an environment in which the learning and activity of web IA can prosper (Orna 2005, p. 132; Evernden & Evernden 2003a, p. 5).

Evernden and Evernden (2003a, p. 20) highlight the reality that every website does have an information structure – be it optimal for its intended audience, or a frustrating and unsuccessful experience that will ultimately detract from the organisation’s business goals. Deliberate attention to the crafting of information structures to meet the information-seeking behaviour of the website user is what the process of information architecture requires (Morville & Rosenfeld 2006; Brinck, Gergle & Wood 2002). It requires expertise and a focus on communication rather than technology (Van Dijck 2003, p. 12). An organisation’s website requires the convergence of a large amount of diverse corporate information into one coherent information space and provides an information platform that spans the internal boundaries of the organisation (Lambe 2007, p. 55).

Acknowledging that the work of IA does involve common sense and can be applied intuitively by novices or business stakeholders, Evernden and Evernden (2003a, p. 6) challenge organisations to accept that web IA requires expertise and formal commitment. There are hidden costs in an unplanned, impromptu approach to IA, as other competitive organisations build capability and expertise in structuring information. Evernden and Evernden (2003a p. 6) give this business advice to modern organisations: ‘Information architecture helps to distinguish you from your competitors’. They continue on to say that:

Leaving the design of information to chance results in an ad hoc collection of information – some structures are good, but many are ineffective and inconsistencies, problems and difficulties abound. The more that an economy is dependent on the processing and exchange of information, the more architecture is necessary, providing additional rigour and discipline to processes, reducing costs and making the use of information more effective.

2.4.1 Managing the web and its information structures

Cox (2007a, 2007b) and Cox and Emmott (2007) report a major study of the management of information-rich websites in large organisations and note that ‘studies from any sector on website creation as an occupation are few’ (Cox & Emmott 2007, p. 309). This study is confined to the tertiary sector in the United Kingdom and only those web managers with responsibility for the websites of the entire institution are investigated. These studies are worthy of review because the position of responsibility for website creation carries with it a responsibility for web IA. IA sits within the bigger picture of web management in organisations.

The role of web managers in large UK universities is found to be extremely diverse across each organisation. Cox (2007b) reports that little uniform practice had emerged across institutions in the nature and location of the position of web manager. It remains an ill defined, new profession and web managers experience ‘a strong sense of diverse activity around the institution, multiple possibilities with only a limited ability to pull things together’ (Cox 2007b, p. 164).

This study identified a web manager as a new professional, requiring a varied and fluid range of abilities. As such, a web manager’s work lies ‘across roles’ (Cox 2007b, p. 149). The work of the web manager is described as fuzzy, an assemblage

of skills, all things to all people, integrative and ‘chameleon-like’ (Cox 2007b, p. 163). There is a strong suggestion of web managers working across the institution with multiple possibilities and perspectives.

Cox’s (2007a, 2007b) study reveals that a clear role and place within the organisation has not emerged for web managers. They are located in a wide range of organisational units with multiple perspectives and approaches to the web and various job titles. The web straddled and interacted with the core mainstream professions and units of IT, marketing and information management in various mixes. Web ‘teams’ often comprise individuals spread across the organisation who did not report directly to the web manager (Cox 2007b).

Web management in this study has no clear or patterned ‘regime of resourcing and governance’ (Cox & Emmott 2007, p. 309). It exists as a balance between expertise in the domain and broader management skills. Cox (2007b) reveals the need for sound management skills, especially in acquiring and controlling resources, for those in the role of web manager.

Cox (2007b) notes that the role of a web manager is thus an isolated, sometimes vulnerable position. This uncertainty and struggle is strengthened by connection ‘to valued organisational purposes’ (Cox 2007b, p. 166). Within these circumstances, Cox (2007b) notes that on one hand, a web manager may, experience vulnerability and lack of power. On the other hand, a web manager may ride ‘the technological possibilities to organisational influence and embeddedness (Cox 2007b, p. 167). Much depends on the context and the person in the role.

Cox (2007b) reports that web management is more likely to be housed in IT or a marketing/public relations unit and that local bitter tension between IT and marketing is evident in the use of the corporate web. Conklin (2005, p. 30) discusses polarised perspectives about design in general and presents two extremes of design within organisations. Firstly there is the world of need and desire, which is often expressed as what ‘ought to be’, and is more likely to be inhabited by a marketing department (Conklin 2005, p. 30). It is complemented by the world of ‘what can be built’ (Conklin 2005, p. 30) within the available resources, knowledge and time frame that

is often represented by the technologists. These two polarities of design need to be reconciled in an elegant way in the design process. Conklin (2005, p. 32) claims that organisations must take care that a design process such as web IA does not turn into a non-productive, inter-departmental war with neither worlds understanding the other or the whole.

Orna (2005, p. 17) claims that information products inclusive of websites are generally ‘chaotically managed, if managed at all’. The value of the website is sometimes unrecognised within an organisation. It often does not attract the attention of top management and suffers from its incremental creation.

Eschenfelder (2003) examines the organisational conflict involved in developing a web IA for a large organisation. She focuses on a significant IA component – web classification schemes (WCS), defined as ‘systematic informational infrastructure that defines the arrangement of web content into groups for storage or retrieval, the description or presentation of the groups, and the relationship of groups to one another’ (Eschenfelder 2003, p. 419). She describes these IA components as covert, powerful, ubiquitous and influential tools ‘that represent content, direct attention, influence perception and promote or detract from customer satisfaction’ (Eschenfelder 2003, p. 420). Acknowledging the importance of organisational websites as interface to customers and integral to achieving business goals, she notes that a site must often serve multiple customer profiles with differing needs and expectations. A common WCS or IA infrastructure must meet the needs of multiple customers, leading to goal conflict among different organisational sub-units with different target customers.

Eschenfelder’s (2003, p. 421) research reveals the ‘growing importance of organisational websites and WCS as fields in which issues of organisational power, conflict and control are worked out.’ Website architecture elements are the results of processes of social negotiation and politicking and have the potential to covertly influence users’ perception and actions. This study goes some way to providing an understanding of the organisational conflict involved in the development of an IA for a public-facing website. It offers the ‘beginning of a practice-based methodology to predict and proactively manage conflict in website design and management’

(Eschenfelder 2003, p. 435). With planning, conflict could be used to enhance the process of IA in a large organisation (Eschenfelder 2003).

2.4.2 The work of web IA in organisations

Organisations using their websites as a platform to communicate and inform will develop a means or a practice to create information structures that facilitate the desire to inform (Orna 2005, p. 128). The systematic approaches to web IA developed to improve this purposeful use of the web by large organisations, discussed earlier in this chapter, are accompanied by contextual realities (Morville & Rosenfeld 2006, p. 26). The practice of structuring information in organisations is characterised by consequences, untidiness, irregularities, emotion and short cuts (Ciborra 2004). Ciborra (2004, p. 6) calls for a greater knowing of ‘the domain of existing in the world’ as he considers the ‘labyrinth of information’ that besets an organisation. He asks ‘how to get closer to the practice’ and the mundane activities of information work and sees value in doing so (Ciborra 2004, p. 6).

Robertson, Hewlett, Harvey and Edwards (2003) examine the work practices of people in the position of information architect and find that those practices vary greatly from organisation to organisation. They discover, too, that practitioners of web IA require a broad set of skills and expertise. From interview data with practising information architects, Robertson et al. (2003 p. 398) built five categories of work practices: research, focused designing, evaluation, coordinating internal and external stakeholders, and management. Communication and political activity are required of information architects in order to co-ordinate the work of all stakeholders and achieve results (Robertson et al. 2003). The opportunities for user-centred design are not always available or easily gained. Frequently information architects become ‘user-representatives in the design process’ (Robertson et al. 2003, p. 400). A consequence of not involving users and their requirements in the design of web information is that information architects have ‘a relative lack of control over the design priorities’ in the products they are building (Robertson et al. 2003, p. 400).

Rosenfeld and Morville (2002, p. 333) exhort practising information architects to ‘make the case’ for IA within organisations and admit that IA is often not

acknowledged because it is not concrete or visually easy to grasp. It is ‘abstract, intangible and new, and each situation demands a unique solution’ (Rosenfeld and Morville 2002, p. 333). The promotion of IA will be easier as organisations feel more and more information pain (Evernden & Evernden 2003a, p. 21). It is also a process and skill set that suffers from invisibility (Bowker & Star 2000, p. 240). Much of the work of IA is not apparent in the interface, thus not apparent to the website audience or management. Good design work should be largely transparent and unobtrusive, allowing ease and ‘flow’ in access to website information (Morville & Rosenfeld 2002, p. 49).

Busch-Geertsema, Balbo, Murphy and Davey (2005) carried out a short study of the work practices of web IA. The authors’ rationale for the study is to understand and clarify IA working processes from a practitioner’s point of view and to contribute to a model of the work of information architects. They provide a contextual analysis of the work of IA in the form of two fictitious practitioners and their diverse approaches to IA.

One IA was contracted specifically for IA work in projects that were well funded and situated in an environment that values and facilitates the work of IA. She was able to adopt user-centred processes that included conducting user research, developing personas and scenarios of use, and carrying out usability testing. Her work processes were organised and structured with a comprehensive set of deliverables, which were handed over for website implementation by another professional (Busch-Geertsema et al. 2005).

In contrast, a second IA was responsible for the entire implementation of a website and he included IA as a small component of his work. He had to convince his clients within an organisation that IA is important and should be funded. He worked heuristically, iteratively and intuitively with less structured processes and went on to develop the actual website himself. He did not employ any user-centred design techniques and structured information from an organisational stakeholder and IA expert perspective.

Busch-Geertsema et al. (2005) point out that the work of these two information architects has been shaped by the environment in which they practice and, implicit in the scenarios presented, they in turn shape that organisation's approach to IA. The user perspective is much less of a concern in the low budget, low IA focused development of websites. Many definitions of IA (Rosenfeld and Morville 2002; Dillon 2002; Wurman 1996) include a clause considering the users' ready access to information, yet Busch-Geertsema et al. (2005) reveal that the user is not part of the IA process in many instances. Their study highlights the impact of organisational readiness to acknowledge, fund and employ the best practice of IA.

2.4.3 Information ecology

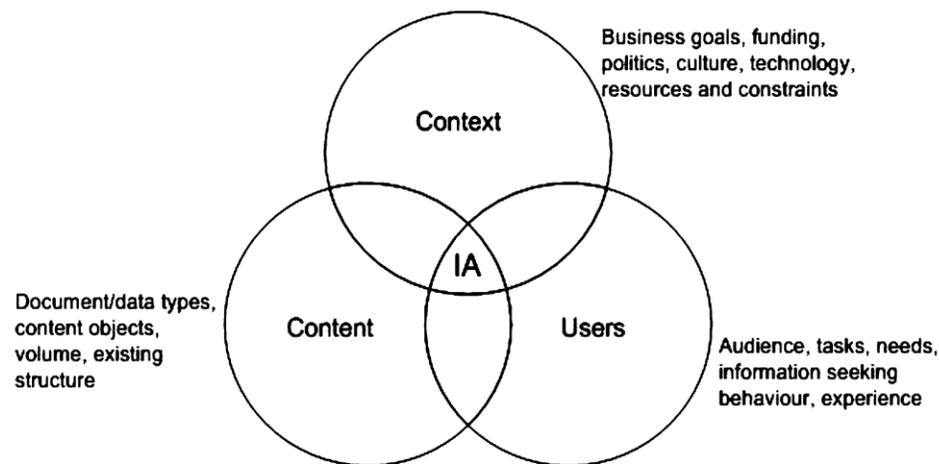
Rather than place instances of information organisation into discrete domains with different characteristics and implications, Davenport (1997, p. 4) surveys all of the information within an organisation and seeks connection. He begins the consideration of an organisation's information holdings using the metaphor of ecology. Davenport (1997, p. 11) describes ecology as 'the science of understanding and managing whole environments' and promotes the application of this metaphor to information because it is 'better suited to living things' – it presents a human-centred approach to information. Nardi and O'Day (1999, p. 50) also use the notion of ecology metaphorically, intending 'to evoke an image of biological ecologies with their complex dynamics and diverse species and opportunistic niches for growth'. In this way, these authors consider all information in an organisation as part of a local ecology and focus on the interaction of information with people, processes, structures and culture.

The basic tenets of Davenport's (1997, p. 29) information ecology are fourfold: integration of diverse types of information; recognition of evolutionary change; emphasis on observation and description; and focus on people and information behaviour. Understanding and adopting any of these attributes and moving an organisation in an 'ecological direction' as it manages its information is Davenport's (1997) recommendation. Davenport (1997, p. 10) sees information ecology as an alternative to a purist architectural, 'control' approach to information management.

Ecological approaches to information are ‘more modest, behavioral, and practical than the grand designs of information architecture’ (Davenport 1997, p. 11).

Information on the web takes its place in an organisation’s information ecology and it is connected to other organisational information objects in derivation or duplication. Morville and Rosenfeld (2006, p. 24) take up the ecological metaphor to describe the interdependence and complexity of practising web IA in organisations. They describe web IA as a ‘complex, adaptive information ecology’ (Morville & Rosenfeld 2006, p. 24) and use a ‘three circles’ diagram, depicted in Figure 2 to demonstrate the complex interdependencies at play.

Figure 2 Three aspects of information architecture



Source: – adapted from Morville and Rosenfeld (2006, p. 25)

Morville and Rosenfeld’s diagram attends to the business context, the web content and the users of the website. It establishes that the business context must be known and considered if the IA outcomes are to enhance business goals and fit within the resource capacity of the organisation. The diagram acknowledges the ecological role of the website user and encourages web information architects to discover more of their needs and behaviours. The nature, volume and volatility of web content is the third component in Morville and Rosenfeld’s (2006) triad of ecological considerations of web IA.

Morville and Rosenfeld's (2006, p. 24) 'three circle' diagram of web IA as ecology is presented as a tool for an IA practitioner to achieve effective web information design. They use this diagram to illustrate the complexity and multifaceted nature of IA, purposely omitting technology from the picture to minimise its existing dominance (Morville & Rosenfeld 2006, p. 25). In doing so the ecological picture is incomplete.

Nardi and O'Day (1999, p. 53) introduce the notion of 'keystone species' – people whose presence and activities are essential for a healthy information ecology. Keystone species are the people who are highly skilled and can facilitate and enable the information activities in a local information ecology. In this way, Nardi and O'Day (1999) encourage information architects to consider themselves as important and active participants within the ecology. Morville and Rosenfeld's diagram (Figure 2), however, removes a specialist information architect from the ecological picture, again presenting a limited view of web IA as information ecology.

Locality is an important aspect of an information ecology for Nardi and O'Day (1999, p. 54). Within the local habitation, people establish the nature of the information ecology and have special knowledge that is not available to outsiders. Rosenfeld and Morville (2006, p. 26) note that every information ecology is unique, having its own 'fingerprint', and recommend their 'three circle' diagram as a means of coming to know each ecologically unique situation.

Lambe (2007, p. 135) calls for the organisation of information to be carried out in a way that is cognisant of the environment and the business context. According to Lambe (2007, p. 136), generating an inappropriate response to the organisation of information is a likely outcome if the environment and its characteristics are not understood. Any methodological approach to web IA must be examined in the light of the context of its practice.

2.5 Informing traditions and practices

The arrangement and structuring of digital information is not new to large organisations. Along with the real and specific need for websites with effective information structures, organisations today are challenged to organise and manage all

corporate information and knowledge (Evernden & Evernden 2003a, p. 44). The structuring of information on websites can be seen as a component of corporate information and knowledge management at large. Organisations draw on their existing skills and knowledge in the broader information domain in pursuit of effective web IA (Evernden & Evernden 2003a, p. 24).

Orna (2005, p. 12) focuses on information products that are created within organisations. She views the transformation of knowledge held in the minds of humans to information that is explicit, visible and available to others as the creation of information products. Websites are one such information product within an organisation (Orna 2005, p. 14) The structuring of information on the web fits within an organisation's suite of information management and design activities. Because the traditions of organising information pre-existed the web, it is wise to examine them and any influence they have had in shaping the way that information structures are designed for the web.

Two major established disciplines that have contributed to the organisation and structuring of data and information in its digital form are library and information science and information systems. Large organisations benefit from the guidance of these traditions in the arrangement of both corporate and scholarly information. Whilst these traditions and disciplines overlap in a number of ways, they maintain separate bodies of literature, theories and perspectives. These bodies of knowledge have informed the practice and methods of web IA and are briefly considered in this literature review.

2.5.1 Library and information science

Rosenfeld and Morville's (1998) seminal methodological approach to the practice of web IA came from a library and information science (LIS) tradition. This is recognised by Morville (2004, p. xiii) himself:

We became evangelists of the LIS school of information architecture. We argued passionately for the value of applying traditional LIS skills in the design of websites and intranets. We hired 'information architects' and taught them to practise the craft. We embraced other disciplines, integrating user research and usability engineering into our process.

‘The Rosenfeld and Morville text was aimed at, in its own words, “applying the principles of architecture and library science to website design”’ (Dillon & Turnbull 2005, p. 1).

Mahon and Gilchrist (2004, p. xviii) also embrace the usefulness of LIS traditions and skill sets for IA, saying:

We have always tended to take the LIS view – even before we began to look at IA, in dealing with the management issues arising as a consequence of the widespread introduction of IT and associated networking in organisations. That is not to say we have always felt that LIS had all the answers but there were, and are, skill sets in LIS that lend themselves efficiently to IA.

Dillon and Turnbull (2005, p. 2) note that ‘IA is an interdisciplinary field of practice and research’ that borrows heavily from other fields of expertise including ‘library and information scientists who have long dealt with classification and categorisation of recorded knowledge’.

The skills and tools of classifying, cataloging, indexing and controlling vocabulary have been developed and used by librarians over a number of centuries. Morville and Rosenfeld (2006) see the need for these practices to be applied to the structuring of information on organisational websites. They go so far as to say ‘we’re all becoming librarians’ and ‘we unknowingly adopt the language of librarians’ (Morville & Rosenfeld 2006, p. 54) in our pursuit of organising information on websites. Dillon and Turnbull (2005, p. 1) note that ‘the methods and practices of information design and management’ now made popular by the web have long been seen as central to LIS. In describing his early attempts to organise information on the internet, Rosenfeld in an interview with Carliner (2008, p. 102) reports:

I was convinced that the detritus of the information explosion would require structure, organisation, and labeling to provide any real value to users. I knew that the principles of librarianship, if ported to non-library settings, could at least partially meet this challenge.

It is noted, however, that LIS theories and practices were developed for and within a relatively stable and ordered environment ‘where taxonomy work is often simply a matter of using and integrating existing standardised taxonomies’ (Lambe 2007, p. 136). LIS is tasked to ‘impose control over the entire world of knowledge, long-

lasting and ephemeral' (Schwartz 2001, p. 145). The traditions of LIS are well established and the practice is characteristically performed by those who have expertise in the tasks and theories and are frequently recognised by a professional association.

2.5.2 Information systems

The field of information systems (IS) has long encouraged the structuring, modelling and diagramming of data and its interrelationships in the construction of information systems (Stair & Reynolds 2008, p. 177). Data flow diagrams and entity relationship diagrams, for example, depict information flows, processes and interrelationships. They are created during the analysis phase of the development of an information system. More recently, the IS discipline has shifted its focus to include the unstructured information that proliferates in modern organisations (Maier 2007, p. 40).

The IS discipline has moved to model data and information in an enterprise-wide framework that is broader and independent of an isolated information system (Evernden & Evernden 2003b). The term enterprise information architecture (EIA) has been adopted for both the process and outcome of the high-level mapping of the total information requirements of an organisation. An EIA provides a framework for 'providing a structured description of an enterprise's information assets and the relationship of those assets to business processes, business management and IT systems' (Cullen 2005, para 5). In this way an EIA provides a proactive guide for information systems development and facilitates integration of systems and sharing of data (Evernden & Evernden 2003b).

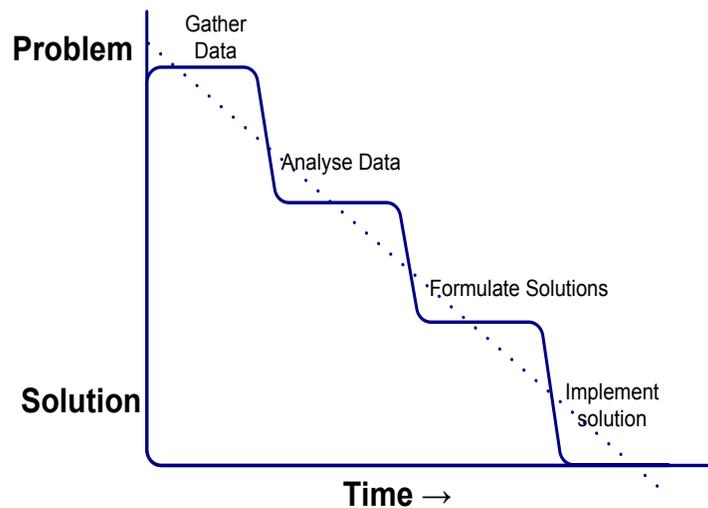
Evernden and Evernden (2003b) report that EIA predates web IA and suggest that EIA is now in its third generation. They suggest that this third generation of EIA has a strong emphasis on information and how it can be used as a resource with rewards in business agility, productivity, effective use of information, and profitability (Evernden & Evernden 2003b, p. 98). They see the need to separate information and technological architectures, citing information on the web as a key driver for this focused attention on the architectures of information. Thus, organisations grapple

with the structuring and organising of data and information from many perspectives; web IA is a component in the complexity of organising and structuring all of the corporate information within an organisation.

A number of structured methodologies and their variations for the development of information systems have emerged over a number of decades (for example, Gane & Sarson 1979; Yourdon & Constantine 1978). Stair and Reynolds (2008, p. 487) hold that the traditional, structured methodology for the development of IS has five stages: investigation, analysis, design, implementation and maintenance, and review. Whilst the underpinning principle of this development approach is sequence and control, information gleaned in any phase can require ‘cycling back to a previous phase’ (Stair & Reynolds 2008, p. 487). This methodology prescribes the stage and tasks of an information system development in an orderly and sequenced manner and has been dubbed a ‘waterfall’ approach (Laudon & Laudon, 2006, p. 534). Conklin (2005, p. 9) describes the ‘waterfall’ methodology as an orderly, top-down and linear approach where a solution is produced at the end of the sequence. This is depicted in Figure 3. Morville and Rosenfeld’s (2006, p. 231) structured development process for the practice of web IA outlined earlier in this chapter bears strong resemblance to a traditional structured ‘waterfall’ approach to information systems development.

Conklin (2005, p. 12) warns that a traditional ‘waterfall’ or structured methodology will not always be effective in achieving outcomes, particularly in complex situations. He claims that human cognitive processes do not work in this orderly linear way and that formulating solutions and understanding problems are simultaneous in most situations. ‘Human beings do not simply start by gathering and analysing data about the problem. Cognition does not naturally form a pure and abstract understanding of the ‘the problem’’ (Conklin 2005, p. 11). Conklin (2005, p. 9) acknowledges that these claims unsettle traditional thinking, previous design methods and internal standards for project management. He also claims a lack of awareness that these traditional approaches are not always effective.

Figure 3 Traditional approach for solving complex problems



Source: Conklin (2005, p. 9)

The IS discipline itself has questioned the feasibility of developing information systems in this way and has introduced more social, iterative and agile approaches (Checkland & Holwell 1998, p. 155; Stair & Reynolds 2008, p. 490). Rapid Application Development uses tools and technologies to speed the development of information systems (Stair & Reynolds 2008, p. 490). Computer-based tools are used to generate aspects of the system and the underlying code. Agile development methods allow for small sections of the system to be developed and put into production as a means of ongoing dialogue and requirement specification with business owners of the system before any more of the functionality of the system undergoes development (Stair & Reynolds 2008, p. 490). These approaches to systems development reduce the time taken to achieve a live system and minimise lengthy documentation (Stair & Reynolds 2008, p. 491). Nonetheless, they are methodologies with a prescribed structure and a deliverable end-product.

The development of an IS occurs around the notion of 'project'. Stair and Reynolds (2008, p. 498) report that 'even small systems development projects must employ some type of project management'. Project schedules, milestones, deadlines and critical paths are used to marshal the development of systems and the work of all

involved (Stair & Reynolds 2008, p. 498). Implicit in the traditional IS development methodology is that communication between the expert IS developer and other stakeholders takes the form of consultation (Avison & Fitzgerald 2006, p. 82).

Snowden (2000, p. 24) suggests that the work of IS is the work of experts following the well worn methodological path and producing closed solutions. The weight of the tradition and established practice of some 40 years is brought to bear in the development and management of systems to store, process and retrieve data and information using technological platforms in large organisations.

2.5.3 Differentiating from LIS and IS

Whilst IS and LIS have informed the practice of web IA, they remain disciplines and professions apart from the realities of structuring information on corporate websites. In general, IS and LIS professionals do not take carriage of the work of structuring and organising information on central organisational websites (Morrogh 2002a, p. 99). The provision and structuring of web information is relatively new in organisations (Morville & Rosenfeld 2006, p. 8) and this unstructured information or web content lives close to the surface of an organisation's entire repository of information. Many individuals within an organisation contribute to its creation and ongoing existence (Morrogh 2002a, p. 99).

The information spaces of the web and the library are significantly different (Morville and Rosenfeld 2006, p. 7). A library information environment is a comparatively ordered and known environment (Lambe 2007, p. 153) and is more commonly in the hands of expert information professionals. Likewise, IS is a purpose-specific, pre-web tradition for managing organisational information. Ciborra (2004, p. 9) suggests that 'the information systems field, with its rational views of knowledge, decision making, strategy, and orderly systems development, is based on a narrow model of rational, ideal actors'. It is the realm of procedure, planning and control with a high dependency on methods and modeling. In contrast, Morville and Rosenfeld (2006, p. 24) report that the web is composed of 'rich streams of information flowing within and beyond the borders of departments, business units, institutions, and countries'.

Dillon (2001, p. 29) notes the need for web IA to be differentiated from the pre-existing traditions, claiming that ‘the biggest obstacle to IA [for the web] becoming a distinct discipline remains its lack of unique methods and theories’. Examining the specific practice of IA in an organisational setting will expose the subtleties of this specific instance of organising corporate information and how it differs from the LIS and IS disciplines. In turn, those distinctions can be used to build unique methods and theories for web IA (Dillon 2001; Madsen 2009).

2.5.4 The use of taxonomies in organisations

Taxonomies are widely used in modern organisations to structure information and their use extends to the web. Morville and Rosenfeld (2006, p. 69) write that ‘the foundation of almost all good information architectures is a well-designed hierarchy or taxonomy’. The use of taxonomies in the modern enterprise is examined by Lambe (2007) who outlines the extremes in the nature of taxonomies.

Lambe (2007) suggests that order and standardization can only be applied to a small portion of the spectrum of taxonomies used within knowledge-based organisations. Changing standard schemes, ‘once designated, is usually a cumbersome, bureaucratically fraught process’ (Bowker & Star 2000, p. 3). Lambe (2007, p. 1) claims that ‘rigour and purity are two of the most intense seductions of taxonomy work’.

Biological taxonomies are paragons of consistency and purity of principle, but they are totally unlike taxonomies for knowledge work. Our messy, confused world of knowledge and information artefacts does not follow the simpler laws of genetics (Lambe 2007, p.xvii).

Many of the taxonomies for structuring organisational knowledge differ significantly from formal, published, standard classification schemes such as Dewey Decimal Classification used in libraries or biological classification schemes. Frequently in organisational use, taxonomies do not rely on codes, but semantics. ‘They provide a fixed vocabulary to describe their knowledge and information assets, and this vocabulary needs to be meaningful and transparent to ordinary users’ (Lambe 2007, p. 6). Semantic taxonomies are foundational in achieving the retrieval of information by the ordinary user (Bowker & Star 2000, p. 7).

Lambe (2007) emphasises the need for ongoing change and evolution for many taxonomies used to support the business endeavour and emphasises the process rather than the product. 'Continuing taxonomy work in an organisation is essential to keep a taxonomy relevant and alive' (Lambe 2007, p. 11). Taxonomies constructed to house web information are often created, modified and discarded in the cut and thrust of everyday change in large organisations. Mahon and Gilchrist (2004, p. xviii) confirm that order and stability in organising information on websites will always be a challenge, saying that web IA 'is a work in progress, given the rate of change in modern organisations'.

Bowker and Star (2000, p. 7) describe the overwhelming 'rummage sale' of information on the web where they claim that 'every link in hypertext creates a category. That is, it reflects some judgment about two or more objects: they are the same, or alike, or functionally linked, or alike as part of an unfolding series'. For Warner (2004), the ambiguous taxonomies of the web are labeled hierarchical navigation schemes; they are taxonomies that are based on language and all of its complexities.

Burford (2008) identifies the unique, ambiguous taxonomies that must be constructed to organise the content for the main organisational web presence and each sub-site within it as a distinct component of the practice of web IA. Within an organisational context they are frequently constructed for information delivered on the web in a complex interplay between business stakeholder, expert information architect and pressing business needs (Burford 2008).

2.5.5 Web Information-seeking behaviour

Claiming that the study of the way that people seek out information in a hypertext environment should strongly influence the development of theories and practices in IA, Hendry, Fisher and Mai (2006, para. 1) note that this is not always the case and warn against a relationship of 'mutual ignorance' between the fields of information behaviour research and IA. Whilst 'descriptive studies, models or theories of information behaviour should be important to information architects who seek to facilitate information behaviours by changing patches of the built world', Hendry et

al. (2006, para. 6) point out that these two fields do not always explore the ideas, methods and results of the other. They propose that ‘these two fields are uniquely positioned to benefit from each other’s unique perspectives’ (Hendry et al. 2006, para. 11).

2.5.5.1 Information foraging

The work of Pirolli and Card (1995, 1999), Spool (2004), Game (2005) and Pirolli (2007) goes some way to building beneficial connections between information-seeking behaviour in a hypertext environment and IA. Pirolli and Card (1995, 1999) first proposed a theory of information foraging for the retrieval of information on the web. Information foraging argues that people seek to maximise the rate at which they find sought-after information and minimise the cost. The cost includes the time taken to access, render and interpret information objects (Pirolli & Card 1995, 1999). During any information-foraging activity, people will adapt their behaviours and modify their strategies, continually assessing the profitability of one information patch in comparison to another potential source (Pirolli & Card 1999). Game (2005, para. 4) describes information foraging theory thus:

Like animals who search for food in the wild, Pirolli suggests that humans optimise their information searches by looking for the greatest benefit with the least cost. He goes on to say that humans judge the value of unseen information resources based on guesses about immediately available cues.

This perspective is based in optimal foraging theory, which draws on evolutionary psychology (Spink & Cole, 2006, p. 27). Information needs become a human need for survival, causing foraging behaviour within the information environment or commons.

Information foraging theory extends to include the notion of the ‘scent of information’ (Pirolli & Card 1999). ‘The proximal perception of information scent’ (Pirolli & Card 1999, p. 646) describes the cues and indicators in the close vicinity that guide information foragers in their search. It describes the extent of the pull or attraction of the words of a link for a person seeking information. Information scent refers to the perception of value or utility an action may have to users when they are trying to decide which path to follow in their search for information. The role of

information scent is to guide users to the target information they seek. Chi, Pirolli and Pitkow (2000, p. 162) describe information scent as:

The imperfect, subjective, perception of the value, cost, or access path of information sources obtained from proximal cues, such as web links, or icons representing the content courses.

This proposed theory and its ongoing development (Pirolli & Card 1999; Pirolli 2007) have contributed to a body of professional knowledge that allows information architects to improve the information scent of a website. The most evident and utilised cues or indicators on websites are the textual labels on hypertext links that represent the content of the associated page (Spool 2004).

More pragmatically and specifically, Spool (2004) describes the way that scent works. Users approach information spaces with a specific mission in mind. Users first scan the page for 'trigger words' – the word or phrases that trigger their clicking on a given link. If they don't find appropriate trigger words, they'll often resort to the site's search function. Users deduce part of a link's scent from its proximity to related links or icons. Groups of links can increase the scent of each individual link contained in the group.

Spool (2004) continues to bridge the research in human information behaviour and the practice of IA in making specific design recommendations such as:

1. Use longer phrases where you can – a longer link is more likely to contain the right trigger word/s.
2. Design labels carefully using 'trigger' words – words that provide the right cues or motivation or 'scent' to continue down a path.
3. Expose as much content with navigational labels as possible.
4. Avoid ambiguous labeling and make sure all labels can be differentiated from each other by a user.

In Spool's (2003a) earlier research, he established that, when users are on the right track to finding the content they are seeking, they usually know it – they are confident and can predict their own success. Users expect every click to make them more confident that they will find their result. When the page that results from a click does

not increase the users' confidence, their frustration increases and they consider abandoning the quest. As long as their confidence value stayed high, users were prepared to follow long paths and were very likely to be successful. Spool (2003a) also claims that returning to the homepage is a clear indication that a user has lost the scent and suggests that secondary navigation, such as site maps and forward/back buttons, can hinder a user by 'breaking the scent' and taking users away from what they are seeking.

Ongoing research resulting in information foraging theory informs the IA design process. Spool (2004) has followed the work of Pirolli and Card (1999) by taking the theory into design practice. The subtle results and insights have resulted in powerful knowledge for practising information architects.

2.5.5.2 Other theories of user behaviour

Spink and Cole (2006) take the information-foraging approach put forward by Pirolli and Card (1999) and attempt to integrate it with prior conceptualisations of how humans seek information. Spink and Cole (2006), in attempting to integrate these approaches to human information behaviour, note that the incorporation of another dimension (evolutionary psychology) to the traditional library and information science approach enriches and informs a broad, umbrella model of human information behaviour. Spink and Cole (2006, p. 33) see great benefit in incorporating evolutionary psychology theory into the more traditional library and information science concepts and models because information, from an evolutionary psychology perspective, is then elevated 'from a secondary to a fundamental human need'.

Katz and Byrne (2003) investigate the way that users of websites obtain specific information and their choice between using a site-specific search or traversing the menu system. They claim that 'information scent can play a large role in a user's decision to traverse the menu system or use the site search function' (Katz & Byrne 2003, p. 201). Strong information scent was a key determinant of the decision to use the menus and this choice was made even in the presence of a prominent search function if the scent was strong. Katz and Byrne (2003, p. 219) also considered the

breadth and depth of information structures on a website and its contribution to information scent and determine that ‘very high menu breadth (i.e., more than 20 items) does not decrease the scent of information or menu usage’.

Suggesting that uncertainty is an underlying heuristic in an IA, Kalbach (2009) links it to information-seeking behaviour in the online environment. He associates user uncertainty to the breadth and depth of an IA (Kalbach 2009, p. 50), suggesting that obtaining the right balance in the structure of an IA will go a long way to alleviating user uncertainty. He also applies the uncertainty construct to the work of Pirolli and Card (1995, 1999) on information scent in the online environment. Kalbach (2009) claims that user uncertainty is reduced with attention to the labeling of information in the form of trigger words.

Toms (2002) explores the relationship between human information interaction and information architecture and describes IA as a contributing component of information interaction. She expands on her earlier model (Toms 1997) of information interaction to discuss the place and role of IA. Toms’ model proposes that users interact with content by iteratively selecting a category, noting cues that affect direction decision making, and then reading and extracting information. The success of these three processes or components of information interaction, argues Toms (2002), is heavily dependent on the effectiveness of the IA. In this process, Toms (2002) claims that the state of the user changes with time and is not reproducible in any way – every information interaction is unique. This variability sets up a significant challenge in the design of an optimal IA.

Toms (2002, p. 859) describes IA as providing a blueprint to the content and states that ‘in information interaction a user interacts with a system to examine an information blueprint’. The use of the term ‘blueprint’ for the actual content structure is at odds with the more accepted use of the term to describe a plan or map of the information structure to be built (for example, Morville & Rosenfeld 2006, p. 296; Wodtke 2002) – rather than the information space itself. Yu and Roh (2002) published their exploration of the effects of the visual design of menus on the effectiveness of a web IA in supporting an information seeker. Yu and Roh (2002, p.

925) define web searching as information seeking with a specific and directed goal, and suggest an optimal menu system as:

providing users with an efficient and effective organisational model that can help them understand the whole system and navigate through the hypertext system to find information without getting lost or experiencing cognitive overload.

Yu and Roh (2002) set up an identical hierarchical information structure on three sites with different implementations of menu systems. Their research concluded that users performed more efficient web searches for specific information when using pull-down menus than using simple menus or menus with both global and local navigation. They suggest that drop-down menus offer a direct and flexible path mechanism with fewer steps to locate the searching target. Yu and Roh (2002) established that users who were 'browsing' – that is, having a general objective but not seeking a known item – were equally successful with drop-down and global and local navigational menus.

Risden (1999) proposes a quantitative usability evaluation of browse hierarchies for the web. The study aimed to determine the usefulness of tracking user traversal patterns through a given web taxonomy when presented with information retrieval tasks. This was done with the aid of a software tool that presents a hierarchical organisation of information and records user paths as they retrieve information. This approach excluded any other interface complexity and focused on the information design itself.

Risden's (1999) study assumed that accessing many categories in a search for specific information revealed user confusion with the taxonomy itself. Risden (1999) then went on to diagram a 'structure' of the confusion in a quest to reveal the problem. A network representation of high-level categories that were significantly confused with other high-level categories was presented, indicating that there was a significant problem with the hierarchy. To determine whether overly general labels were the source of the confusion, another set of users were asked to rate the category labels for similarity. The correlation between similarity and confusion frequency was high. Risden (1999) concluded that analysis of the traversal data and mapping of

‘confusion’ clearly revealed usability problems with the information architecture and resulting information scent that was presented to them.

2.6 Knowledge, learning and practice in organisations

This section of this chapter examines the literature of knowledge and organisational studies and talks of the presence and flow of learning, knowing and expertise in organisations particularly as they carry out epistemic work. It includes the learning of individuals and of organisations as they advance their knowledge to meet the challenges of change and innovation. When learning does not occur, particularly amongst decision makers, a mindlessness is exposed that affects a practice. Practice theory importantly adds credence to the study of situated activities with a specific pattern and goal within an organisation and enactment talks of discovery as a result of action. These literatures have been found to underpin and inform much of the constructed theory of the practice of web IA that is described in chapter five and six of this thesis.

2.6.1 Organisational learning

The literature acknowledges and debates the differences between the terminologies of *organisational learning* and *learning organisations*. Organisational learning is generally claimed (Sun & Scott 2003; Goh 2003; Burnes, Cooper & West 2003) to be based in social and cognitive psychology with a focus on the learning processes in organisations. It is also a field that is concerned with the production of instrumental knowledge (Gherardi 2006, p. 5). It investigates the characteristics of organisations that foster learning and the nature of how that learning occurs in order to improve these phenomena in organisations (Gherardi 2006, p. 5).

The notion of *learning organisations* presents an archetypical organisation that offers an ideal environment and set of practices in which learning can flourish (Sun & Scott 2003; Burnes et al. 2003; Senge 1992). Gherardi (2006, pp. 3-4) claims that the *learning organisation* is a realist reaction to the juxtaposing of the concepts of learning and organisation that creates the identity of an actual organisation with

characteristics that can be measured and compared. Others suggest that *learning organisations* is a realm that is practice-oriented and prescriptive in nature (Argyris 1999, p. 1; Tsang 1997, p. 73). Senge (1992) attempts the prescription of a *learning organisation*, claiming the great value of systems thinking as a discipline to integrate all other disciplines and to perceive organisations as a whole rather than reducible to their components. Senge (1992, p. 3) makes a popular contribution to how organisations might become places:

Where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together.

The use of the term *learning organisation* is less frequent in recent days, claim Burnes et al. (2003), because the idealised state is so far from reality and reach.

Sun and Scott (2003) see great value in integrating the two streams of learning in organisations and suggest a broader theoretical framework to bridge the different schools. They suggest that until organisational learning theory provides a clearer understanding of learning processes, prescriptions for implementation of learning initiatives are likely to stumble. Until the barriers to learning transfer are identified, the *learning organisation* will always remain elusive (Sun & Scott 2003).

Whilst Stacey's (2003b, p. 331) challenge to the notions that organisations can learn could be interpreted as technically correct by scholars of traditional cognition learning theory, it can also be countered by semantics and the volume of scholars (for example, Sun & Scott 2003; Argyris & Schon 1996) who view collective learning within organisations as being an attribute of the organisation as much as the individual. Gherardi (2006, p. 7) assures us that *organisational learning* was metaphorical in origin and should continue to be used that way. In viewing organisational learning as a 'live-metaphor', 'a means to represent an organisation as if it were a system that learns', Gherardi (2006, p. 7) proposes that the focus should be on revealing the knowledge that could be yielded by this metaphor rather than attempting to precisely prescribe the learning processes present in organisations.

Cressy, Boud and Docherty (2006, p. 12) write that learning in organisations, whether individual or collective, means ‘going beyond rules and procedures’. This notion is inherent in the pioneering work of Argyris and Schon (1978, 1996), who propose levels of error detection and correction in organisations as a measure of learning. According to Argyris and Schon (1996, p. 20), single-loop learning occurs when the need for change in the current norms, practices and processes is identified. The underlying and deeply held values, beliefs and assumptions, or ‘theories-in-use’ that shape organisational processes, are not challenged until double-loop learning or second-order error correction takes place (Argyris & Schon 1996, p. 21).

Learning in organisations is strongly associated with achieving competitiveness and prosperity. There will be longer-term benefits to the organisation as a result of its attention to and shaping of the learning that takes place within (Massingham & Liment 2009; Goh 2003; Ng 2009; Weldy 2009). Burnes et al. (2003 p. 452) see two major drivers for organisational learning: the pace of change and the competitive threat posed by globalisation. An agile ability to learn and adapt is needed to compete in volatile, complex and increasingly global markets (Burnes et al. 2003).

A number of scholars hold that organisational learning theory presents a necessary shift from cognitivist and individual learning to the learning of the collective (see for example, Applebaum & Goransson 1997; Gustavsson & Harung 1994; Grieves 2000). This focus on the active, participatory and collective nature of learning in organisations has spawned a debate of the nature of knowing and learning in ‘activity and process which unfolds over time’ (Gherardi 2009a, p. 353). The growing conversation around practice-based studies and the active nature of learning and knowing are explored in the next sections of this chapter.

2.6.2 Knowledge and situated practice

2.6.2.1 Knowledge in action

Since Drucker’s (1994, p. 20) original assertion that the world economy is increasingly based on the production of ideas and information as opposed to one based on manufacture and production of goods, the reality of a knowledge economy has been adopted by more and more scholars (see for example, Blackler 1995;

McElroy 2000). A corresponding and significant focus has been applied to knowledge management in organisations. Knowledge management 'is concerned with the leveraging of existing knowledge in an organisation and creating new knowledge in the process' (Rajan, Lank & Chapple 1998, p. 2) and has enjoyed great attention in literature and organisational practice over the last two decades (Koenig 2008). This surge of interest in knowledge management as a management lens has led to renewed exploration of the nature of knowledge in organisations. Attention has been given to knowledge within organisations from the perspective of activity – the situated achievement of complex tasks (Blackler 1995; Brown & Duguid 1999; Cook & Brown 1999; Orlikowski 2002; Tsoukas 2005).

Brown and Duguid (1998) contribute to the consideration of knowledge as action, claiming that 'know-how' and 'know-what' knowledge are both essential components of a core knowledge competency in any organisation. 'Know-how is critical in making knowledge actionable and operational' and 'know-how embraces the ability to put know-what into practice' (Brown & Duguid 1998, p. 31). Whilst noting that work activity creates knowledge, Brown and Duguid (1998) continue to conceptualise know-how as objective knowledge about a practice or needed action.

Cook and Brown (1999, p. 381) describe knowledge, both tacit and explicit, as having an 'epistemology of possession'. They interpret knowledge as static. Humans possess knowledge about things and how to do things, but it is when they act with that knowledge that there is a shift to knowing. Knowledge and knowing are quite different – there is more epistemic work in action than in the knowledge that is possessed. Cook and Brown (1999) use the example of riding a bike to demonstrate. Knowledge about bikes and how to ride a bike is possessed and static. When the bike is actually ridden, there is further 'epistemic work that is done as part of action' (Cook & Brown 1999, p. 387) – this is knowing. Cook and Brown (1999, p. 381) claim a 'generative dance' between organisational knowledge and organisational knowing. Knowledge is a tool that brings discipline to knowing and the practice and engagement of knowing can create new knowledge.

Dissatisfied with prior notions of knowledge and knowing in organisations – both the static and separate notions of knowledge and 'the stable disposition embedded in

practice', Orlikowski (2002, p. 249-250) turns to the study of 'an ongoing social accomplishment, constituted and reconstituted as actors engage the world in practice'. Blackler (1995) had earlier explored this conception of knowledge as action, preferring the term 'knowing'. He describes the active process of knowledge as 'mediated, situated, provisional, pragmatic and contested' (Blackler 1995, p. 1021).

Viewing organisations as systems of knowledge, Tsoukas (2005) emphasises the 'crucial role of human interpretation, communication, and skills in generating effective organisational action' (Tsoukas 2005, p. 3). He claims 'the locus of individual understanding is not so much in the head as in the situated practice' (Tsoukas 2005, p. 3). Complex forms of knowing that see 'the world as being full of possibilities, which are enacted by purposeful agents embedded in power-full social practices' are part of organisational life (Tsoukas 2005, p. 5).

2.6.2.2 Situated practice

Ciborra (2006) traces the notion of *situatedness* used variously by scholars. He outlines the early use of the term by Heidegger in 1962, who used the term to stay close to 'everyday factual life' (Ciborra 2006, p. 138). 'A rich and multiple notion of situation, in which inner life is as important as surrounding circumstances, where the pre-theoretical is preserved by giving space to the moods, emotions and dispositions not linked to thinking' is Ciborra's (2006, p. 138) description of earlier notions of situatedness. More recent use of the term (Suchman 1987, Lave & Wenger 1991) also builds distance from the cognitivist and rationalist theories. Ciborra (2006, p. 131) claims, however, that the use of situatedness is often limited to 'context' or 'emerging circumstances of action and knowledge' and that it lacks a consideration of the inner life or situation of the actors. Whilst Lave and Wenger (1991, p. 33) are able to say 'that there is no activity that is not situated', they apply situatedness only to learning and knowing, omitting the emotional life of the actors that is attended to by Heidegger (1962).

When the knowing involved in situated activity is taken into the work and organisational context, Cook and Brown (1999) use the term *practice*, which they define as 'the coordinated activities of individuals and groups in doing their "real

work” as it is informed by a particular organisational or group context’ (Cook & Brown 1999, p. 386). Shaw (2002, p. 119) writes of a similar understanding of practice. It is usually interpreted, she suggests, as ‘patterns of activity that can be mapped and grasped as wholes distinct from the persons acting in particular times and places’. From concepts of roles and jobs, professions and practice can be created. Bjorkeng, Clegg and Pitsis (2009, p. 145) describe practice as ‘novel patterns of interaction developed into predictable arrays of activities, changing and transforming while at the same time continuing to be referred to as ‘the same’’. The nature of practice is not individual, nor is it universal, write Brown and Duguid (1996, p. 51). It is very much a situated, collective activity.

Suchman, in 1987, made a prior and major contribution to the development of thinking about practice by examining the relationship between situated action and planning for that action. Suchman (1997, p. 50) brings the focus of intelligent action into the circumstances or situation where it takes place and away from attempts to abstract action and ‘represent it as a rational plan’. Suchman (1997, p. 52) claims that:

it is frequently only on acting in a present situation that its possibilities become clear, and we often do not know ahead of time, or at least not with any specificity, what future state we desire to bring about.

Plans and accounts of our actions say more about the nature of our analyses than our situated actions. ‘Our descriptions of our actions come always before or after the fact, in the form of imagined projections and recollected reconstructions’ (Suchman 1987, p. 51). She sees value in scrutinising and describing everyday social practices, to ‘render our world publically available and mutually intelligible’ (Suchman 1987, p. 57), but emphasises that these descriptions do not determine situated activity.

Gherardi (2009b) sees practice as a powerful concept in managing and organising studies because of the plurality of its semantic possibilities. ‘Practice is a malleable term which can be put to numerous uses and employed to denominate many aspects of the phenomenal reality under study’ (Gherardi 2009b, p. 116). Gherardi (2009b, p. 115) sees more to practice than just ‘routine’ or ‘what people really do’, with the actor as central to the notion. For her, practice is located in the significant pattern of

how conduct or activity takes place. 'Theories of practice assume an ecological model in which agency is distributed between humans and non-humans and in which the relationality between the social world and materiality can be subjected to inquiry' (Gherardi 2009b, p. 115). Research using a practice-based approach exhibits a desire 'to shed new light on organisational phenomena by getting closer to the "real" work in organisations' and a move away from structural notions of organisations (Geiger 2009, p. 129).

Geiger (2009) points to two main camps of practice-based studies: the first, 'practice as what actors do', focuses on the analysis of actions, routines and activities within organisations (Geiger 2009, p. 131). 'This 'performative' understanding of organisational practices/routines emphasises the processual nature of practices/routines and places actions and their respective actors as central to our understanding of process' (Geiger 2009, p. 131). The theoretical construct of practice is of less interest than the revealing of the processual nature of the phenomenon under study.

In his second suggested stream of practice-based study, Geiger (2009, p. 132) finds 'practice as epistemic-normative concept'. Gherardi (2006, p. 34) agrees with the notion of practice as ordering and normalising, defining practice 'as a mode, relatively stable in time and socially recognised, of ordering heterogeneous items into a coherent set'. She adds that practice constrains and forbids some alternatives and choices, while approving others as preferable or easier. Thus, practice becomes a normative construct where 'actors share a practice if their actions are appropriately regarded as answerable to norms of correct or incorrect practice' (Rouse 2001, p. 190).

Practices are made socially recognisable or legitimised by being stabilised and institutionalised (Lawrence & Suddaby 2006; Gherardi 2009a, p. 356). Practices stabilise to provisional agreed ways of doing things – even if that understanding is contested (Gherardi 2009a). A negotiated, shared and recognised way of working collectively means that practices shift and evolve from a relatively firm, but not fixed, foundation. In this way, the identity of both practitioners and the practice is established and can be observed from outside the practice (Gherardi 2009a, p. 356).

For many, practice is also about knowing (see for example, Gherardi 2006, 2009a; Marshall 2008); hence the epistemic attribute given by Geiger (2009). Bruni, Gherardi and Parolin (2007, p. 85) claim an equivalence between knowing and practice 'in the sense that practising is knowing-in-practice'. For Gherardi (2006, p. 14), learning and knowing are not separate practices, they are embedded in everyday practices and flow of experiences and are part of human existence. Knowledge is viewed in non-thinking, anti-cognitivist terms. Strati (2007) explores how people work and know with their bodies. Sensory and aesthetic knowledge is also a part of practice and will not allow abstraction and representation. Practice-based studies in general provide a counter to the extensive use of cognitivist and rational approaches to understanding work in organisations (Gherardi 2006, p. xii, 2009a). But Gherardi (2009a, p. 355) also claims that many practice-based studies do not support the dualism of mind/body, knowing/doing. For her, practice is found at the place of union of these extremes (Gherardi 2009a).

Gherardi (2009a, p. 354) finds place in her notions of practice for 'materiality'. Objects, tools and artefacts embody knowledge and 'anchor practices in their materiality'. Thus, practice-based studies are well placed to extend from social considerations to include the technology of work.

Bjorkeng et al. (2009) follow the development and establishment of a practice from its beginning. Established practices are always changing and evolving, but Bjorkeng et al. (2009) move their attention to practices that are still becoming recognised, practices that are yet to stabilise. Neither propositional knowledge, nor shared understandings, skills, habits or goals can be assumed. Bjorkeng et al. (2009, p. 149) find three important mechanisms in becoming a practice. Firstly, *authoring boundaries* is their explanation of the constant and energetic construction of rules and norms. Without the silent sanctioning and legitimacy of established practice, much energy is expended on boundary establishment. Secondly, once activities have been constructed as belonging to the emerging practice, *negotiating competencies* will take place. Nascent practices construct the expectations and norms of competence (Bjorkeng et al. 2009). Thirdly, *adapting materiality*, is proposed. The necessary tools for the practice are established in myriad forms such as technologies, plans,

budgets and physical spaces. The ‘becoming’ practice will adapt and optimise artefacts and material objects that will become intrinsically bound and part of the practice (Bjorkeng et al. 2009, p. 153).

2.6.2.3 Expertise

Code (1991) writes that people frequently have no choice but to utilise expert knowledge, because no individual is capable of acquiring the amount of knowledge that they will need to function in society. ‘It is simply part of the division of intellectual labor essential to the smooth functioning of complex epistemic communities’, claims Code (1991, p. 182). Fleck (1998, p. 143) also attributes the growing importance of expertise to the rise of the ‘knowledge society’.

Expertise, claims Saviotti (1998, p. 48), can reside in an individual or an organisation and differs from knowledge in that it stresses the critical ability to obtain outcomes on the basis of knowledge. Deployment and exploitation of knowledge are also part of expertise for Fleck (1998, p. 145). Fitzpatrick (2003, p. 101) writes that ‘embodied knowledge is the essence of expertise’.

Ericsson and Smith (1991, p. 2) seek to develop a general theory of expertise, applicable in a wide range of domains, and define this endeavour as seeking to ‘understand and account for what distinguishes outstanding individuals in a domain from less outstanding individuals in that domain, as well as people in general’. Immediate comprehension in experts occurs as a solution method is automatically evoked. A body of knowledge is more extensive and more efficiently accessed in the mind of an expert (Ericsson & Smith 1991, p. 21). Gherardi (2006, p. 33) supports this notion, saying that ‘an expert’s practical knowledge resides in the ability to understand immediately’. Patel and Croen (1991, p. 93) add that, on presentation of information about a problem, an expert will quickly discern if it is relevant and integrate it into a known solution method. Novices, claim Ericsson and Smith (1991, p. 20), must deliberately construct a step-by-step solution for an equivalent task.

Performance is improved by the amount of practice, but the practice should not be confused with mere exposure or experiences (Ericsson & Smith 1991, p. 27).

Practice comes replete with complexity and feedback. Camerer and Johnson (1991,

p. 200) claim the benefits of training and formal instruction in the production of an expert. Thus the activity of experts relies on engagement ‘in a number of complex mental activities involving reasoning that relies on mental models and internal representations’ (Ericsson & Smith 1991, p. 31). These same cognitive efficiencies are seen as ‘limitations’ by Hinds and Pfeffer (2003, p. 8) when they consider the explanations given by experts to novices. Even when willing to share knowledge, experts ‘may face the challenge of not being able to revert to a level of concreteness and detail that is needed by novices to understand and build their own expertise at the task’ (Hinds & Pfeffer 2003, p. 8). Fitzpatrick (2003, p. 102) confirms that expertise, as embodied knowledge, is difficult to make explicit and often needs ‘triggering’ in order to be shared.

Along with knowledge, Fleck (1998) examines power and tradeability as facets of expertise. With expertise comes ‘status or a position of control and influence within an organisation’ (Fleck 1998, p. 145). Thus, expertise is not neutral; rather, it embodies ‘social relations within which power is mediated and reproduced’ (Fleck 1998, p. 147). Fleck (1998, p. 147) offers the ‘tradeability’ of expertise – an examination of the ‘diffusion of efficient practice across an economy’. He incorporates the trade or exchange of expertise, patents and ‘the job’ as aspects of the tradeability of expertise.

2.6.3 Situated learning

Barley (1996, p. xiii) suggests the conceptualisation of learning as a situated phenomenon ‘promises to contribute significantly to both occupational and organisational studies’. Whilst Lave and Wenger (1991) were not the first scholars to acknowledge that learning takes place in contextual social activity, their seminal work in 1991 is credited with a *situated learning theory* that renewed interest in this field and introduced the notion of *community of practice* (Huzzard 2004, p. 351). Lave and Wenger (1991, p. 29) claim that ‘the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community’. Huzzard (2004, p. 352) describes situated learning theory and contrasts it to ‘mainstream’ accounts of learning:

Knowledge is socially constructed: when actors draw on new “knowledge” they attribute new meaning to it, contextualise it locally and translate it into practice through everyday interaction. New understandings are then generated retrospectively through collective reflection. Accordingly, learning has a relational character whereby the negotiation of meaning is pivotal. Although such learning can be triggered by information obtained from external sources, it is nevertheless more appropriately defined in terms of the (social) negotiation of meaning during its contextualisation rather than the receipt and storage of “facts”; for example the content of training manuals.

Lave (2008, p. 5) considers situated social practice as a version of ‘everyday life’ as she explores the learning that occurs in the ‘lived-in world’. In doing so, she moves away from the conceptual-mental way of viewing human learning and into the ‘site of praxis, pragmatics and social practice’ (Lave 2008, p. 4). All too often learning is associated with withdrawal from ordinary life and the thing to be learned, for contemplation and formal distanced learning. When learning is reified in ‘formal stints of mentally internalising knowledge’, disturbing divisions are created between learning and using that learned knowledge (Lave 2008, p. 10). The duality that we can learn or live, but not in combination, is encouraged, and we are not able to see that what we are doing in everyday life, or situated social practice, constitutes learning. Polarised distinctions between learning and doing, learning and living, and learning and using knowledge are created (Lave 2008, p. 12).

Rather than live with this polarity, Lave (2008, p. 13) suggests acknowledging learning as a part of everyday life and seeing it as a social, relational, de-centred process that occurs in situated practice – rather than preparing for it. She suggests a renewed consideration of ‘apprenticeship’, where partial participation takes place at the site of ongoing, multiple and interrelated practice. The effect of this notion of learning would be to minimise the polarities of knowers and novices, and knowledge production and reproduction (Lave 2008, p. 13). Situated learning or learning by participating in social practice ‘contests the assumption that learning is a response to teaching’ (Brown & Duguid 1996, p. 48). Rather, it takes place as an uneven, unfinished series of circumstances and interactions, whereby newcomers participate in authentic social practice and learn in the doing. Brown and Duguid (1996, p. 49) describe the outcome of situated learning as ‘stolen knowledge’ – knowledge acquired without teaching.

Brown and Duguid (1996) emphasise the need for learning in situated practice because much of what occurs in actual practice cannot be made the subject of explicit instruction. Instruction therefore is inevitably partial and often an incoherent account of practice. Implicit and inherent aspects of practice by their very nature are dynamic, and they change and evolve with the practice as it ‘develops new routes across the domain’ (Brown & Duguid, 1996, p. 50). Brown and Duguid (1996) argue that any explicated and abstracted accounts of practice should arise from the specific situated activity. ‘Problems arise, then, not through abstraction *per se*, but rather through the detachment of abstraction from the practices in which they were created or when imposed from another practice’ (Brown & Duguid 1996, p. 50). Abstractions are only valuable when they are kept close to the experienced complexity of practice and cause problems when they are interventions from outside (Brown & Duguid 1996, p. 50).

Lave and Wenger (1991, p. 29) label social, focused activity and achievement as ‘communities of practice’. Within supportive communities of practice, complex learning can take place with minimal instruction write Brown and Duguid (1996, p. 51). A competent member of a community of practice has a ‘demonstrated ability to ‘read’ the local context and act in ways that are recognised and valued by other members of the immediate community of practice’ (Contu and Willmott 2003, p. 285). Yet both Contu and Willmott (2003) and Huzzard (2004) warn against an idealistic view of communities of practice, noting that they are enabled and constrained by relations of power and control. Contu and Willmott (2003) point out that the popularising of Lave and Wenger’s original thinking on communities of practice has painted a rosy picture of support, consensus and stability as a locale of knowledge reproduction and transfer. Rather, they claim, relations of power will always be at play and must be recognised.

Lave and Wenger (1991, p. 27) put forward the notion of ‘legitimate peripheral participation’ and describe it as the involvement of novices in situated work practices who are learning but are not pivotal member of the practice community. Whilst learning, the novice remains at the edge or periphery and lacks full acknowledgement’ or ‘membership of the practice’ (Lave & Wenger 1991, p. 27).

Huzzard (2004, p. 350) notes that this brings a power imbalance within a situated learning environment and that communities of practice can also be ‘communities of domination’.

2.6.4 Enactment

Enactment is a component of Weick’s (1979) framework for sense-making in organisations. Sense-making is presented as a retrospective process in which a ‘world of experience is converted into an intelligible world’ (Weick 2001, p. 9). The nature of sense-making is to tentatively create enough understanding to improve the ongoing effort – there is no pre-existing reality to be understood (Weick 2001, p. 8). This image of sense-making is well presented by Fay (1990, p. 38) – ‘there is no body here but us scratching around trying to make our experience and our world as comprehensible to ourselves in the best way we can’. Sense-making is the human process of creating a sense of order and understanding and a temporary guide for subsequent action (Weick 2001, p. 11).

Weick (1979, p. 130) presents a model with four sequential elements that outline the process of understanding and coping with the surrounding organisational environment by those that work within it. The four elements are *ecological change*, *enactment*, *selection* and *retention*. Enactment, an early component of the sense-making sequence, provides a focus on action and on how ‘people act their way into explanation’ (Weick 2001, p. 176). It is often in the doing that knowing is produced. ‘Cognition lies in the path of action’, states Weick (2001, p.viii). A dynamic and occasionally chaotic process, enactment is full of trial and error. Saetre, Sornes, Browning and Stephens (2007) claim that the notion of enactment leaves behind passivity and receptivity and creates active organisational members.

We must act out our puzzles and concerns and in doing so become part of them and their solutions. Weick (2001, p. 177) argues that people create their environments by their actions and improvisations and can be subsequently constrained by the very environment which they have had a hand in constructing. He is of the opinion that environments created in this way come into existence by ‘acts of invention’ (Weick 2001, p. 188) rather than discovery. For Weick (2001), there is no separate and

underlying environment to be discovered; it can only be created. Enactment ‘blurs the traditional distinctions between environments and organisations’ (Orton 2000, p. 231). An environment that is dynamic and not fully understood is a necessary prerequisite for enactment. Ongoing ecological change is necessary for the processes of building understanding through activity to occur. The improvisation or activity that occurs within the ecology to make sense of it feeds back into the environment with additional changes and shifts (Weick 2001, p. 12).

Through enactment, those engaging in organisational work can determine which activity produces more favourable circumstances and results. They improvise to improve the situation and their understanding of it and then adopt some of the actions that with hindsight, are known to produce favourable outcomes (Weick 2001, p. 63). It can be necessary to ‘bracket’ (Weick 2001, p. 186) the flow of experience to interact with it – to single out a particular aspect of the environment and give it closer attention in an attempt to comprehend it. It is those activities that prove beneficial that prevail and are retained in the process of sense-making (Weick 2001, p. 176). The end product of enactment is an invented causal map or network of causal sequences in the minds of individuals that brings some order and understanding to ‘a stream of experiences’ that have demanded engagement and activity (Weick 2001, p. 186).

There is an aspect of control in enactment – actions are taken in order to increase the understanding of a problematic situation and bring it under control. In achieving this superimposed sense of order, it is reasonableness, claims Weick (2001, p. 194), that is achieved, rather than accuracy. If enactment leads to a reasonably functioning set of strategies, they are retained and the need for further trial and error ceases.

The construct of enactment has been applied to a large and varied number of studies within organisations. It has been used in the exploration of organisational redesign processes (Orton 2000), strategic management (Mir & Watson 2000) and cultures of entrapment (Weick & Sutcliffe 2003). Enactment has proved a useful lens for the consideration of any novel and quickly evolving set of practices and requirements within an organisation. ‘People act their way into clearer identities by learning from retrospective interpretation of the improvisations necessary to handle discontinuous

work assignments' (Weick 2001, p. 177). The relative newness of producing effective web information designs calls for improvisation and action with the promise that cognition, knowledge and favourable strategies will follow.

2.6.5 Mindfulness/mindlessness

The construct of mindfulness was first defined by Langer (1989) and further described in applications to learning in her 1997 book, *The Power of Mindful Learning*. Langer (1997, p. 4) describes three characteristics of mindful approaches to any activity: 'the continuous creation of new categories; openness to new information; and an implicit awareness of more than one perspective'. Mindlessness, then, is the other side of the coin, where activity is approached with the restriction of existing cognitive categories or concepts, not attending to new information or signals and a focus on a single perspective. 'Mindfulness is the process of drawing novel distinctions' (Langer & Moldoveanu 2000, p. 1). It encompasses a full awareness of contexts and perspectives and a heightened sense of involvement in the present.

Weick and Sutcliffe (2006) extend the work of Langer and examine the construct of mindfulness afresh. They describe Langer's notion of mindfulness as a process of distinction making and a focus on discriminatory detail that invariably leads to the formation of categories. They make the point that in the 'shift from perception to conception' a threat to the rich awareness of any phenomena exists (Weick & Sutcliffe 2006, p. 516). Adopting what they describe as a more Eastern perspective, Weick and Sutcliffe (2006, p. 518) describe mindfulness as being 'about reducing distraction and holding an intended object in mind'. Their emphasis is on sustained and focused attention to a matter that would be closed and limited by conceptualisation. It is more about noticing nuances, discrepancies and small oddities that may indicate that a situation is not fully understood or captured by any given or existing concepts. Weick and Sutcliffe (2006) claim that potential pitfalls and opportunities in the workplace can be detected by this state of mindfulness.

Saetre et al. (2007) successfully merge the notions of enactment and mindfulness and apply them to the use of media in organisations aiming to more fully understand how people choose and use media in the workplace. They use the notion of 'scripts'

(Saetre et al. 2007, p. 137) to describe the personal retention of patterns of activity and behaviour appropriate for a given situation. Scripts are the end product of enactment and Saetre et al. (2007) claim they are a more appropriate way of describing the learned patterns of work practices because they chart behaviours as well as causal relationships. When these scripts are invoked consciously, mindful behaviour is exhibited. According to Saetre et al. (2007), mindlessness occurs when scripts or patterns of behaviour are used with little consciousnesses of the surrounding circumstances.

Saetre et al. (2007) claim that enactment can alter the state of mindlessness. The performing, doing or acting out of an unsolved problem can form new 'scripts', mental models or categories. 'Enactment is usually mindful as social actors co-create their own working environments' (Saetre et al. 2007, p. 138). They go on to say that enactment can also be mindless with the unconscious invoking of scripted behaviour, and Weick's (2001, p. 176) agrees that enactment is not always productive and is at times 'simply messing up 'the scene of the crime' thereby making it impossible to see what really happened'.

Langer (1994) explores the concept of mindfulness/mindlessness in relation to decision making. She claims that many of the behaviours of decision making, such as 'integrating and weighing information' that have been presented as options are mostly post decision activities (Langer 1994, p. 34). A cognitive commitment is the point of decision making and it can happen well before a formal evaluation of options. Cognitive commitment can engender mindlessness. Langer's (1994, p. 39) model of active or mindful decision making includes participatory engagement by the decision maker in option generation who thus comes to know more about the matter under scrutiny. For Langer (1994) enactment and engagement are needed to make mindful and effective decision.

Weick and Sutcliffe (2006) warn that unusual or abnormal occurrences must not be normalised or ignored when making decisions. Attention paid to what does not fit our pre-existing categories will improve the outcomes of decision making. Snowden (2000, 2002) and Lambe (2007, p. 135) strongly recommend mindfulness and awareness and encourage a deep knowing of the environment and culture in which

the practice of information organisation takes place, in order to be more effective and minimise problems.

2.6.6 Liminality

‘Liminality’ refers to ‘the condition of being betwixt and between, of existing at the limits of existing structure’ (Tempest & Starkey 2004, p. 507). Those working in new or temporary positions can lack the assurance of a well defined place in an organisational structure and of a traditional and established profession – they are ‘inhabitants of new territory’ (Gornall 1999, p. 48). Those in newly developed professions are described by Gornall (1999, p. 48) as ‘threshold people who fall on or between the boundaries of categories’ of workers in an organisation. New organisational roles and work, such as that of web IA, can be viewed through a lens of liminality. Gornall (1999) applies the concept of liminality to the relatively new profession of educational technologists in universities and Cox (2007b) extends it to those involved in website production and management. Barley and Kunda (2004) and Garsten (1999) apply liminality to the more flexible contract and consulting modes of working.

The ambiguous nature of liminal roles is noted by Barley and Kunda (2004), Tempest and Starkey (2004) and Garsten (1999). A liminal status carries both risk and opportunity and implications of both marginalisation and power – ‘the capability of upsetting normative orders and of transcending institutional boundaries’ (Garsten 1999). Positively, the liminal worker can be seen as a catalyst for change and creativity, ‘a position from which new models, symbols and institutions arise’ (Garsten 1999, p. 615) renewing and instigating change in organisations. Yet marginalisation, vulnerability and invisibility can exist for the liminal new professional (Cox 2007b). There is inertia, ownership and established order and tradition to combat in the workplace.

2.6.7 Using organisational theories

Because the contextual nature of web IA is being investigated, it is beneficial to examine a number of knowledge and organisational theories. It is a natural extension

of any investigation of organisational practice to find synergies and dependencies in the literature and theories of organisational studies. This thesis draws on the constructs and theories of the nature of organisations and the nature of learning and doing knowledge and information work within them. The consideration of this set of theories is justified in that they provide a richer understanding of web IA in organisational practice.

2.7 Complexity

Complexity theory finds its way into this review of the literature because it provides a fitting metaphoric lens through which to view the situated activity of web IA. The outcomes of the analytic work of this research, outlined in chapters five and six, portray a picture of the activity of web IA that is further expounded and interpreted by the application of complexity theory.

2.7.1 Complexity defined

Complexity, claims Cilliers (1998, p. 2), is a concept that eludes definition. Miller and Page (2007, p. 3) share this perspective and report their avoidance of attempting to define complexity. Luhmann (1985, p. 25) broadly but succinctly describes complexity as the notion that, within a system, there are more possibilities than can be actualised. Stacey (2007, p. 179) describes the common thread in the complexity sciences as the centrality of non-linearity. Understanding of complexity is best achieved by a consideration of its characteristics rather than a definition (Cillier 1998).

‘Complexity’ is often used interchangeably by scholars with ‘complexity science’ and ‘complex systems’ (Miller & Page 2007; Cilliers 1998; Axelrod & Cohen 1999). However, Stacey (2005) includes chaos theory and the theory of dissipative structures as branches of complexity science. He claims a distinguishing aspect of complex systems is that there is no expectation of global control over the system – attention is focused on interactions at a micro level (Stacey 2005, p. 26). Stacey’s further dissent, in claiming that complexity is better considered and described without the constraints of systems thinking, is discussed later in this section.

A most commonly offered (Axelrod & Cohen 1999, p. 15; Cillier 1998, p. 2; Miller & Page 2007, p. 3; Byrne 1998, p. 3) description of a complex system is that it is not the sum of its components. A complex system is ‘irreducible’ (Snowden 2002, p. 105). ‘At the most basic level, the field of complex systems challenges the notion that by perfectly understanding the behaviour of each component part of a system we will then understand the system as a whole’ (Miller & Page, 2007, p. 3).

Understanding complex systems cannot be achieved by taking the system apart. ‘In cutting up a system, the analytical method destroys what it seeks to understand’ (Cilliers 1998, p. 2).

Describing complex systems from a more internal, localised perspective, Stacey (2007, p. 183), Axelrod and Cohen (1999, p. 15) and Waldrop (1994 p. 152) use the concept of emergence. Perpetual self organisation is occurring as the result of the interactions between components or agents. Each agent has patterns of action that affect those in close connection to it. Local patterns of relationships establish broader patterns within the whole population. The intricate interactions between components shape the whole on a continuing and unpredictable basis. The organisation or pattern for the whole system emerges from local activity. ‘Emergence means that there is no blueprint, plan or programme for the whole system, the population-wide pattern’ (Stacey, 2007, p. 183).

2.7.2 Complex adaptive systems

Complex systems are also adaptive. ‘They actively try to turn whatever happens to their advantage’ (Waldrop 1994, p. 11). The diversity of heterogeneous agents offer a greater tendency for spontaneous change and evolution – transformation of the system is possible and is driven from local pockets of interaction (Stacey 2001, p. 204). Complex adaptive systems are a field of active research in the complexity sciences (Miller & Page 2007; Stacey 2007).

A complex adaptive system is made up of a large number of entities or agents that interact locally with other agents. Agents continually adapt or change in response to their interactions with other adjacent agents (Stacey 2007, p. 195; Shaw 2002, p. 66). ‘The complexity is created by the fact that all the agents are responding to one

another's signals all the time in an iterative, non-linear dynamic' (Shaw 2002, p. 66). It is the responsiveness of other agents that allow the evolution of a population wide pattern. A complex adaptive system functions more as an ecology where 'emergent properties of the interactions of the various agents' form patterns (Snowden 2002, p. 107). Stacey (2007, p. 196) emphasises that there is no plan or blueprint for the complex adaptive system as a whole. Complex adaptive systems are not formed by external control, planning or designing.

Complexity is often described by what it is not. A comparison of complex and complicated systems reveals more about the nature of complex adaptive systems (Snowden 2002). In complicated worlds or environments, components of a system assume a degree of independence. Removing a component from a complicated system affects the system only as a direct effect of that piece being removed (Miller & Page 2007, p. 9). Remaining components do not adapt. Complicated systems are reducible to their, sometimes plentiful, individual elements (Snowden 2002; Miller & Page 2007, p. 9). Understanding the components leads to understanding the system which, however complicated, has a blueprint and an order.

Complexity is often understood by placing it in a realm between indeterminate chaos and linear order. The subtitle of Waldrop's 1994 book, 'the emerging science at the edge of order and chaos', is much used by scholars to position complexity. Waldrop (1994, p. 12) also claims that complex adaptive systems have a 'peculiar dynamism' that is 'a far cry from the weirdly unpredictable gyrations known as chaos'. He claims that complex adaptive systems have the ability to bring order and chaos into balance. 'This balance point ... is where the components of a system never quite lock into place, and never quite lock into turbulence' (Waldrop 1994, p. 12).

Stacey (2001, p. 1; 2007, p. 237) argues against the 'systems' construct within complex adaptive systems and introduces the notion of complex responsive processes. Stacey (2005, p. 24) suggests that:

Instead of thinking that local interaction is producing a global whole, or system, we could think of patterns of local interaction as producing further patterns of both local interaction and global patterns at the same time. There is then no need to think in terms of systems or wholes at all.

Stacey (2007, p. 244) prefers to think that there is no external viewpoint and all activity is as a participant responding to others in the vicinity. Whilst Stacey (2007, p. 237) does not support the reification of a situation or group as a 'whole' or a 'system', he does not clearly distinguish between his comfortable use of the term 'global' and his rejection of 'whole' – to many they would be interchangeable.

Snowden and Stanbridge (2004) separate complexity into social complexity and mathematical complexity in their attempt to develop the place of complexity thinking in the practice and theories of human activity. They define social complexity as a complex system that involves humans as distinct from complexity that is found in 'nature' (Snowden & Stanbridge 2004, p. 141). Snowden and Stanbridge (2004) and Stacey (2007, p. 238) tell us that people as actors in complex adaptive systems bring a number of distinguishing features to these situations.

Snowden and Stanbridge (2004) claim the following attributes of human actors in complex adaptive systems. Humans are unique in that they make decisions for unpredictable reasons offering no rule base to model. They create and maintain multiple identities, shifting between them as needed, thus not allowing a fixed location of an agent. Humans claim intentional action and causal relationships where none exist, not acknowledging that spontaneity occurs as a result of multiple interactions over time. Humans are capable of creating aspects of order in the midst of complexity by establishing social convention or ritual. Snowden and Stanbridge (2004) use the example of driving on the left (or right) side of the road as a social construct of order in an otherwise complex system. Humans have the ability to operate in chaos, complexity and order 'and the ability to move between them as a result of both accidental and deliberate action' (Snowden & Stanbridge 2004, p. 146).

Investigation involving complex adaptive systems theory is attempted in two significant ways (Miller & Page 2007, p. 6; Stacey 2003a, p. 51). Using computers to model or simulate the behaviour of complex systems is one way to better understand the nature of complex systems and pursued by Holland (1998) and Kauffman (1995). Acknowledging that complex adaptive systems theory originated from chemistry, biology and physics, mathematical algorithms are used to build models or design rules by which optimal decisions can be made. Mathematical formulae and

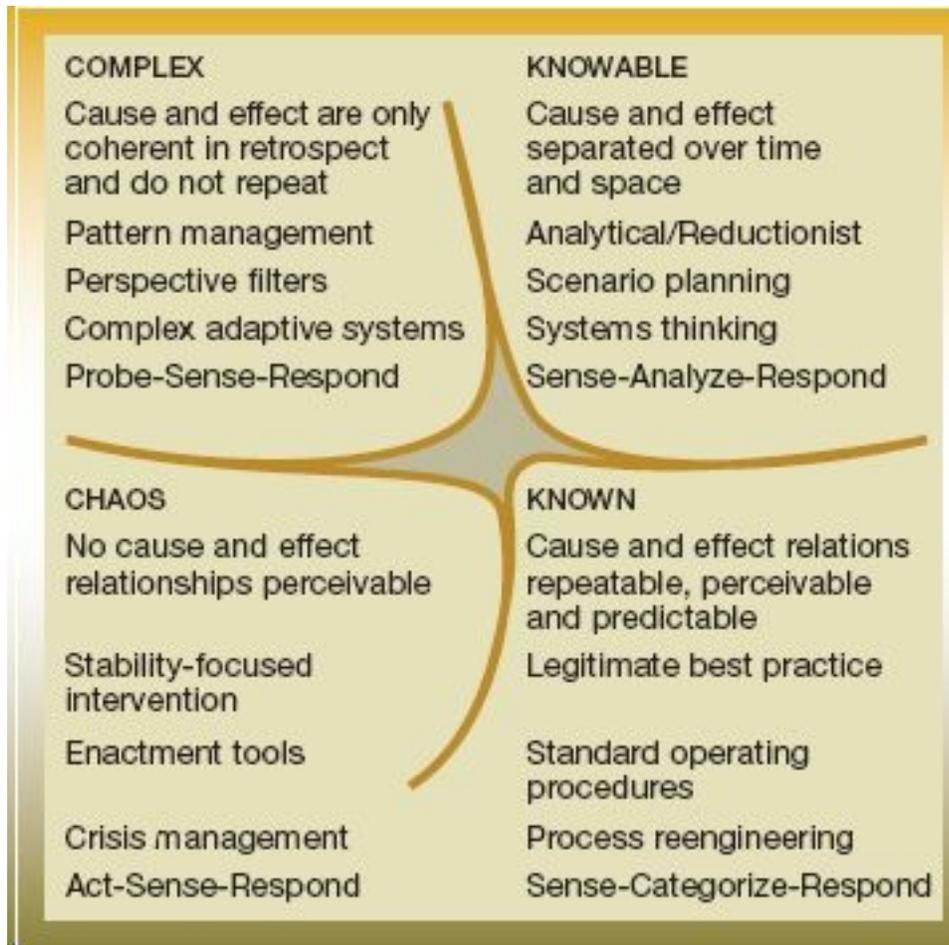
algorithms are frequently utilised ‘at the level of agent behaviour to simulate system level properties’ (Snowden & Stanbridge 2004, p. 145). Computational modeling has moved from static, homogenous situations to be able to accommodate large numbers of heterogeneous agents and dynamic environments (Miller & Page 2007, p. 5). ‘New frontiers for exploration’ have opened up, providing ways ‘to grow worlds from the ground up’ claim Miller and Page (2007, p. 26), who promote computational modeling as the primary means for exploring complex systems.

The second way that complex adaptive systems theory is used is to apply it as metaphor to examine a phenomenon of interest. Stacey (2003a, p. 53) warns that ‘the complexity sciences can never simply be applied to human action; they can only serve as a source domain for analogies with it’. Some kind of translation is needed. In applying the language and concepts of complexity to complex environments, a challenge in traditional thinking and practice is established. The frames of complexity theories ‘serve to shift explanatory attention away from where it was accustomed to be in the past, and towards different aspects of what’s being studied, aspects that were most likely traditionally neglected’ (Goldstein et al. 2007, p. x). Byrne (1998, p. 3) notes that complexity thinking prevents linearity and order ‘being forced on a world which isn’t really like that’.

2.7.3 The Cynefin framework

The Cynefin framework, depicted in Figure 4, has been developed over a number of years as an outcome of research in knowledge management and complexity theory in organisations (Kurtz & Snowden 2003). It is used as a sense-making and decision making tool in varied situations (see for example, Mark & Snowden 2006; Snowden 2001). To assist in understanding an environment and its characteristics, problems and approach to solutions, Snowden (2002, 2001) looks to the Cynefin framework. Cynefin is not an attempt to categorise a situation, but an attempt to understand it better. It allows people to think differently, share an understanding and reconsider intractable situations (Kurtz & Snowden 2003).

Figure 4 Characteristics of the Cynefin framework domains



Source: Mark and Snowden (2006, p. 33)

The Cynefin framework is presented as five domains (four sectors and a central area) and challenges the rational belief that all things, with enough time and effort, can be ordered. Within the framework there are two subdivisions based on the construct of order. Kurtz and Snowden (2003) use the vertical axis to divide the regions of order on the right and un-order on the left. Un-order is not considered by the authors to be the opposite of order. It is used to describe the paradox of the lack of order within order or ‘emergent order’ or a form of order that is not directed or controllable.

Kurtz and Snowden (2003) claim that co-existence and interaction between order and un-order, portrayed by the central space in Figure 4, can occur at any one time and use the example of urban structures described by Kofstorf (1991). Cities consist of planned and directed structures, yet simultaneously consist of organic and

spontaneous growth – both order and un-order are intertwined and overlaid. This description of the order/un-order coexistence in cities provides a useful analogy for websites: ‘the two primary versions of urban arrangement, the planned and the ‘organic,’ often exist side by side’ (Kofstorf 1991, p. 46). Like Kofstorf’s cities, websites of large organisations can be described as ‘puzzles of premeditated and spontaneous segments, variously interlocked or juxtaposed’ (Kofstorf 1991, p. 47).

It is useful to briefly examine each of the Cynefin domains to reveal the characteristics of that environment. The ‘known’ quadrant describes a place of order and structure where we look to standard categories and processes. It is a predictable, well-understood environment (Lambe 2007, p. 134) and ‘the only legitimate domain of best practice’ (Snowden 2002, p. 106). In this domain,

Repeatability allows for predictive models to be created and the objectivity is such that any reasonable person would accept the constraints of best practice that can be found here. This is the domain of process re-engineering, in which knowledge is captured and embedded in structured processes to ensure constancy (Mark and Snowden 2006, p. 34).

In the ‘knowable’ domain of the Cynefin framework, laws of cause and effect are still in place but are less obvious. The simplicity and rule base of the known domain is not present – the situation is complicated. Often a set of analytical processes and input from an expert, as well as significant time and resources, are required for problem resolution. A solution may not immediately present itself, but it is possible. Structured techniques and experts in the field are normally part of the process. Both Snowden (2000) and Lambe (2007, p. 137) place IT projects in this domain.

On the left hand side of the Cynefin framework the two unordered domains of ‘complexity’ and ‘chaos’ exist without obvious laws of cause and effect. Snowden (2002) claims that in chaos it is not possible to make sense or achieve solutions – the environment is too turbulent and our only actions should be to reduce the confusion and instability of this domain. In doing so we may shift the environment out of chaos into the realm of the complex.

The fourth domain of the Cynefin framework, is one of complexity, where the nature of interacting components and their relationships cannot be fully known nor defined.

Making sense and forming decision can be achieved by noticing patterns and acting on this observation. Hence decisions and ‘solutions’ are achieved when we ‘recognise, disrupt, reinforce and seed the emergence of patterns; we allow the interaction of identities to create coherence and meaning’ (Snowden 2002, p. 106). Our mindsets, tools and decisions should be different in the complex domain to those used in the ordered domains.

2.7.4 Complexity and organisational studies

Within the full range of complexity sciences, a number of scholars (for example, Stacey 2003a, p. 39; Holland 1998; Snowden 2001) have focused on complex adaptive systems and their associated metaphors to provide a rich framework to better understand humans and their actions. McElroy (2000) claims that many human activities in organisational settings are complex adaptive systems. Finance, leadership, law, business and education are included in the list of fields in which complexity theories have been used to examine the areas afresh (Goldstein et al. 2007). Complexity theories challenge and offer alternatives to linear, rational and controllable notions of organised human activity. They are valuable because they offer fresh perspectives on human activities and the nature of organising.

The dominant discourse in talking and writing about organisations is challenged by the insights of complex adaptive systems. Organisations as systems that can be designed from external and rational perspectives and that incorporate predictability and a desire for stability is the prevalent discourse and thinking according to Stacey (2007, p. 180). A major characteristic of traditional approaches to organisational practice and theory is the notion of control. In this paradigm, leading and managing an organisation by controlling and directing are deemed possible and desirable (Stacey 2007, p. 181). Traditional organisational theory is challenged by the application of complex adaptive systems, because none of the assumptions and mindsets of several centuries are supported. The dominant thinking in organisational theory is increasingly in conflict with complexity theory (Stacey 2007).

There have been many claims that organisations themselves are complex environments (McElroy 2000; Morel & Ramanujam 1999; Kurtz & Snowden 2003).

Anderson (1999, p. 230) claims that ‘many modern organisations are complex adaptive systems par excellence’. Studies of organisations as complex adaptive systems include Anderson and McMillan’s (2003) exploration of self-organising teams and Levinthal and Warglien’s (1999) study of organisational design.

Yet Dooley and Van de Ven (1999) and Stacey (2007, p. 231) note that, in practice, the traditional management paradigm of control remains dominant. Linear and ordered assumptions are easier to enact claim Dooley and Van de Ven (1999). Snowden (2000, p. 3) insists that managing the complex requires a significant paradigmatic shift:

Managing complex systems is radically different from managing those that are complicated. Cause is intertwined with effect, and the sheer number of connections means that predictive rules are not available.

Brown and Eisenhardt (1998, p. 12) note that managing an organisation requires a command of complex and ordered environments, saying ‘the critical management issue at the edge of chaos is to figure out what to structure, and as essential, what not to structure’. Complexity cannot be eliminated nor controlled (Axelrod & Cohen 1999), but need not be approached as a negative and problematic situation. Once identified and acknowledged, complexity can be used to advantage or ‘harnessed’ (Axelrod & Cohen 1999).

The literature also reports the application of complex adaptive systems thinking to specific phenomena within organisations. Rhodes and MacKechnie (2003) apply complexity to public sector processes and Garavan, Morley, Gunnigle and McGuire (2002) examine the development of human resources in the light of complex adaptive systems. Axelrod and Cohen (1999, p. 23) explore the ‘information revolution’ through the lens of complex adaptive systems theory. They note the massive amounts of change and adaptation in organisations and broader society, and use a complexity framework to question the value of policy and design interventions in dealing with many of the new social scenarios thrown up by the rapidly advancing technologies of information. Prediction in the information age is increasingly difficult due to the multiplicity of forces that are interacting (Alexrod & Cohen 1999, p. 25). When information is viewed as a mediator of interaction, then its increased availability leads

to an intensification of interactions and an increased pace of adaption in our social and technical worlds (Alexrod & Cohen 1999, p. 27).

2.7.5 Cynefin and information organisation

Kurtz and Snowden (2003), Snowden (2001) and Lambe (2007, p. 136) emphasise the need to know and consider the context in which the organisation of information occurs. They claim that decision models and solution methods from the wrong environment will be ineffective; responding without fully understanding the characteristics of the environment will not produce a successful outcome. ‘The message is simple: highly structured, stable, historically validated responses do not work in complex environments containing hazy, emergent threats and opportunities’ (Lambe 2007, p. 136).

Lambe (2007, p. 134) uses the Cynefin framework to explore the environment and corresponding approaches to organising information using taxonomies, saying that taxonomy work is a continuum that spans the known, knowable and complex domains of this framework. He examines and maps the nature and context of taxonomies in the business world and describes their resulting characteristics. Justifying this approach and concern with knowing the environment, Lambe (2007, p. 135) claims that taxonomy projects are doomed to fail without due consideration of their context.

Taxonomy work in the known domain is well understood, well bounded and stable according to Lambe (2007). It is characterised by the reuse of existing, standard, formal taxonomies. Much of the work of libraries falls within this description and the use of the Dewey Decimal Classification scheme provides an example of taxonomy work in this domain. A known, widely used and standard classification scheme changes only with widespread consultation and agreement over extensive periods of time (Bowker & Star 2000, p. 3). The maintenance of such a taxonomy is achievable in an orderly manner and its use remains standardised.

The knowable domain involves taxonomy work that enables sharing across diverse areas of knowledge and bridges boundaries of organisational knowledge. Lambe

(2007, p. 137) writes that complicated taxonomies are constructed to meet organisational knowledge needs possibly at the enterprise level, and using experts in the field. The taxonomy development is complicated but an end-state is achievable.

In the complex domain, a taxonomy structure struggles to ‘represent radical differences in view, vocabulary or organising principles’ (Lambe 2007, p. 138). The structure of taxonomy is less important than semantic concerns and the ‘processes of taxonomy work become more important than the structures and contents of the taxonomies themselves’ (Lambe 2007, p. 138). When organising information in complex environments, provisionality is the focus.

We are mapping and remapping and seeking to identify productive patterns that will help us build simple but powerful frameworks and matrices to filter out meaning from noise. An element of art also enters the fray: the ability to identify salient organising principles quickly is the mysterious additional skill we need to acquire (Lambe 2007, p. 139).

Snowden (2001) maps the use of digital networks to the complex quadrant of the Cynefin framework. He considers an intranet to be a complex environment, seeing it as a place where humans experience fear, exercise power and worry about privacy. An intranet should cater to a variety of audiences and modes of work and should be an online space that adapts and evolves over time. Snowden (2001) examines intranets using metaphorical approaches to complexity science – complex ecology or complex adaptive systems.

When considering the development of an intranet, Snowden (2001, p. 2) warns that ‘repeating past “best practice” has often led to a dangerous complacency’ in the digital economy. It is not possible to treat an intranet as a simple or complicated system that exists, respectively, in the known and knowable Cynefin domains. It is not possible to develop intranets using known and orderly techniques of enterprise systems design and to look for outcomes of order and permanent structure (Snowden 2001). We must look to the design and management of complex digital ecologies with a mindset other than the knowable and achievable solution.

2.7.6 Complexity theory as lens

Complexity theory and its associated frames prove a valuable lens for the study and richer understanding of many intricate social situations, including the digital information work and environment that is embedded in organisational life. It offers an alternative perspective to the objective, orderly and achievable paradigm of information organisation and suggests that responsiveness, self-organisation and emergence have a role to play. This thesis uses complexity theory to explain the activity of web IA.

2.8 Research in web IA

2.8.1 The nascent field

This review of the literature has demonstrated that any convergence in the methods and theories surrounding the practice of web IA is a place of discomfort. It lacks coherence and maturity. Confusion arises from two strong and sometimes contradictory messages. The first message is that a maturing structured methodology for web IA now exists and that its use in organisations will create effective websites for conveying information (Morville & Rosenfeld 2006; Brinck et al. 2002; Wodtke 2002). The second message is that much information organisation in modern knowledge organisations requires the construction of rapidly changing, ambiguous taxonomies (Lambe 2007; Snowden 2001). These information structures belong to a complex environment where structured methodologies and best practice are of little use in achieving effective solutions (Snowden 2001).

Noting that the widely used design methods for web IA originated from an LIS tradition, we must reconsider their usefulness. We should question if it is possible for website information to be effectively organised using processes that are grounded in the taxonomic work of the ordered and known domain of the Cynefin framework. Lambe (2007, p. 139) himself undertakes only to provide systematic methodologies for taxonomy work in the known and knowable domains. Acknowledging that taxonomy construction in the complex domain is dependent on provisionality and constant change, he offers no further advice on how to proceed.

It is timely to enquire how well the Morville and Rosenfeld (2006) methodology for web IA serves a large organisation in its use of the web to achieve its goals and inform its clients. Perhaps Rosenfeld himself has reconsidered his 2006 structured methodology for web IA. In a 2008 interview with Saul Carliner, Rosenfeld shifts his position by recommending that process rather than project should be the focus for approaching web IA. 'Our sites are moving targets. They can not be perfected, only improved' (Carliner 2008, p. 103). Rosenfeld also recommends the avoidance of redesigns especially for 'the huge and motley collection of sites that make up an enterprise's web environment', saying that large redesigns are 'overly ambitious and ill-conceived efforts to boil the ocean' (Carliner 2008, p. 103). Recognising that redevelopments of websites are often the result of political motivation and unlikely to succeed, Rosenfeld (in Carliner 2008) recommends a focus on small continuous improvement of the organisational web. But these are insights from a practitioner in the field. The lack of clarity in the practice of web IA is evident and indicative of the fact that the practice has not been rigorously or empirically investigated.

An additional weakness in the knowledge base for the practice of web IA is the sparsity of empirical consideration of this activity in situ. There is a need to examine the contextual practices in which the information structures of a large organisation's website are created, maintained and renewed. Whilst the need to better understand the environment in which online information is organised is evident, the literature lacks reports of research that examine the situated practice. In knowing more about the environment and real work of web IA, we are more readily able to apply suitable strategies to achieve effective outcomes in the delivery of information on enterprise websites. The interplay of the practice of web IA and the organisation that gives it a reason to exist requires greater understanding.

2.8.2 The call for research

The formalisation of the practice of web IA and the documenting of that practice have largely been driven by practitioners in the area (Fast 2006; Surla 2006; Campbell 2007). An abundance of short papers supporting and reporting the work of IA are published in online magazines such as *Boxes and Arrows*, *Digital Web Magazine* and

the *IA Institute library*. In 2006, Fast (para. 2) considered ‘that IA is characterised by its practice: not by its research’.

Research in IA, whilst still scant, has begun to follow the establishment of the professional practice. Research literature is beginning to emerge, but is piecemeal and usually devoted to aspects of the IA components and processes rather than an organisation’s ability to enable it (see, for example, Cunliffe et al. 2002; Sinha & Boutelle 2004; Yu & Roh 2002). IA best practice and emerging theory is supported by allied theories, especially those of web information-seeking behaviour.

In 2002, the *Journal of the American Society for Information Science and Technology* published a special edition on IA demonstrating that academia was beginning to engage with this emerging discipline. A peer-reviewed research stream was introduced at the seventh annual IA Summit in 2006. Fast (2006, para. 5) sees this purposeful action as remedy to his claim that ‘without a research community the growth and maturation of the field will be constrained’.

Orna (2005) points out that little research has been conducted about information products such as websites in an organisational context. ‘It is particularly noticeable that among the vast quantity of advice on how to design websites, there are very few attempts to relate the topic to the organisational context’ (Orna 2005, p. 18).

Research is sparse in the interplay of web information products and business goals, how and why websites are created by a business, who makes decisions and how those decisions are made (Orna 2005, p. 18). The structuring of web information is a relatively new phenomenon, and there is a crucial need for research and the development of theory for this specific information product in an organisational context.

Whilst there is much professional activity and reporting in the use of the web for information provision, there are strong claims (Dillon & Turnbull 2005; Fast 2006; Resmini et al. 2009; Madsen 2009) that the practice of structuring online information in organisations is not informed by a mature research base nor a body of theoretical literature. Dillon (2001, p. 29) notes that ‘the biggest obstacle to [web] IA becoming a distinct discipline remains its lack of unique methods and theories’. Five years on

the situation is little altered. The research base for web IA as a distinct information environment is minimal (Dillon & Turnbull 2005) and ‘there is no discernable body of IA research’ (Fast 2006, para. 2).

In 2009 a peer-reviewed scientific Journal of Information Architecture was established in recognition that ‘for the discipline to mature, the community needs a corpus, a defining body of knowledge’ (Resmini et al. 2009, para. 14). Dorte Madsen (2009, p. 3) as editor of the new journal, claims that this journal will provide a forum where researchers can examine IA as ‘a field of scientific inquiry, and build a central body of knowledge with its own theoretical bases for framing research problems, building arguments and explanations for the phenomena that information architecture deals with’.

IA for the web has borrowed from other fields of information organisation, but must quest to produce its own effective methods and theoretical frameworks for organising and structuring information on the web. It is now the undertaking of information research at large and this thesis in particular to individuate and refine the work of IA and to pinpoint its different needs and complexities and processes that cannot be drawn from existing disciplines. This doctoral research goes some way to addressing this knowledge gap by asking: *How is web information architecture carried out in large organisations with public-facing, information-rich websites?*

2.9 In conclusion

This chapter presents and reviews literature in a number of different domains, all of which have relevance to an organisation’s ability to structure information on its website. Firstly, the extensive debates around the definitions and the nature of the work of web IA are examined, revealing that the relatively new work of information organisation on the web is establishing itself and seeking an identity. This chapter also scrutinises the systematic approaches to web IA that have been developed and offered as good practice. Where studies of websites and web management within organisational contexts have been carried out, they are reviewed for the insights that they reveal about the activity and achievement of web IA.

Allied information practices are surveyed in this review of the literature for their relevance to web IA. This chapter establishes the notion that web IA has been informed by other traditions of information organisation and pinpoints the borrowed techniques and approaches. It also highlights that the various information holdings across an organisation are frequently seen from an ecological point of view and that not all information organisation activity takes place in a logical and orderly manner.

As this literature coalesces, it establishes a confused and patchy knowledge base that has not attended well to the situated nature of the practice of web IA. Strong calls for further research in this field are noted in this chapter.

The intention of this thesis is to come to a fuller understanding of the situated practice of web IA. The work of web IA is embedded and given purpose within the enterprise for which it produces web information structures. There are deep dependencies and interactions as the organisation creates a practice to achieve its informational goals in using the web, and that practice, in turn, makes demands, forces change and influences the organisation. The literature and theory that offers insight into these active processes are reviewed in this chapter. Theories of knowing, learning and practising in organisations were introduced as they became relevant during the analysis of data and are examined for their import.

Into this mix, complexity theory is added. Complexity theories, particularly complex adaptive systems, prove useful in this thesis as an explanatory lens through which to better understand the nature of the practice of web IA and its implications. In order to use its metaphors to extend the insights and perspective of the practice of web IA, the literature of complexity theory is reviewed.

3 CHAPTER THREE RESEARCH DESIGN

3.1 Overview

This chapter outlines the research design and associated theories that were adopted in this study. It presents a framework for the research, adopted from Crotty (1998).

Crotty's framework consists of *epistemology*, *theoretical perspectives*, *methodology*, and *methods* and discussion under these headings frames the research design.

Throughout this chapter a rationale for the research design is built, justifying the approach taken.

3.2 Approaching research

Crotty (1998, p. 2) suggests that research projects begin quite pragmatically with a concern for which *methods* and *methodologies* will be used and how they will be justified. From here a researcher might explore the *theoretical perspectives* or assumptions about reality that they bring to their work. In exploring the philosophical underpinning of their research, the researcher will grapple with and reach an understanding about the nature of knowledge that confirms the research approach – an *epistemology*.

Crotty (1998, p. 3) proposes a four-element model that provides a scaffold or framework for any research process. These elements are:

Methods: the techniques or procedures used to gather and analyse data related to some research question or hypothesis.

Methodology: the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes.

Theoretical perspectives: the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria.

Epistemology: the theory of knowledge embedded in the theoretical perspective and thereby in the methodology.

Acknowledging that there are other frameworks that provide meaning and perspective in the research process, this research project is approached using Crotty's four

element model. Crotty's framework for the overall research design was used by Kennedy (2006) in her recent doctoral research studies in the area of knowledge management involving grounded theory. Abu Ziden (2007) also used it in her recent doctorate that examined learning in online discussion forums.

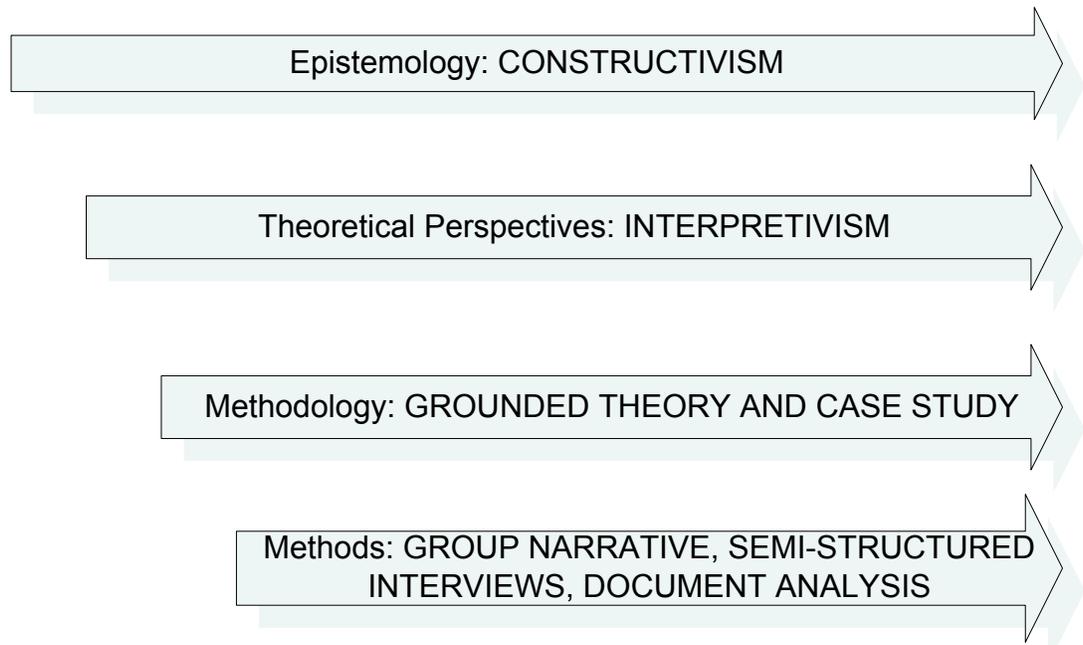
It is important to note that this is just one possible framework and other scholars proposed variations. Creswell (2003, p. 3) describes Crotty's model as the 'aspects that inform a choice of approach, ranging from the broad assumptions that are brought to a project to the more practical decisions made about how to collect and analyse data'. Creswell (2003, p. 5) suggests that Crotty's model addresses three questions central to the design of research:

1. What knowledge claims are being made by the researcher?
2. What strategies of inquiry will inform the procedures?
3. What methods of data collection and analysis will be used?

Creswell (2003, p. 3) joins Crotty (1998) in exhorting researchers to adopt a general framework to support their research design, noting that research approaches have multiplied in recent decades and investigators now have many choices. Kayrooz and Trevitt (2005, pp. 116-117) modify Crotty's model to rebadge methodology as 'research approach', which they describe as the 'plan of action or design, the strategy lying behind the choice and use of particular methods'.

Figure 5 outlines Crotty's framework for approaching research and includes the selected approaches for this study. Each facet of the chosen approach to this research endeavour will be discussed in detail subsequently in this chapter and in chapter four.

Figure 5 Research approach using Crotty's (1998) framework



Source: Adapted from Crotty (1998, p. 5)

3.2.1 Qualitative and quantitative approaches

Quantitative and qualitative approaches to research are positioned in the research design process quite differently by scholars. Creswell (2003, p. 5) describes the choice of quantitative, qualitative or mixed methods as ‘approaches to research’ that translate into processes in the design of research, and Kayrooz and Trevitt (2005, p. 115) see qualitative and quantitative approaches ‘as having long histories and complex philosophical pedigrees’. Merriam (1998, p. 1) elevates the label ‘qualitative’ to be a research paradigm and describes it as a quest for understanding the meaning that people have constructed – how they make sense of and experience their world:

The qualitative, interpretive, or naturalistic research paradigm defines the methods and techniques most suitable for collecting and analysing data. Qualitative inquiry, which focuses on meaning in context, requires a data collection instrument that is sensitive to underlying meaning when gathering and interpreting data.

Positioning qualitative research as a research paradigm, Gorman and Clayton (2005, p. 14) call for its greater use in information research. They report that the quantitative model ‘has dominated research in information work for many decades’ (Gorman & Clayton 2005, p. 3) and that this is often due to ‘the demand for accountability and assessment in its various guises’ (Gorman & Clayton 2005, p. 13). Gorman and Clayton’s (2005) claim that a qualitative approach will give information researchers a greater understanding of the meaning behind research outcomes and help to explore problems that are not amenable to quantification.

A qualitative approach may also ‘provide broader insights not only into existing issues but also into so far unexamined areas of information work’ (Gorman & Clayton 2005, p. 14). Information work often occurs in complex environments and in a climate where the demand and pressure to deliver effective outcomes is increasing. These authors go on to suggest that information professionals need to understand the complexity of social organisations and information work more fully. Qualitative research allows ‘complexities to be elucidated by those who are directly involved, rather than studied from a distance by remote researchers who may not be aware of the subtle nuances and hidden currents in a particular situation’ (Gorman & Clayton 2005, p. 14).

Crotty (1998, p. 14), however, restricts the place of the qualitative or quantitative choice to the level of methods – rather than epistemology or theoretical perspective. He supports the place of quantification within non-positivist research and explains that a constructivist epistemology may well include quantitative methods. Yin (2003a) acknowledges that some investigators distinguish between quantitative and qualitative research on the basis of philosophical beliefs – which has created a sharp and perhaps irreconcilable debate between the two approaches. But Yin (2003a, p. 15) claims that ‘case studies can be based on any mix of quantitative and qualitative evidence’, firmly placing the choice and mix of quantitative and qualitative research at the level of the method and the tool for collecting evidence. Strauss and Corbin (1998, p. 160) also note the place of both quantitative and qualitative data collection in a grounded theory methodology, positioning this consideration after the more

philosophical decisions have been made and a grounded theory methodology is in place.

In this study, the use of 'qualitative' or 'quantitative' to describe research will be at the level of the method. A qualitative approach will be taken to data collection.

3.3 Epistemology – Constructivism

Pickard (2007, p. 6) defines epistemology as the philosophy of how we can know the nature of reality and the epistemological question as 'what is the nature of the relationship between the knower and the known?'. Epistemology examines all aspects of knowledge – its source, its nature, its limits and the human ability to 'know'. A number of different epistemological stances exist, the three main positions being objectivism, constructivism and subjectivism (Kayrooz & Trevitt 2005, p. 117).

Objectivism asserts that research can lead us to know and to verify an objective truth. At the opposite end of the spectrum, subjectivism claims there are infinite interpretations of events, none of them superior to another. In between, constructivism posits an objective world mediated by an individual's conceptual lens or framework (Kayrooz & Trevitt 2005, p. 116).

The constructivist epistemological position is taken in this research. The term constructivism is derived from the Latin *construere*, meaning 'to interpret or analyse' (Kayrooz & Trevitt 2005, p. 117). Constructivism places knowledge, meaning and understanding at the point where a person interacts with the world and the objects in it. Human knowing is a result of our interaction with the world in which we exist. Constructivism holds that there is a knowable world and we come to know it imperfectly as a result of our interactions (Kayrooz & Trevitt 2005, p. 117).

Creswell (2003, p. 8) tells us that a 'knowledge claim' allows a researcher to start a project with certain assumptions about how they will learn and what they will learn during their inquiry. Crotty (1998, p. 8) elaborates: our theoretical perspective to research 'involves knowledge and embodies a certain understanding of what is entailed in knowing, that is, *how we know what we know*'. Epistemology clearly impacts on research and the way it is conducted and presented. There is a social

aspect to constructed knowledge – it incorporates history, culture and community, and occurs via interaction with a human community (Creswell 2003, p. 9).

Thus constructivism allows us to emphasise the social context in which we live, learn and construct knowledge and allows for the fact that multiple and complex interactions are involved in knowledge creation. A researcher must look for multiple and complex views rather than narrow meanings (Creswell 2003, p. 8).

Crotty (1998, p. 42) more fully defines constructivism as:

The view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context.

During this study the social and organisational aspects of achieving web IA in large enterprises are investigated. Positioned in an organisational collective and culture, this study embraces the complexity of human beings interacting and employing known IA techniques to achieve an outcome. Thus, a constructivist epistemology is well suited to the quest for knowing more about how to practise IA in complex, dynamic and imperfect environments.

3.4 Theoretical perspectives – Interpretivism

Crotty (1998, p. 66) describes a theoretical perspective as ‘the philosophical stance lying behind a methodology’ and our ‘view of the human world and social life within that world’. Defining a theoretical perspective allows us to recognise and state the assumptions that we bring to our research and chosen methodology. A theoretical perspective gives a worldly context to our research (Crotty 1998).

Closely allied to the constructivist epistemology is the interpretive paradigm that includes symbolic interactionism. Interpretivism posits that there is no single, universal reality. Reality ‘belongs’ to the individual in a particular context at a particular time (Crotty 1998, p. 70). Hence, there are multiple complex realities that are constantly changing as ‘a product of the interaction of the known and the knower’ (Pickard 2007, p. 12). During the research process all actors – researcher and

participants – are shaped or changed by their involvement; shifts occur in their understandings. ‘Interpretivism can offer understanding of the meanings behind the actions of individuals’ (Pickard 2007, p. 12). According to Crotty (1998, p. 67), interpretivism ‘looks for culturally derived and historically situated interpretations of the social life-world’. It is at odds with a positivist stance, which assumes that there is an objective truth and that knowledge is absolute.

Gorman and Clayton (2005, p. 14) call for information researchers to adopt an interpretivist approach in order to uncover complex social conditions in the field. Richer, contextual data is more likely to present insights and perspectives in existing and emerging areas of information research that have not been previously reported using positivist strategies. According to Gorman and Clayton (2005, p. 14) an interpretivist approach to information research also involves a closer interaction between the researcher and the locale and a stronger participation in the research by those involved in the situated practice of the information work. Their contributions and insights are better captured with a researcher in close proximity than in a remote and distant location (Gorman & Clayton 2005, p. 14).

3.4.1 Symbolic interactionism

If ‘constructivism assumes the relativism of multiple social realities, recognises the mutual creation of knowledge by the viewer and the viewed, and aims towards interpretive understanding of subjects’ meanings’ (Charmaz 2000, p. 510), we must look to the ways in which this may occur. ‘Symbolic interactionism is but one stream of the interpretivist approach to human inquiry’ (Crotty 1998, p. 71). According to Charon (1979, p. 23) it ‘focuses on the nature of interaction, the dynamic social activities taking place’ and rejects images of humans as passive and conforming. He goes on to describe symbolic interactionism thus:

Individuals interact: societies are made up of interacting individuals. People are constantly undergoing change in interaction and society is changing through interaction. Interaction implies human beings acting in relation to each other, taking each other into account, acting, perceiving, interpreting, acting again. Hence, a more dynamic and active human being emerges, rather than an actor merely responding to others.

Goulding (1999, p. 5) attributes to George Herbert Mead (1863-1931), the proposition that the most significant way that humans interact is by symbolism, language being the most prominent form. Symbolic interactionism addresses the processes of the construction of meaning and knowledge, and claims that they are achieved in the interactive use of symbols, such as words, objects or actions. A key feature of symbolic interactionism is that ‘individuals are influenced by other people, but that they are also active in interpreting and responding to the people and objects they encounter in the world’ (Travers 2001, p. 24). ‘Individuals engage in a world which requires reflexive interaction as averse to environmental response. They are purposive in their actions and will act and react to environmental cues, objects and others, according to the meaning these hold for them’ (Goulding 1999, p. 5).

Blumer (1969, p. 2), who first used the term symbolic interactionism, proposed three basic tenets of the perspective:

1. Human beings act toward things on the basis of the meanings that the things have for them.
2. The meaning of such things is derived from, or arises out of, the social interaction that one has with one’s fellows.
3. These meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he/she encounters.

Essentially, symbolic interactionism looks at the human as the key to society – humans are actors who interpret the action of others and accordingly and continually adjust their own understandings. The conflicting meanings that are held by individuals in society are continually negotiated and transformed, thereby transforming the social order itself (Joffe 1979). Humans have choice in their own actions and can ‘rehearse’ or imagine the outcomes of their actions prior to taking them. Blumer (1969) claims that a human interprets or creates meaning in observing the action of another. Meaning is not inherent in objects but in the human that interacts with the object. Crotty (1998, p. 71) richly describes symbolic interactionism as an exploration of ‘the understandings abroad in culture as the meaningful matrix that guides our lives’.

The interpretation process involves the use of shared symbols i.e., language and other symbolic tools such as objects and acts, which form the basis of human communication. Words, physical objects, gestures and actions can all be symbols when they are used purposively to give meaning to others (Crotty 1998, p. 75). Without these symbols for representation and communication, an individual could not create meaning, could not consider their observations of the actions of others. Without the learned use of language and other symbols, humans could not solve problems, reflect nor conceptualise – ‘understanding would cease’ (Charon 1979, p. 52). It is through the use of symbols that our complex social order or pattern exists and continues to evolve. ‘Social reality is created in symbolic interaction, and social life depends on symbols for socialisation, mutual understanding, and culmination of knowledge’ (Charon 1979, p. 56).

Central to the perspective of symbolic interactionism is the idea of putting oneself in the place of the other – being able to see the perspectives and points of view of another (Goulding 1999). We are able to step back and reflect on the meaning that actors ascribe to particular social phenomena. It is through reflection and our own thought processes, enabled by the use of symbols, that we can become aware of others’ meanings and possible course of action. Role taking is an important interaction in this theoretical perspective. From a perspective of symbolic interactionism, researchers take, to the best of their ability, the standpoint of those studied (Crotty 1998, p. 74). They have a strong concern for understanding the situation and phenomena of interest and must do this through the understandings of the actors involved.

Methodologically, the implication of the symbolic interactionist perspective is that the actor’s view of actions, objects and society has to be studied seriously. The situation must be seen as the actor sees it, the meaning of objects and acts must be determined in terms of the actor’s meanings, and the organisation of a course of action must be understood as the actor organises it. The role of the actor in the situation would have to be taken by the observer in order to see the social world from his perspective (Psathas 1973, pp. 6-7).

Research approaches by symbolic interactionists involve unearthing meaning of events and processes to those involved in them – it is a study in dynamic, creative and constantly changing social processes (Crotty 1998, p. 74). Close contact and personal

interaction with those involved with the phenomena under investigation is needed. The researcher is required to enter the domain of the research participants and to engage with the participants' environment, actively interpreting all of the interactions presented to the researcher as a result of the field study. The research must look for the meaning of actions and the contribution that actors make to the situation or phenomenon through their interactions.

'Symbolic interactionism has [also] spawned the research methodology known as grounded theory' (Crotty 1998, p. 78) which is used in this research and is described in section 3.5. Grounded theory attempts to derive a theory of a process, action or interaction, grounded in the behaviours, words and actions of actors or participants in the study. Strauss and Corbin (1998, p. 160) state clearly that grounded theory is interpretive work:

Interpretations must include the perspectives and voices of the people whom we study. Interpretations are sought for understanding the action of individual or collective actors being studied. Yet, those who use grounded theory procedures share with many other qualitative researchers a distinctive position. They accept responsibility for their interpretive roles. They do not believe it sufficient merely to report or give voice to the viewpoints of the people, groups, or organisations studied. Researchers assume the further responsibility of interpreting what is observed, heard, or read.

The research presented in this thesis is immersed in language and symbols – in the qualitative approach to data collection and in the nature of the research problem itself. Information architecture is a phenomenon involving symbolism, especially language and the presentation of the written word. This study requires the investigator to enter into the social, complex world of those that undertake web IA in organisations and to make a genuine attempt to understand their work, their perspectives and their context. Also enmeshed in the symbolic interactions of an organisation's website are the perspectives and actions of its audience. This study, however, is restricted to the practice of web IA within the organisation. It does not consult the website's audience.

3.5 Methodology

3.5.1 Grounded theory

This research draws on the methodology of grounded theory, a term that is used for both the mode of inquiry and the outcome of the research (Charmaz 2005). Grounded theory was first proposed by Glaser and Strauss in 1967 as a research approach that insisted that the theory put forward by qualitative researchers was firmly grounded in the data collected during the investigative processes. Its focus is on the creation of theory rather than testing of hypotheses. It is primarily an inductive approach to the generation of theory that is firmly grounded in data.

Charmaz (2005, p. 508) describes grounded theory thus:

A grounded theory approach encourages the researcher to remain close to their studied worlds and to develop an integrated set of theoretical concepts from their empirical materials that not only synthesize and interpret them but also show processual relationships.

Grounded theory avoids the proposing of initial hypotheses for testing and verification. Instead, it promotes social research as a process of new theory generation and outlines a systematic and defined procedure for collecting and analysing qualitative data in order to generate new theory (Glaser & Strauss 1967). The naming of this methodology as grounded theory follows the notion that any resulting theory would be ‘grounded in the behaviour, words and actions of those under study’ (Goulding 1999, p. 6).

Morse (1994, p. 25) describes a theory as ‘the best comprehensive, coherent and simplest model for linking diverse and unrelated facts in a useful and pragmatic way. It is a way of revealing the obvious, the implicit, the unrecognised and the unknown’. Grounded theories, as interpretive theories, emphasise understanding rather than explanation and prediction (Charmaz 2006, p. 126). They ‘allow for indeterminacy rather than seek causality and give priority to showing patterns and connections rather than to linear reasoning’ (Charmaz 2006, p. 126). Interpretive theories assume multiple realities and provisional truth.

Theories developed using grounded theory are quite often substantive in nature – i.e., focused on a particular area or phenomenon. Strauss and Corbin (1998, pp. 161-162) claim that the majority of grounded theories are substantive theories – but that this is due to the interests of grounded theorist rather than the nature of the methodology. They go on to say that the methodology can equally well be applied to theory at a higher level of abstraction – general or formal theory. Glaser (1978, p. 143) proposes that a substantive theory may become an important catalyst or stepping stone for formulation of a higher level or formal theory, and in fact, it is usually desirable for formal theory to originate from a substantive theory.

Vaughan (1992) recognises that *theoretical elaboration* is a useful extension of the original grounded theory offered by Glaser and Strauss (1967). She claims that some research studies will start with existing grounded theories in place and that research can be designed to build on prior investigation. The rigour of grounded theory must remain and the extant theory must be constantly compared with new data and the concepts as they emerge.

Regardless of its level of abstraction, a grounded theory is one based on concepts. The processes associated with a grounded theory approach provide a systematic and explicit process for conceptualisation from data. The conceptual density of a theory describes the extensiveness of concepts and their relationships that are set out in the theory. The emphasis is on conceptualisation rather than description and the difference is strongly pointed out by Glaser (2002, para. 3, capitals in original): ‘the product will be transcending abstraction, NOT description’.

3.5.1.1 Constructivist grounded theory

Charmaz (2005, p. 508) challenges the ‘objectivist leanings’ of early grounded theory and calls for a 21st century shift to situate grounded theory more solidly in a social constructivist epistemology. She describes grounded theory as having ‘an original objectivist cast with its emphasis in logic, analytic procedures, comparative methods, and conceptual development and assumptions of an external but discernible world, unbiased observer, and discovered theory’ (Charmaz 2005, p. 509). She goes on to describe her alternative base for grounded theory thus:

A constructivist approach emphasises the studied phenomena rather than the methods of studying it. Constructivist grounded theorists take a reflexive stance on modes of knowing and representing studied life. That means giving close attention to empirical realities and our collected renderings of them – and locating oneself in these realities. It does not assume that data simply await discovery in an external world or that methodological procedures will correct limited views of the studied world. Our theoretical analyses are interpretive renderings of a reality, not objective reportings of it (Charmaz 2005, p. 509-510).

This study of web IA in organisations follows a constructivist epistemology and is positioned in Charmaz’s 21st century ‘constructivist grounded theory’. Constructivist grounded theory enables the study of IA processes within the enterprise to be taken into a social realm – involving people in their organisations – as well as the complex interactions involved in achieving an appropriate IA for an organisation’s website. ‘Given its emphasis on new discoveries, the method is usually used to generate theory in areas where little is already known, or to provide a fresh slant on existing knowledge about a particular social phenomenon’ (Goulding 1999, p. 6). Glaser and Strauss (1967, p. 3) argue that grounded theories are more likely to ‘fit and work’ than theories that might be proposed and tested. For this research into a recent phenomenon, an emergent theory is likely to reveal new knowledge that will ‘fit and work’ and prove useful to those responsible for creating web IA in organisations.

3.5.1.2 Central elements of grounded theory

The literature reports the evolution and divergences of grounded theory since the *Discovery of Grounded Theory* was published in 1967 (see for example, Goulding 1999; Glaser 2002; Charmaz 2005). Some of these divergences have caused strong debate and controversy, particularly around the process of data analysis. Yet Strauss and Corbin (1998, pp. 163-164) embrace these changes, calling grounded theory ‘a general methodology, a way of thinking about and conceptualising data’ and view it as an evolving and adapting methodology subject to the influences of newer intellectual movements and positions that can be accommodated by the central elements of grounded theory. Those principles that remain integral to the practice of grounded theory in any of its variant forms are well reported in the literature (Glaser & Strauss 1967; Strauss & Corbin 1998, 1990; Glaser 2002; Charmaz 2005, 2006)

and are now recounted briefly in this section in light of their applicability to this study.

The development of theory during the research process is described by Strauss and Corbin (1998, p. 156) as ‘a continuous interplay between analysis and data collection’. Analysis begins after the first data set has been collected and from that point the:

grounded theory methods consist of simultaneous data collection and analysis, with each informing and focusing the other throughout the research process. As grounded theorists, we begin our analyses early to help us focus further data collection. In turn, we use these focused data to refine our emerging analyses (Charmaz 2005, p. 508).

The concept of *constant comparative analysis* (Glaser & Strauss 1967, p. 102) is key to grounded theory development. Whilst the concept and relationship building process is underway, the result of analysis at any point forms a hypothesis to be continually compared and contrasted to the next round of data analysis. A constant comparison of the incidents revealed by the data contributed to the verification of the emergent theory. Thus, verification of proposed hypotheses is a continual focus throughout the research process.

This research approached data collection and analysis using the key tenet of grounded theory called *theoretical sampling* (Strauss & Corbin 1990, p. 176). Theoretical sampling directs the process of continual collection of data throughout the investigation. As novel concepts and relationships between those concepts emerge from the data, the investigator seeks more specific and focused data to flesh out, refine and validate the emerging concepts, categories and relationships (Charmaz 2006, p. 107). The principles of grounded theory that dictate that data collection and analysis be a tightly coupled and interactive process are the approach taken in this research. As preliminary concepts and their relationships emerged about web IA in large organisations, ongoing and more targeted data collection took place. These processes are outlined in greater detail in chapter four.

Theoretical saturation defines the point at which a researcher can assume that the collection of new data can cease (Glaser & Strauss 1967, p. 61). It is signaled when

the categories are dense and well developed and new data no longer inform the provisional theory. Charmaz (2006, p. 113-114) points out that 'categories are saturated when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of these core theoretical categories. She also points out that, according to the canons of grounded theory, theoretical saturation should be the aim of grounded theorists and suggests that novel research questions demand more theoretical complexity and more sustained inquiry.

The methodology of grounded theory finds increasing application in the business use of information in organisations. Strauss and Corbin (1998, p. 166) note the uptake of grounded theory in a range of disciplines, including business and management, the use of computers by the physically disabled and knowledge production. More recently, Pace (2003) takes a grounded theory approach in his doctoral studies on the flow experiences of web users engaged in information-seeking activities. The entire sphere of human interaction with digital information is increasingly being investigated using grounded theory (see for example, Eschenfelder 2003, 2004; Lang & Fitzgerald 2007; Hansen & Kautz 2005).

Grounded theory enables the study of the practice of web IA within the enterprise to be taken into a social realm. The people who form the community of practitioners within an organisation are consulted about their endeavours to produce effective web IA.

3.5.2 Case study

The grounded theory methodology is tightly integrated with a case study approach in this research. Data collecting for the construction of a grounded theory took place in specific organisations, which represent 'cases'. Hence, the research was conducted using grounded theory and comparative case study methodologies. A number of large organisations that use the web as a significant information delivery platform to communicate with their clients were investigated as the units of analysis (Yin 2003a, p. 22).

The use of case studies in social research is a widely accepted practice (Yin 2003a; Merriam 1998; Stake 2005; Hartley 2004). Some authors describe the case study as a research method (Crotty 1998, p. 5; Kayrooz & Trevitt 2005, p. 116), whilst others place it under the heading of methodology (Hartley 2004). Yin (2003a), in a single publication, describes the case study as a method, a research strategy and a methodological framework.

In this study, the case study approach to enquiry is discussed in the methodology section because it is an umbrella concept for the more granular tools of inquiry that are described as methods. Hartley (2004) reinforces this approach, considering a case study as a research strategy within which a number of methods may be used. In this work, the case study is part of Crotty's (1998, p. 7) strategy or plan of action 'that shapes our choice and use of particular methods and links them to the desired outcomes'.

Yin (2003a, p. 13) defines the use and scope of a case study as an empirical inquiry that:

- Investigates a contemporary phenomenon within its real-life context, especially when
- The boundaries between phenomenon and context are not clearly evident.

Merriam (1998, p. 27) notes that the case study can be defined as a process, a unit of analysis or an end-product of research. She has been swayed over 10 years to conclude that 'the single most defining characteristics of case study research lies in delimiting the object of study, the case', stating that 'if the phenomenon you are interested in studying is not intrinsically bounded, it is not a case' (Merriam 1998, p. 27). A case study is a bounded and integrated system, 'a specific, a complex functioning thing' (Merriam 1998, p. 27). Yin (2003a, p. 21) advises that:

in general, case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context.

‘Case studies can be useful for exploring new or emerging processes or behaviours’ and understanding ‘how behaviour and/or processes are influenced by, and influence context’ (Hartley 2004, p. 323).

This research meets all of these theoretical conditions. The investigation is of a contemporary nature. It has been established in section 1.4 of this thesis that the phenomenon of organisations providing information on the web is less than two decades old. The new and emerging processes of web IA are examined in a real-life context.

Becker’s definition (1968, p. 233) of the purpose of a case study is particularly appropriate to this study. It is twofold: ‘to arrive at a comprehensive understanding of the groups under study’ and ‘to develop general theoretical statements about regularities in social structure and process’.

This research conforms to Yin’s (2003a, p. 23) direction to ‘use the case study method because you deliberately wanted to cover contextual conditions – believing that they might be highly pertinent to your phenomenon of study’. In fact, this condition is a foundation one for this research and is firmly expressed in the title: *The Practice of Web Information Architecture in Large Organisations*. ‘The distinctive need for case studies arises out of the desire to understand complex social phenomena’ (Yin 2003a, p. 22). This research adopts a case study approach in order to ‘retain the holistic and meaningful characteristics of real-life events’ (Yin 2003a, p. 22) and to explore the activities of web IA in context – ‘to uncover the interaction of significant factors characteristic of the phenomenon’ (Merriam 1998, p. 29).

Merriam (1998, p. 29) sums up the use of the case study in saying:

The case study offers a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon. Anchored in real-life situations, the case study results in a rich and holistic account of a phenomenon.

In this way, the research is designed as a *particularistic* (Merriam 1998) or *instrumental* (Stake 2005) multiple case study – it examines a particular phenomenon where each case is important for what it reveals about the phenomenon of practice of web IA. It is purposely designed to generalise and build theory.

Yin (2003a) differentiates between holistic and embedded case studies. Using a holistic design, the case or bounded system is also the unit of analysis – a global aspect of the case is being examined. An embedded design occurs when sub-units of analysis occur within an overall case. This study follows a holistic case study design – the organisation is the unit of analysis – because the structuring of information on the website that represents the whole enterprise is under scrutiny.

Stake (2005) warns of danger in not honouring the individual case in the quest to theorise. He places much weight on ‘the intrinsic study of the valued particular’ (Stake 2005, p. 448) and describes a tension between the researcher’s time and resources that may be spent in the complexity of a single case – thereby unearthing important features for analysis and understanding – or moving on to another case in order to generalise across a larger number of cases.

An exploratory case approach is used in this research. Yin (2003a, p. 8) recommends an exploratory case study approach when the phenomenon of interest is ill defined, is not clearly distinguishable from its context and is likely to be composed of complex interacting constructs. These three criteria are well met in this study of performing web IA in organisations. Use of the web is relatively new and the need to incorporate management, resources and skills for the design of hypertext information spaces is ill defined. Again, the activities of web IA are difficult to distinguish from its organisational context.

Yin (2003a, p. 46) considers ‘multiple case studies to be variants within the same methodological framework’ as single case studies and makes ‘no broad distinction between the so-called classic (i.e., single) case study and multiple-case studies’, considering the choice to be one of research design. This proposition is important to this research endeavour because it more closely fits the grounded theory tenet of constant comparison and closely supports the development of grounded theory from data collected in a multiple case study environment. Multiple cases expand and enable the constant comparison, which is fundamental to grounded theory. But rather than examine the differences in the theory of single and multiple case studies, it is more urgent in this study to examine the research approaches that have been conducted using multiple case studies and grounded theory.

3.5.3 Building theory from case studies

This study draws upon the case study methodology but does not comply with Yin's (2003a) insistence that, for case study research, theory must be proposed in advance of the data collection in order to guide the collection and analysis of data. 'Theory development prior to the collection of any case study data is an essential step in doing case studies' (Yin 2003a p. 28). Rather, this research has followed Eisenhardt's (1989) lead in building theory from case studies using grounded theory and has abided by the grounded theory notion of theoretical sampling; organisations or cases are selected to further the development of theory as needed.

Eisenhardt (1989) synthesises and extends the work of Glaser and Strauss (1967) and Yin (1984) with a focus on the specifics of building theory from multiple case studies. She offers a 'roadmap' or framework for generating theory from case study research and indicates that 'this research approach is especially appropriate in new topic areas' (Eisenhardt 1989, p. 532). She goes on to suggest three strengths of building theory from cases. Firstly, it is likely to build novel theory. Attempting to reconcile data containing possible contradictions or paradoxes across multiple cases 'increases the likelihood of creative reframing into a new theoretical vision' (Eisenhardt 1989, p. 532). Secondly, the resultant theory, having undergone repeated verification during the building process, is likely to prove 'testable' (Eisenhardt 1989, p. 547) into the future. Thirdly, Eisenhardt (1989) claims the likelihood of empirical validity due to the tight integration of data and resultant theory.

It is not uncommon for grounded theory approaches to be applied within and across a unit of analysis, that is, a case (for example, Eschenfelder 2004; Eisenhardt 1989; Martin & Turner 1986; Vaughan 1992). Eschenfelder (2004) applies an exploratory multi-case study approach and a grounded theory methodology to the study of the production of textual content for American government websites using the organisation as the unit of analysis. Lang and Fitzgerald (2007, p. 203) use a multi-case study approach with grounded theory 'to contribute towards a richer understanding of the current "real-world" context of web based systems design'.

In merging the methodologies of grounded theory and multi-case study, this investigation has generated theory from the analysis of the data collected in all cases – in this instance, organisations. Hartley (2004, p. 325) supports this approach, saying that ‘case studies have an important function in generating hypotheses and building theory’. In this study it would make little sense to examine the phenomenon of organisational strategies for web IA outside of an organisational context, and case study design is therefore a logical approach to the design of this study, with the organisation as the unit of analysis.

In general terms, Yin (2003a, p. 46) believes that a multiple-case design has rigour that cannot be afforded by a single case study. There may be unique conditions within a single unit of analysis that affect the research findings. Merriam (1998, p. 40) notes that the inclusion of multiple cases is a common strategy for enhancing the external validity or generalisability of findings. In this research, multiple organisational case studies were used to enrich the development of theory and enable its generalisability.

3.6 Considerations using this approach

3.6.1 Transferability

Lincoln and Guba (1985, p. 39) list fourteen characteristics of operational, naturalistic inquiry. Among them are the conduct of research in a natural setting or context for the object of study; humans as the main instrument of data gathering; prevalence of qualitative methods; and the utilisation of tacit knowledge. This study adopts a naturalist style of inquiry. Lincoln and Guba (1995, p. 290) address the concept of trustworthiness in naturalistic inquiry, asking ‘How can an inquirer persuade his or her audiences that the findings of an inquiry are worth paying attention to, worth taking account of?’ The authors believe that traditional, positivist terms do not support a naturalistic paradigm and restate the proposal of Guba (1981) to replace external validity with the term ‘transferability’. Transferability is the extent to which the outcome of a research project in a particular context can be applied in a similar but different context.

Kayrooz and Trevitt (2005, p. 136) use the label *external alignment* interchangeably with *external validity* and *transferability* in application to the naturalistic tradition and define it as ‘the integrity of the conclusions that are drawn from the research’ and ‘a fit between research and external world’.

Lincoln and Guba (1995) note that it is the reader of the research who makes the judgement about transferability, since information about both contexts must be known. It is the responsibility of a researcher to provide sufficient detail of the research context to allow a reader to evaluate transferability to a different situation. This study details the research situation clearly and reports the process and outcomes of the research and so that readers will be able to consider transferability to another context as required.

Lincoln and Guba (1995, p. 124) acknowledge that since ‘an inquirer cannot know all the contexts to which someone may wish to transfer working hypotheses; one cannot reasonably expect him or her to indicate the range of contexts to which there might be some transferability’. Yet it is useful to consider some of the contexts to which this research in web IA may transfer. For pragmatic reasons, this research was conducted in Australian capital cities. That being the case, an Australian context flavours the research output; the employment patterns, opportunities for learning, internet maturity levels and ways of working are all unique to metropolitan Australia. It may, however, provide some insights and benefits to large organisations in other countries, particularly those more allied with the Australian cultural context and situated in metropolitan environments.

This study may not transfer well to small organisations, which do not enjoy the same economies of scale as larger organisations – a factor that may preclude them from employing the IA skills that they need. A small organisation, almost invariably, is in need of a website with effective IA, but the issues that beset a small enterprise in achieving this are different from those in large organisations.

3.6.2 Triangulation

The main way that researchers of naturalistic inquiry strengthen the external alignment of their research is by the use of *triangulation* (Kayrooz & Trevitt 2005, p. 143). Triangulation involves taking multiple perspectives of the same event, ‘since this is likely to lead to less biased and more accurate information (Kayrooz & Trevitt 2005, p. 143). The use of multiple methods in this research in obtaining data about the topic increases the validity of the emergent theoretical framework. The three major methods or tools that are used to collect information about web IA in each organisation are group narrative, semi-structured interview and document analysis and each is more fully described in chapter four.

External alignment is also improved in this research by the use of the rigorous data coding procedures and the methodology of grounded theory (Glaser & Strauss 1967). Grounded theory proceeds with the constant comparative approach to the discovery of ‘latent pattern in the multiple participants’ words’ (Glaser 2002, para. 9). It is not concerned with the accuracy of the narrative. By using many cases of the same phenomenon, any bias or individual perspective in the data collected is constantly corrected (Glaser 2002).

3.6.3 Reflexivity

Reflexivity is a consideration by a researcher of their position in the research. It is not possible during qualitative research to claim an entirely neutral role; hence the role should be examined in an open and detached way. Charmaz (2006, p. 188) describes reflexivity as ‘the researcher’s scrutiny of his or her research experience, decisions and interpretations in ways that bring the researcher into the process and allow the reader to assess how and to what extent the researcher’s interests, positions, and assumptions influenced inquiry’. In this research, a major consideration for the investigator was that she had previously managed the website of a large organisation and the processes of web IA. A reflexive position was taken by the researcher during her interactions with research participants not to bring any of her prior experiences, knowledge or perspectives to the conversation.

Symon and Cassell (2004, p. 6) comprehensively describe reflexivity thus:

Critical appraisal of our methodological practices, for example thinking about how the research should be designed or conducted in order to provide a convincing account; thinking about alternative interpretations of our results and how these might be refuted; thinking about the role we might have played in producing the results; reflecting on the choices that were made during the research process and reasons for them.

Some choices can only be made during the research project, and as they are made, the researcher is required to maintain a 'reflexive stance' (Charmaz 2006, p. 188). As this study proceeded, a number of decisions were made: for example the specific organisations that were studied were selected and the individuals within the organisations for group narrative and follow-up interviews were identified. These choices were made in a reflexive manner. One specific decision that required a reflexive stance was the possibility of using the organisation in which the researcher worked as a case study for the research. Access to the field was assured, but because of the pre-existing knowledge that the researcher possessed about the organisation at large and how web IA was carried out, a choice was made not to add this organisation to the set of case studies to be investigated in the research.

3.7 In conclusion

This chapter outlines the adopted framework and approaches to the design of this research and justifies the choices that have been made in the process. An epistemology of constructivism, a theoretical perspective of interpretivism and methodologies of grounded theory and multiple case studies that have been adopted in this research are outlined. Transferability, triangulation and reflexivity are key considerations in the research approach and they are addressed in this chapter. Methods of data collection are described in detail in the following chapter.

4 CHAPTER FOUR DATA COLLECTION AND ANALYSIS

4.1 Overview

The chapter begins with an account of the selection of organisations for inclusion and scrutiny in this study and presents a profile of the organisations that accepted the invitation to participate. It then describes the methods that were used to collect data from these organisations and the process of analysis and interpretation of data within a grounded theory methodology. The chapter concludes with a description of the analytic work, which is detailed in a series of phases. This study is imbued with a concern for ethical practice and that is signaled throughout the chapter.

4.1.1 An ethical approach

The ethical considerations of this study have been explored, and issues such as voluntary participation, informed consent, anonymity, confidentiality and reasonable use of work time were comprehensively addressed in an application to the Ethics in Human Research Committee at Charles Sturt University. That committee, satisfied that the research would be conducted in an ethical manner, approved the research approach and issued a protocol approval number, 2007/063.

The trust of research participants was gained in a discussion of these ethical issues prior to collection of any data. At that time, they were assured of anonymity at the individual and organisational level by a full explanation that the disseminated research outcome is an integrated conceptual framework rather than a description of their organisation. Research participants were given written letters of information and consent forms for their written endorsement. These documents are attached in Appendix A.

4.2 Selecting case studies

Case studies of large organisations with websites that are publicly accessible and predominantly used for the purpose of informing clients are important components of

the research design. Important criteria for selecting an organisation for inclusion in this study are that it has a website that is predominantly used for information delivery and that is fully accessible to any user of the web – that there is no password requirement for access. This does not exclude public-facing websites that served as access points to restricted online environments.

In order to establish that the organisation was of a considerable size, only those with over 300 employees were included in the research. A large organisation is variously defined, but at the lower limits McAdam and Reid (2001) consider a large organisation as one in excess of 250 staff. In order to move away from an arbitrary boundary and ensure the characteristics of a large organisation, that number was shifted to 300 for this study. In short, the imperative for selecting an organisation was based on the three criteria of:

1. Possessing an information-rich website
2. Possessing a website that is public-facing
3. Staff numbers being greater than 300.

There was no unique or unusual attribute of any case that was considered in its selection. It might well be considered a typical ‘instance drawn from a class’ (Adelman, Jenkins & Kemmis 1983, cited in Merriam 1998, p. 28). Organisations were not drawn from a particular sector; rather, they were selected as they fitted the three criteria mentioned above. All of the organisations were Australian and, whilst some of the organisations had a presence in more than one Australian location, field work took place in the cities of Canberra and Melbourne. All other conditions and circumstances within the organisations studied were considered as the contextual background for the study of the phenomenon of the practice of web IA. It is the interaction of the activity of web IA and these contextual factors that forms the basis for this inquiry of situated practice.

Grounded theory prescribes that the collection and constant comparison of data, and hence the incorporation of new organisations into this study, continues until the point at which additional data no longer informs and shapes the emergent theory. Thus the number of case studies could not be stated with total confidence at the

commencement of the project. It was, however, anticipated that in excess of four organisations or cases would be needed to reveal adequate data for the building of this substantive theory and by the conclusion of the study seven organisations were investigated. This is in keeping with the experiences of Martin and Turner (1986, p. 149), who report from their extensive use of grounded theory in organisational studies that ‘by the time three or four sets of data have been analysed, the majority of useful concepts will have been discovered’.

Cases must be chosen well to achieve the greatest understanding of the critical phenomena (Stake 2005, p. 450). Stake (2005, p. 451) recommends choosing cases from which we expect to learn the most and comments that this may simply mean ‘taking the one most accessible or the one we can spend the most time with’. The pragmatics of access and willingness of individuals to spend time with the researcher were significant for the inclusion of organisations in this study.

4.2.1 Gaining access

In accord with the ethics approval, the willingness of an organisation to participate in this research was gauged by contacting the person in the role of web manager or the role most similar to it within the organisation. Agreement to participate in the research was subsequently sought by individual participants, but buy-in to the research at the web management level was the essential first step and one which created the access to the organisation. Two organisations that were approached and invited to participate in this research declined the invitation.

Pickard (2007, p. 73) points out that gaining access to a particular research site is complex, and although the formal gatekeeper may be willing to participate in a research project, gaining the trust, confidence and cooperation of individuals so that they will fully participate is also a necessity for the success of the research. All levels of approval, hence access, are dependent on the organisational members being fully informed of the research, especially at the points where they feel vulnerability.

The keys to access are almost always in the hands of multiple gatekeepers, both formal and informal. In most cases those gatekeepers, before giving assent, will want to be informed about the inquiry in ways that will permit

them to assess the costs and the risks that it will pose, both for themselves and for the groups to which they control access (Lincoln & Guba 1985, p. 253).

Staff members who made significant contributions to the management and practice of web IA within the organisation were invited to participate in this research. The preliminary work in each organisation was to identify those individuals who were most involved in web IA and to invite them to be part of a group narrative – to collectively tell the story of how web IA was carried out in their organisation. This was achieved by the researcher in dialogue and negotiation with the web manager or equivalent. Once those people were identified, the web manager took on the responsibility of contacting them, gaining their assent and coordinating a time for the group to meet with the researcher.

Prior to the conduct of the research, an information sheet about the study and a consent form were circulated to the research participants by email. On first meeting with the participants, the researcher made available additional printed copies of the information sheet and asked if there were any questions about the research in general or the process about to take place. When all questions had been addressed, a consent form was distributed to research participants and they were invited to signal their consent to take part in the research. The signed consent forms remain filed under lock and key in the researcher's office. Thus, due consideration was given to research participants' concerns and confidence in participating in the research.

All narratives and interviews were conducted at the organisational site at a venue arranged by the web manager and were captured using a digital recorder. The audio files that resulted were subsequently transcribed as required. This is discussed in greater depth later in this chapter. An offer was made to return copies of the audio and textual transcripts of the group narratives and interviews to participants if they wished. Those that accepted this offer were forwarded the data in textual and audio formats.

The nature of grounded theory is that data is collected as necessary to support the development of the theory, thus exact data collection time commitments were difficult to predict. Yet it was expected that the initial open group narrative or story telling of how IA is carried out within an organisation would be conducted in less

than three hours – and that follow-up interviews of less than two hours might be required with some or all of the research participants in each organisation. This expectation was conveyed to research participants in writing prior to the conduct of the research. All research was conducted during normal working hours.

4.2.2 The participating organisations

Table 1 summarises the more objective data gathered about each participating organisation and offers a brief profile of the organisations or case studies.

Table 1 Web staff and structures in organisations studied

Org	Web manager	Central web team	Centrally employed web information architect	Location of web team (if existing) in organisational structure	Forms of governance for web?	Consultants
A	Yes	Yes	Yes	Knowledge/Information management unit	No	No
B	Yes	Yes	Yes	Knowledge/Information management unit	No	No
C	Yes	Yes	No	Communication	Yes	Yes
D	No	No	No	NA	No	Yes
E	Yes	Yes	No	Marketing/Communication	Yes	Yes
F	No	No	No	NA	No	No
G	Yes	Yes	No	Marketing/Communication	No	No

Having presented this information about each organisation, it must again be acknowledged that a grounded theory approach to case study research is not to describe each case. Grounded theory approaches analysis by fracturing the data collected in each case study and rebuilding that fractured data into a conceptual framework – constantly comparing all data (Charmaz 2006, p. 60). A description of how web IA is carried in a specific organisation or the organisation itself is not the intended outcome of this study. The data in Table 1 are also part of the data that has been fractured and re-constituted as a conceptual framework for web IA in large organisations.

4.3 Methods of collecting data

Methods are the researcher's tools, techniques and procedures used to gather data (Kayrooz & Trevitt 2005 p. 116). They are the fourth and most pragmatic element in Crotty's (1998) framework for approaching research that was outlined in chapter three. A qualitative approach to data collection was used throughout the research. The following paragraphs elaborate on the research methods that were used within each organisation that participated in this study, namely those of group narrative, in-depth semi-structured interviews and document analysis.

The first method employed was to ask the group of people with responsibility and involvement in IA to tell the story of how it was achieved within their organisation. These narratives were analysed and followed up with more focused semi-structured interview questions to further the development of theory as needed. The data (the narrative and interview transcripts) were coded to allow concepts and their relationships to be established. The researcher also examined web IA documentation that existed within an organisation – be it policy, process or best practice documents.

4.3.1 Group narrative

At each organisation the staff most concerned with web IA were asked as a small group to focus on the question: 'How is web IA carried out here?' As Kayrooz and Trevitt (2005, p. 9) point out, this group of people are gathered because of their similar experiences or shared circumstances. In this research the common thread was a workplace purpose of structuring information for the organisational website. After initially presenting the group with this open question, the researcher initiated 'ice-breaking' dialogue by asking the web manager to recount a little about the history of the web in the organisation. From there, the conversation and story of how web IA was practiced was told. At all times the researcher acted as the facilitator 'to ensure that topics are addressed in a balanced way, and that all participants have an opportunity to contribute' (Kayrooz & Trevitt 2005, p. 9). The size of the group varied across organisations from two to four research participants, and whenever the roles existed within an organisation, the group included the web manager and web information architect.

‘Narratives are oral or written accounts of personal experience, told either to oneself or somebody else’ (Hoyle 2002, p. 394). Unlike responses to open-ended questions, narratives have the structure of a story and are used to reveal information that might not be attainable by more structured means (Hoyle 2002, p. 394). The interaction between participants is likely to trigger additional insights (Kayrooz & Trevitt 2005, p. 9). The complex story of achieving web IA in an organisational environment is one that could, to a large extent, be constrained by more structured approaches to data collection. Hoyle (2002, p. 395) suggests that narratives can reveal themes that a researcher might not even think to ask about and can be particularly useful in the initial phase of a research project, ‘when the researcher is trying to identify the variables that are critical to understanding a phenomenon’.

4.3.2 Semi-structured interviews

Follow-up semi-structured interviews about the way that the practice of web IA is enabled within each organisation took place, when required, after the preliminary analysis of the data collected at the group narrative. Kayrooz and Trevitt (2005, p. 8) claim that interviews are particularly appropriate to collect complex information, and when research ‘needs to probe to clarify previously existing information’. In keeping with the grounded theory tenet of theoretical sampling, the need for follow-up interviews in each case study to provide the information needed to build or disprove emerging concepts and theory, was identified following the analysis of the earlier group narrative data. Similarly, the most appropriate interviewee and the interview questions and structures were determined for each organisation after the collection and analysis of each initial group narrative data. Of the 7 organisations studied, the researcher determined the need to conduct follow-up interviews in 4 organisations. In organisations A, B and C follow-up interviews were held with the web manager. In organisation F, an organisation without a web manager, a staff member responsible for high level web sites including the homepage was interviewed.

Kayrooz and Trevitt (2005, p. 8) promote the interview as the most widely used method of data collection in organisational research, allowing the researcher to enter into the real-world experience of the participant and gain rich information at great depth. Interviewing key informants, those with knowledge of how the organisation

achieves web IA, provided data that may have otherwise taken a great deal of time and effort to collect. ‘Advice and feedback from key informants increases the credibility of any research project’ (Kayrooz & Trevitt 2005, p. 190).

It is relevant to note that some follow-up interview data about IA in organisations has been sought from only one key informant and that the accuracy of the data is open to the perceptions of a single person. Glaser (2001, p. 145), however, downplays the importance of any one data item saying that ‘data is always as good as far as it goes, and there is always more data to keep correcting the categories with more relevant properties’. Any bias in the data collected from a sole informant was corrected by the constant comparison of data and the fact that a grounded theory is not about accurate description – it is about building concepts and increasing levels of abstraction. This ‘abstraction from time, place and people frees the researcher from the tyranny of normal distortion by humans trying to get an accurate description to solve the worrisome accuracy problem’ (Glaser 2002, para. 3).

4.3.3 Document analysis

The study also examined any web IA documentation that existed within each organisation – be it policy, process, checklists or best practice documents. Any internal or external documents that guided the work of IA within the organisation and that could be made available to the researcher were collected and became a component of the analysis. Whilst not coded, like narrative and interview data, the IA documentation was scrutinised for new insights and confirmation of emerging theory. IA documentation provided another perspective on the practice of IA in the organisation. Delheim (1986, p. 20) considers documentary analysis:

Without extensive research in corporate records it is all too easy to accept one’s informant’s statements at face value or to mistake an external façade for an internal reality. Documentary research provides an excellent means to test the accuracy of different images and perception of the organisation and to compare espoused and actual values.

A variety of best practice guidelines and checklist documents were analysed for what they revealed about the reality of IA within an organisation. They were examined for their fit and purpose within the social context within the organisation. Unexpectedly,

the research participants often pointed to web templates enacted on websites as powerful forms of documentation and policy enactment. These too were considered data in this research.

4.3.4 Justifying the choice of methods

Kayrooz and Trevitt (2005, p. 231) note that questionnaires are another widely used tool for collecting data in organisational research and have common features with interviews in that they consist of clearly constructed questions directed to individual participants. They differ, however, in that they are most suited for well known topics where questions can be fixed in advanced. Web IA and its conduct in large organisations have not been widely researched, nor is it a well established practice with its own language and shared understandings. It is better investigated by complex questioning and the resultant emergent insights from conversation (Kayrooz & Trevitt 2005, p. 232). Questionnaires are not suitable tools for collecting data in this exploratory research.

Observation is another well regarded research method that was considered inappropriate for this research endeavour. The practice of web IA with multiple and dispersed stakeholders and processes is difficult to observe. Its ongoing nature and spontaneous responses do not allow for a contained practice that will avail itself to time-dependent observation.

The overall approach to data gathering for grounded theory in this study is supported by Glaser (2002, para. 5), who states that ‘much grounded theory interviewing is a very passive listening and then later during theoretical sampling focused questions to other participants during site spreading and based on emergent categories’. The group narrative and the document analysis in this study comprise the ‘passive listening’ component of this research, and active and directed theoretical sampling is made possible by the semi-structured interviews.

4.4 Analysis of data

4.4.1 Analysis and research participants

The researcher gave full consideration to the possibility of involving research participants in the analytic processes of this study. Charmaz (2005) describes the value of the joint efforts of researchers and participants in analytical work in the field of social justice research. She argues that, in that field, participants may have taken a reflexive stance on practice and are committed to change and can reasonably be involved in analysis. However, involving participants in analysis should not be the situation for all research. ‘Although well intended, doing so may create a series of knotty problems in concrete situations’, notes Charmaz (2005, p. 512).

Morse (1998, p. 444) warns that research participants are generally not analysts and suggests that a theoretical analysis derived from a participant’s narrative may reveal a larger conceptual picture of ‘nuances, paradoxes and intricacies that may not be evident to the participants themselves’.

Furthermore, the research product is a synthesis of multiple participant’s perspective and is more representative than the perspective of one participant. It is not a requirement for theory evaluation – and indeed, it is an extraordinary and unrealistic expectation – that the theory, which by definition, is decontextualised and abstract, be a perfect fit to the particular experience of a single participant (Morse 1998, p. 443).

Morse (1998) goes on to claim that participant involvement in analysis compromises the formation of theory and is a threat to validity. For these reasons, in this study participation and feedback on the emerging theoretical constructs was not sought from individual participants.

Whilst participants did not take an active role in the analysis of the data in this study, they continued to take part in the construction of theory throughout this research via the process of theoretical sampling. Rigour in grounded theory is achieved by testing emerging concepts and assumptions about the phenomenon that we are studying and by returning to participants and collecting more and appropriate data to verify these assumptions (Strauss & Corbin 1990, p. 176).

Charmaz (2006) sees the collection of rich data as an essential component of quality and rigour in research. From her constructivist perspective, she sees the need to enter the ‘research participant’s worlds’ and achieve a ‘careful and interpretive understanding’, considering what is not stated and what lies beneath the surface of description (Charmaz 2006, p. 19). Rich, substantial and relevant data are the research participants’ contribution to the development of theory in this study.

4.4.2 Coding

Grounded theory coding takes at least two forms (Charmaz 2006, p. 44). Initial coding is open and involves very close and detailed scrutiny of the data. Codes emerge as the data and its meaning is studied. During open coding, the researcher must remain open to any and all concepts that emerge from the data and must not be influenced by preconceived theoretical directions. ‘Initial codes are provisional, comparative and grounded in the data’ (Charmaz 2006, p. 48).

With an analytic direction from open coding, the second form of coding can begin. Focused coding takes place by examining the most significant and frequently used open codes. These are tested and used across a large data set to examine their ability ‘to categorise the data incisively and completely’ (Charmaz 2006, p. 57). It is here that the process of *constant comparison* (Glaser & Strauss 1967, p. 102; Charmaz 2006, p. 54) of data against data and concepts against data occurs. If the purpose of open coding is to fracture the data, the purpose of focused coding is to draw a coherent picture from the pieces (Charmaz 2006, pp. 57-60).

Strauss and Corbin (1990, p. 125) propose a third type of coding – axial coding – to link categories to sub-categories in a quest to build ‘a dense texture of relationships around the “axis” of a category’ (Strauss 1987, p. 64). They propose a more structured set of analytical steps. However, Charmaz (2006, p. 63) claims that following the leads in the data to produce categories, sub-categories and relationships is equally plausible and questions if the framework of axial coding enables or limits a researcher’s vision. Axial coding provides a frame or formulaic structure that ‘at best, helps to clarify and to extend the analytic power of your emerging ideas. At

worst, it casts a technological overlay on the data – and perhaps on your final analysis’ (Charmaz 2006, p. 63).

Whilst Charmaz does not use axial coding herself, she does not preclude others from using it. Glaser (1992) also questions the wisdom of axial coding, suggesting that it ‘forces the data’ into a predetermined pattern rather than allowing a pattern to emerge. In this study, the analysis of sub-categories, categories and their relationships will follow Charmaz’s (2005, 2006) advice, which allows flexibility and simplicity rather than adherence to an explicit framework.

Glaser (1978, p. 74) proposed a set of 18 theoretical codes to do the work of integrating concepts and has subsequently expanded his proposed set of codes (Glaser 1998). Extant theoretical codes are considered in this research but, after Charmaz (2006), they must earn their way into any formulation of theory about the practice of IA in large organisations.

4.4.3 Building concepts and categories

Building concepts and categories occurs when the researcher seeks to identify a higher level of abstraction to that achieved by coding the data (Martin & Turner 1986; Charmaz 2006, p. 91). Concepts and categories are terms that are used interchangeably in grounded theory, claim Martin and Turner (1986, p. 147). Having classified data into codes, it is time to consider ‘what category does this code indicate?’ (Charmaz 2006, p. 92). A concept label representing the category is, therefore, one into which a number of codes or labeled incidents, facts and observations might be clustered.

Dey (1999, p. 63) points out that in grounded theory, categories are conceptual, creative constructs that provide for classification of concepts at increasing levels of abstraction. He also points out that grounded theory categories are connective and used in the interactive analytical work of constant comparison.

Charmaz (2006, p. 186) suggests beginning this process with focused codes and attempting to treat them as categories. They are evaluated in the process and less helpful ones fall into disuse (Martin & Turner 1986, p. 149). The codes that have

overriding significance are retained. An alternative approach is to abstract common themes and patterns in several codes into an analytic concept (Charmaz 2006, p. 186). Both approaches to category formation are used in this project. At times a semantic code from the coding process would be elevated to form a higher level concept and at other times a new named abstraction was introduced to house a cluster of codes with similarities.

Collection of data and analysis continued until *theoretical saturation* (Strauss & Corbin 1990, p. 188; Charmaz 2006, p. 113) occurred. At this point the analysis of new data did not add fresh insights about the practice of web IA and was deemed to no longer inform the emergent theory.

4.4.4 Using software to support analysis

NVivo version 7 was used as a software tool to support the management of the collected data. A current debate about the use of software to support qualitative analysis was considered. Some researchers (see, for example, Marshall 2002) argue that software places a barrier between the researcher and the data and interferes with the analysis. But Pickard (2007, p. 281) points out that the comprehensive management and arrangement of data using software in large complex projects may provide an agility and flexibility to the analysis that improves the quality of the research conclusions. Durkin (1997 p. 92) assures us that ‘QDA [qualitative data analysis] programs neither promise nor threaten to think. QDAs cannot theorise, nor do they automatically create complex data codes. What they can do is improve our relationship to the data’.

In this study, NVivo was used to tag data segments to initial codes that were created and named by the researcher. NVivo was again used to manage the depiction of categories and sub-categories once those categories had been creatively and manually constructed by the researcher. The software tool proved beneficial in the management and arrangement of data and abstract constructs.

4.4.5 Details of the analytic process

This section of the chapter draws attention to the specifics of how the analysis proceeded and describes the process and interplay of data collection and analysis.

Whilst the researcher, of necessity, worked one step at a time, the iterative nature of data collection and theory building in a grounded theory approach is revealed in this account of the field work and analysis of data.

The data collected about the way an organisation enables the practice of web IA has been coded and reassembled as concepts in this research. Grounded theory produces conceptual hypotheses rather than findings or facts (Glaser 2001, p. 160). The resulting conceptual framework is not proven; it is grounded or suggested by the data. Collected data is selected and used as illustration through vivid imagery to establish understanding as need arises (Glaser 1978, p. 134).

The analytic process is outlined via a series of phases that describe the sequence of activity and by a number of exhibits that seek to demonstrate the building of levels of abstraction during each phase. The exhibits presented do not encompass the full coding of data and analytical work; rather a small subset of data are used to demonstrate process.

Phase 1

Data were collected from the first organisation in April 2007 and from the second and third organisations in August and October 2007. Data collected from the first three case studies were fully transcribed by a professional transcription service. Once in textual form, the data from these three organisations were initially coded in their entirety by the researcher using the software NVivo version 7 as a supporting tool. Coding began and continued after the data collection at each individual site. Thus, all data from the interactions with the first three organisations were carefully coded on a phrase or incident basis to reveal their analytic import (Charmaz 2006, p. 42).

This initial coding process is demonstrated in Table 2, which begins a series of three exhibits that demonstrate the process of analysis and the construction of theory.

Table 2 reveals the initial or open coding of data to deconstruct and semantically tag

the collected data. The initial list of open codes that was created at the conclusion of this phase was reviewed and several of the codes and the data categorised within them were merged, as they were deemed to be describing the same notion.

Table 2 Exhibit of analytic process – part a

Data	Initial code
<p>But I guess it came to a head recently because the department restructured as a result of the budget and xxxxx is now a big thing for the department, and so there's a new division of xxxxx within the department and they wanted that reflected on the homepage. [Org B]</p>	<p>Meeting business needs</p>
<p>Recently two of our divisions shut down and merged with existing divisions and that has generated an enormous amount of workload. We had a joint venture that came back into the fold. So first we had to convert everything through into the new division, and then the decision was made, after the last round of budget cuts, to actually merge that in with other divisions. So it sort of, just as we were getting near the end of the first job, we had a whole new job. [Org E]</p>	<p>Following business change</p>
<p>And things might completely change after the election and there might be a new division, a new department and all that sort of stuff. [Org D]</p>	<p>Following business change</p>
<p>we're so flat-out, we're doing stuff we're going "oh we know this isn't quite right but you know it's got to be live tomorrow, we'll put it up, we'll worry about it a bit later. [Org B]</p>	<p>Doing the IA later</p>
<p>So I'll tell you what, when we first launched, the divisions were very down, about five clicks deep into the website and you wouldn't believe how much angst it caused us. And we ended up pulling them up and giving them a direct link from the homepage..... from the foundation layer so that everywhere has a fly out to all the divisions. Politically, it just wasn't worth it. [Org E]</p>	<p>Conflict</p>
<p>Yeah, we get things imposed, we get told to do things because someone decides that's what it's going to be, like definitely! [Org E]</p>	<p>Power</p>
<p>Yeah certainly here and when I worked in other places, the boss has a lot of power and it can basically be the boss wants this and to hell with good IA... [Org B]</p>	<p>Power</p>
<p>It is all about persuasion, horse trading skills. It is not like they say in the textbooks where you can go away and do this research and come out with some wireframes and then that is kind of it. That is the easy bit really. [Org A]</p>	<p>Working across units</p>
<p>That is the reason why we employed him – seductiveness. Yeah I think the approach should be consultation first, and confrontation as the last resort, and we probably wouldn't bother unless it was something that seriously embarrassed the organisation. [Org A]</p>	<p>Avoiding conflict</p>

Phase 2

Despite the possibility of applying theoretical sampling at the level of selecting organisations, it was not considered because not enough of the internal practices of an organisation could be discerned prior to the collection of data within that organisation. Thus, all of the remaining organisations were selected based on the three criteria outlined in section 4.2 and being able to access the field. Data were collected from two more organisations during July and August of 2008.

After its collection, data from these two organisations were fully transcribed, again by professional transcribers. With these transcriptions available, the grounded theory analysis moved to the focused coding phase. The initial codes were tested against this extensive data (Charmaz 2006, p. 42). With this scrutiny and comparison of the additional data to the codes, several more codes were added to the list that was created in phase 1. The final list of 115 open codes embodied the beginning of the interpretive rendering of this studied phenomenon of the situated work of web IA and is presented in Appendix B.

Phase 3

At this point the analytic process moved to a more integrative phase. The open codes were sorted and clustered to build higher level concepts. Comparison between concepts revealed relationships that formed the basis of even higher levels of abstraction or categories. All documentary support for the practice of web IA that was given by the research participants was considered in conjunction with the group narrative and interview data.

A preliminary theoretical framework was constructed again using NVivo as a supporting tool to document the emerging conceptual picture. Appendix C reveals the preliminary and transitional conceptual framework that emerged from this focused integrative phase of the analysis. It consists of four major categories and associated sub-categories at this point in the analysis.

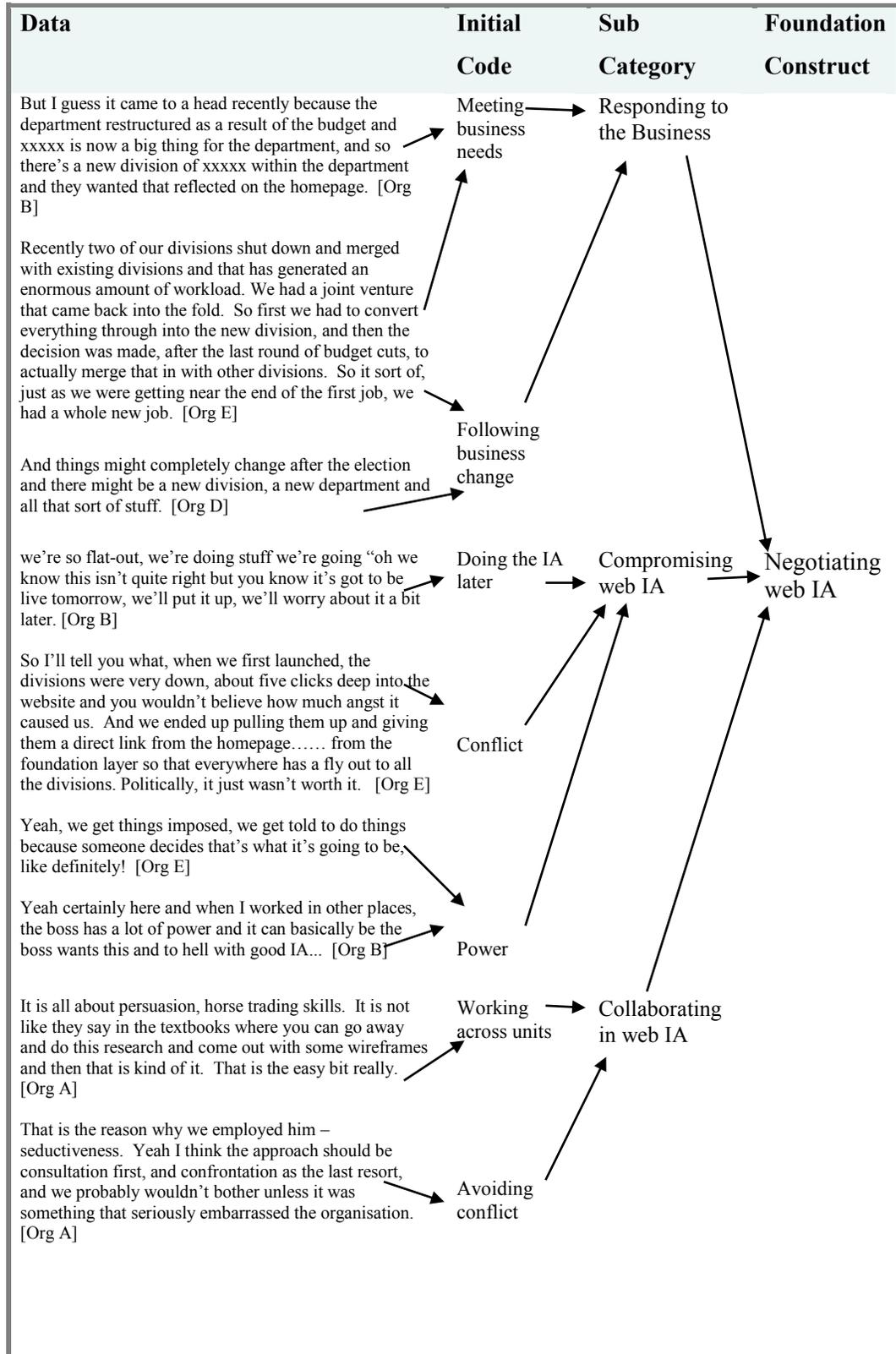
Table 3 extends the exhibit of analysis shown in Table 2 using the same small section of data and demonstrates the formation of minor and major subcategories as the analysis reaches a higher level of abstraction.

Phase 4

Data were then collected from two more organisations during September of 2008 and February of 2009. Rather than full transcription of this data, the researcher repeatedly listened to the audio data and tested the data against the provisional theoretical frame, transcribing as necessary. Strauss and Corbin (1990, p. 30) support this approach, saying ‘as your theory develops, you may wish to listen to the tapes and transcribe only those sentences, passages, or paragraphs that relate to your evolving theory’. The provisional categories and concepts did not change with the careful study of the data of the seventh and final organisation. Theoretical saturation was indicated. Data from these final organisations was partially transcribed by the researcher and used to describe the conceptual outcomes in the narrative of this thesis.

Acknowledging that theoretical saturation is the goal of grounded theorists, Charmaz (2006, p. 114) notes the hazard of claiming theoretical saturation that may not have been reached, especially in novel and complex enquiry. Dey (1999, p. 257) challenges the notion of theoretical saturation, saying that it requires conjecture, and prefers the goal of *theoretical sufficiency* to denote a set of categories well supported by the data. At its analytical conclusion, this research claims to have approached theoretical saturation and reached theoretical sufficiency in its final abstraction and formation of categories.

Table 3 Exhibit of analytic process – part b



As mentioned in chapter three, this study has followed a ‘constructivist’ grounded theory approach after Charmaz (2006). Glaser and Strauss (1967, p. 40) and Glaser (1978, p. 93) call for the identification of a single core category at the conclusion of every grounded theory analytic process. At odds with this prescription of outcome, Charmaz (2006, p. 132) argues against the rigidity of the insistence that a single core category must emerge from the studied phenomenon. In accord with constructivist grounded theory, this research is more concerned to represent ‘diverse local worlds and multiple realities’ (Charmaz 2006, p. 132) than a strict adherence to a prescriptive research process that has been coined ‘positivist grounded theory’ by Charmaz (2006, p. 132). At this point in the analysis, the researcher was confident that the theoretical framework of this study would be constructed devoid of a single core category. Rather, it would present four major categories as its highest level of abstraction. Dey (1999, p. 111) encouraged this possibility saying:

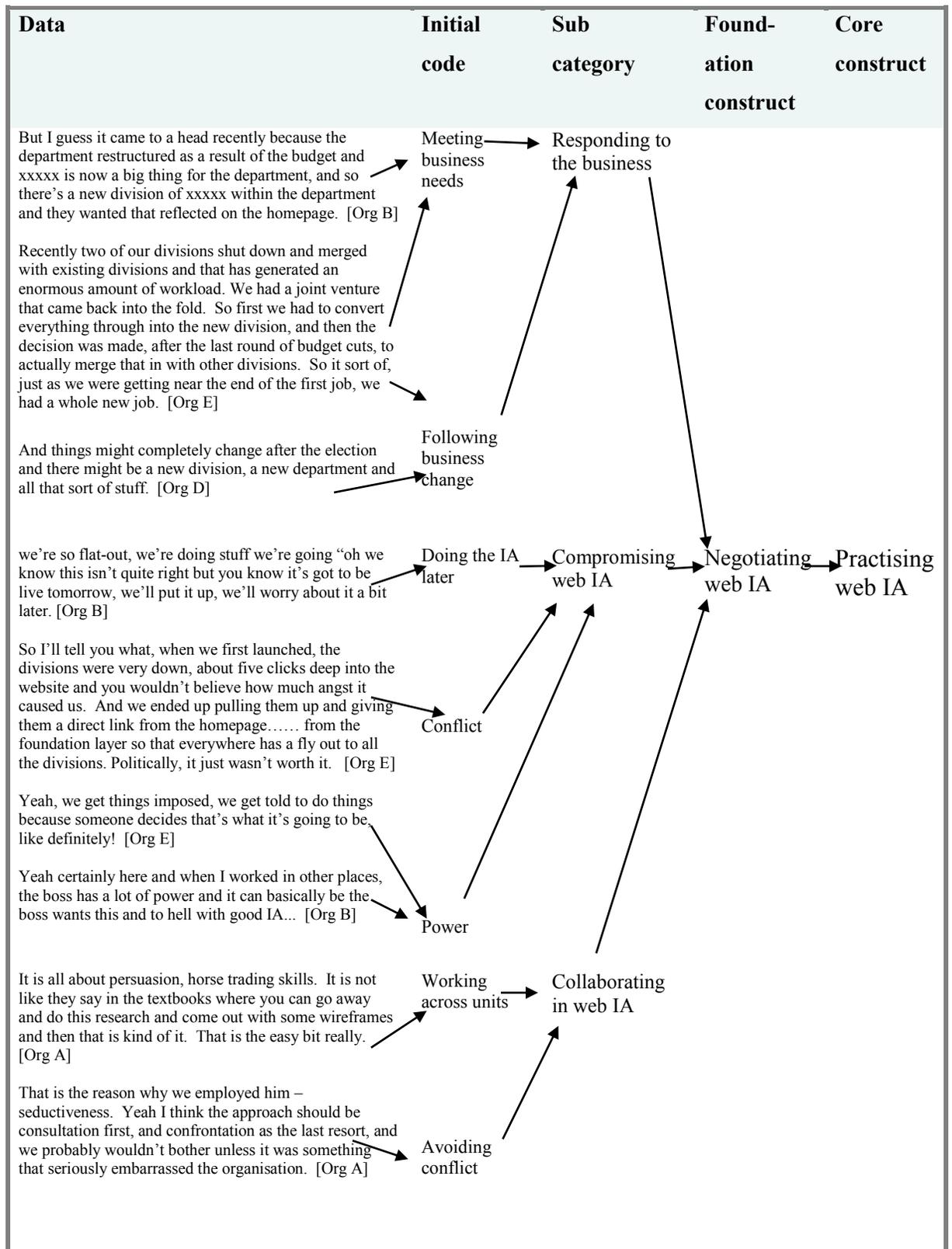
Taking one core category as a fulcrum for theory may also mislead if it excludes or underestimates the role of other important factors. The research may result in a single product rather than offer a menu of possibilities.

Phase 5

The final analytical phase of this research took place during the writing of the theoretical outcomes. The researcher embraced the detailed and subtle results of the analysis through writing. Fine-tuning and small shifts occurred in the emerging framework through this attention to detail.

In the written consideration of the four major categories and their integration, a higher level of abstraction emerged. From the accumulating interrelatedness of the four existing constructs, an overarching core category became apparent. It was informed by extant literature, which Glaser (1978, p. 31) recommends be consulted for an integration of ideas when a ‘theory seems sufficiently grounded and developed’. Thus, the theoretical framework shifted in the final phase of analysis to include a single core category and its properties, yet maintained the constructivist approach to grounded theory by not forcing data to fit a particular outcome. This last phase of the analysis is added to the exhibit in Table 4.

Table 4 Exhibit of analytic process – part c



Shifts throughout the analysis

Throughout the process, the collection of data at a particular organisation was followed by analytical activity that was dependent in its nature on the phase of the analytical process. During phase 1, the first three organisations were treated as initial sampling research sites or starting points to the research. As the data collection progressed to the fourth and fifth organisations of phase 2, theoretical sampling was subtly at work. Greater focus was placed on the verification of the provisional conceptual framework in the analysis of data from organisations six and seven within phase 3. Whilst the methods of data collection remained constant, the tentative concepts that were emerging from analytic work between field visits drove a different nuance in the sampling objective which focused more on the ‘conceptual and theoretical development’ of the analysis as the research progressed (Charmaz 2006, p. 101).

A major and final shift was in the shape of the theoretical framework itself. As mentioned, very late in the analysis a single core category emerged to integrate and house the entire substantive theory.

4.5 In conclusion

This chapter describes of the importance that the researcher has placed on professional ethics throughout this study. Considerations and criteria for the selection of case studies are described and a profile of organisations that took up the invitation to participate in this research is presented. The methods used to collect data are discussed and justified. This chapter then describes the iterative nature of grounded theory data collection and analysis and points to the variants that have formed in the grounded theory analytic process since Glaser and Stauss’s (1967) first recommendation. Embracing the evolution and refinement of grounded theory and following Charmaz’s (2006) lead, this chapter reports a constructivist approach to analysis of data and provides a detailed account of the analytic process.

5 CHAPTER FIVE BUILDING THE THEORY

5.1 Overview

This chapter begins the presentation and description of the grounded theoretical outcomes of this research endeavour. In four main sections, this chapter details and describes the emergent major sub-categories of:

- *Owning web IA*
- *Negotiating web IA*
- *Enacting web IA*
- *Knowing web IA.*

A detailed discussion of these four major concepts that underpin a core or central category is provided in this chapter. That discussion is supported by excerpts from the collected data. The four concepts provide a foundation for an integrated theory that is proposed in chapter six.

5.2 Presenting the foundations

To some extent this theoretical framework is presented as it was ‘discovered’ (Strauss & Glaser 1967) – from the bottom up. The first discovered and four major sub-categories are initially described, providing a rich understanding of the various aspects of the work of web IA. Earlier warnings of Dey (1999, p. 111) that a core category may overshadow, exclude or underestimate other importance facets of a theory and bury a ‘menu of possibilities’, are negated by the early prominence and detail afforded the major sub-categories in this thesis.

The tight integration and iterative nature of the voluminous data and its analysis using the grounded theory approach of this research, is revealed in the presentation of this chapter. From the analysis of the data a conceptual picture has emerged which will be used in this chapter to structure, house and reveal the data at greater depths.

Discussion of the analytical results of this research is supported and entwined with the presentation of segments of data. Research data, the voice of the research participants, is integral to the reporting of the outcomes and is interspersed within the thesis prose to enrich the discussion. Where names of people or things may identify research participants they have been removed from the data.

The four major sub-categories will be used to frame their discussion in this chapter. This approach has Charmaz's (2006, p. 163) support: 'use your major categories for headings of sections. Your categories ground readers in your topic and direct them through your analysis. They foreshadow the content and emphasise the logic'. The major section headings to follow are those that name the major sub-categories that result from the analysis:

- *Owning web IA*
- *Negotiating web IA*
- *Enacting web IA*
- *Knowing web IA.*

5.3 Owning web IA

The first section of this chapter reports the importance and the extent to which large organisations take ownership of the information structures that comprise their websites. *Owning web IA* is purposely constructed as an action to indicate the ongoing activity involved in taking up the responsibility and attending to the information space of corporate websites, rather than any nuances of possession. The research data is rich with reports of how whole-of-organisation ownership and responsibility affects all aspects of its website, including its information structures. It should be noted that the literature in this area is scarce and that few studies about responsible and intentional action by organisations to attend to web IA have been carried out.

This section discusses the way in which large organisations arrange the work of the web and in whom authority and responsibility are vested. Organisational behaviours such as proclaiming a vision, providing adequate funding, implementing a

management layer for the web, championing the web and providing some level of governance combine to constitute an environment in which the web and its information structures can take a position of importance and value. In turn, an effective information resource is created for the enterprise. This section also examines patterns of work, decision making, and aspects of governance that impact on web IA.

Table 5 serves two functions: It lists the contents of this section and outlines the lower-level categories that were created in the formation of *Owning web IA*.

Table 5 The major sub-category of *Owning web IA*

Major sub-category	Subsequent sub-categories
<i>Owning web IA</i>	<p>Owning the website</p> <ul style="list-style-type: none"> ○ A vision for the web ○ Challenges to owning ○ Resourcing <p>Governance for the web</p> <ul style="list-style-type: none"> ○ Committees and policies ○ Towards managing ○ Using technology <p>Web management</p> <ul style="list-style-type: none"> ○ Purposeful management ○ Without a web manager ○ Influence of web managers <p>Web IA as new work</p> <ul style="list-style-type: none"> ○ Legitimising the work ○ Locating the work

5.3.1 Owning the website

Attention to web IA in organisations is influenced by the extent to which organisations take ownership of their websites as a whole. Organisational websites and their information structures should be designed in full cognisance of corporate business goals and with an attitude of contribution to the achievement of those goals (Morville & Rosenfeld 2006, p. 232). Organisations must also create the circumstances in which this connection can occur. The extent to which an

organisation effectively grasps the opportunities that are present in this relatively new medium and creates the necessary organisational structures, roles and authorities will impact on how well the website can be developed to enable its business purpose. One research participant is able to clearly articulate that the work of web IA is dependent on the support received from a high level within the organisation:

It's really come down to the web team's skills and knowledge of IA and the resources we have, which is also tied back to the governance or the, the championing and support from higher up and if we're valued...I think that's the main thing sort of thing. [Org A]

The owning of the web – the sense that the web is a part of the business, that it has value and potential and that it requires attention – was present in varying degrees in the organisations studied. It proved an important precursor to effective web IA. Some organisations were strong in vision and business ownership of the web. Research participants in other organisations, however, revealed that their website and their work was not well governed, managed or valued by the organisation as a whole – they felt rudderless and lacking in leadership and direction.

Examining the set of seven organisations in the study reveals a continuum in the degree of web ownership and reveals a pattern of movement and growth in ownership maturity in all organisations. One research participant was able to express the slow progress of gaining support and recognition from managers above her. Her words reveal the gradual growth and awareness of the work of the web by the organisation and the sense that despite the struggle, progress is being made:

In the past and again until recently we probably haven't had a lot of support from higher up, so it's like you know it's only really lately that our boss has actually realised that we are doing good things, we really need to prove to him that this is the best way and all that sort of stuff so that is quite a battle anyway to convince him that, you know, he should stick up for us, but still he does seem to more lately. [Org B]

5.3.1.1 A Vision for the web

A high-level, explicit, corporate vision for the web is an empowering tool for web IA. It motivates and gives direction, signals strategic change and provides a rationale for the work of web IA. In its rhetoric, it strengthens the position and the status of the

work of those whose employment is based on the provision of an information-rich website. It also assists in bridging the activities that are required to produce a large enterprise website and the business of the organisation. This is highlighted in one research participant's account of strategic direction for the web in an organisation:

There is also a very high-level objective that has been set at the CEO level. He has basically said, 'By 2011 that clients and staff will have a one stop shop that will be delivered online and that will be a seamless experience between the online and offline experience'. Which clearly over the next few years motivates a large number of changes in the way that we organise information, support business functions...I guess we are sort of seeing ourselves on the edge of quite a large and prolonged series of changes to the way we do web stuff, that will likely have an effect in information architecture and whole range of other places as well. [Org A]

This statement reveals positive energy for engaging in the vision and direction set by executive level management. This organisation has exhibited a high level of owning and strategising in regard to its website, incorporating the web into its business objectives and clearly stating this vision and timeframe. Whilst the CEO of this organisation was making a very strategic and abstract statement of what an online experience would be like for clients and staff by 2011, its very existence informed staff with web IA expertise that they were part of the business future and were becoming increasingly integrated in the organisation. Their role appeared crucial to the organisation's direction and they were part of a community. There was excitement, motivation and challenge as they looked into the future and the change that would occur in response to this vision for and owning of the website.

A second organisation was further along the continuum of organisational ownership of its website. When asked if the website was attended to by the organisation's executive, this web manager replied:

Absolutely, no question about that. It is definitely recognised as a core communication channel that we have... and its number one purpose is to get key messages across to our targeted audiences... like a lot of money was sunk into getting to the launch in 2005. [Org E]

Strong linkages had been established between the business visions and strategies and the enterprise website in this organisation. The business knew what it wanted for its

website and had moved a long way toward achieving it. Web management, staffing, resources and leadership had been established to embrace the medium of the web. The web manager was able to articulate the connectedness of the business philosophy and his work of managing the web:

With the new strategy that launched ...well, that has been brought in by the current chief executive. They are definitely trying to break down some of those silos to get traction to, so, to get people working together where they can provide the most value. And our [web] project was really the embodiment of that, of that philosophy that says instead of having a whole bunch of separate websites that are costly to maintain, but more importantly I think, don't serve the organisation or users very well. This project was sort of put in place to solve that...we wanted an enterprise view of the organisation. [Org E]

The clarity of purpose and direction in the business use of the web in this organisation was edifying for web management and staff as they went about the work of web IA and other contributing tasks. There was a clear and explicit 'number one purpose' for the website. The web manager was also able to express an understanding of how the website was positioned among other initiatives that exist within the organisation. He was aware of the need for the web to be integrated into the overall organisational strategy for informing and communicating and revealed that this organisation was moving toward a more integrative approach in using its website.

This high level of web ownership was in strong contrast to another organisation, which did not inspire and lead its web staff. There was no active ownership and valuing of the website. There was no web manager in this organisation. Opportunities and responsibilities were not being taken up. This organisation put the web 'low on the priority lists'. There was a sense of despondency and neglect in the expressions of these web staff:

I just don't think we do the web particularly well... ..It's about leadership I think and priorities. I believe we're actually often low on the priority lists when they've got to deliver other stuff, and that's fine, I understand the website's not the 'be all and end all' of everybody's life, but it's an important part of what they do and whether they like it or not they've got public information up on the web that's there for the

whole world to see, and it's public and if it's wrong then it's really not a good look for the sector. [Org D]

There was disenchantment and some annoyance that higher-level managers and the organisation as a whole did not own their website responsibilities. That neglect was foreshadowed to have consequences for the organisation – public information that is not well presented or accurate will not present a ‘good look’. In an attempt to rectify this situation, several of the web staff from across the organisation had written a proposal to the executive to counter this lack of ownership of the web and its information by managers within the organisation. A clear case of managing upward to attempt to change the way the organisation attended to its corporate web presence was evident in this suggestion:

We're putting up a board paper or whatever for senior executives that managers of programs or whatever should have written into their KPIs for their performance that the website is kept up to date and that sort of thing and then measured against that ... I don't think it figures in their priorities because it doesn't have to, they're not told, they're not directed by their KPIs that it's part of their role. [Org D]

Research participants from this organisation noted that client expectations and corporate owning of the web were out of step. They also reported that rate of change in the technologies and client expectations for web service was significant and that the organisation was not being visionary or strategic in its use of the medium. Neither the present nor the future were being adequately addressed.

And the expectation is, it's on the web, it's readily available, it's always up to date. You've got to start thinking now about what will people need in five years time, or having an educated guess at least. [Org D]

5.3.1.2 Challenges to owning

Taking ownership of the corporate web can be difficult. The nature of the web establishes a diffuse, thin, digital, presentational medium in which the whole organisation can participate. Access to contribute can be relatively easy when compared to other corporate publications. Questions such as:

- which staff design information structures and write web content?

- how is the web resourced?
- who is responsible for particular web functions?

often form a maze of confusion in large organisations – rather than a set of processes with clarity. The interplay between various sections of the organisation that do not appropriately take up web responsibilities and ownership and other sections that act without authority is constantly present. This statement from a research participant portrays the confusion:

I think people sort of see it there and they, still people don't understand who owns the web and who does it and 'cause its there, it might not be good, whatever, but it's there and they don't really know as far as the money side of things go... [Org F]

Another reason that taking corporate ownership of the web is difficult is because it has often meant 'undoing' many existing websites. The stories of the history of corporate websites usually involve the original existence of many websites from business units across an organisation. Disparate websites developed mostly in the 20th century and in the absence of any ownership or direction setting for the web by the organisation, presented a very diverse visual identity to the organisation's client base. The evolving nature of the web's existence and importance to organisational life contributed to the grass-roots beginnings of multiple organisational sub-sites. In one organisation studied, 250 separate websites existed across the organisation in the previous decade.

Around the year 2000, there was an increasing realisation that the web was an integral and important medium and that organisations needed to provide enterprise-level entry into this information space. It was also realised that some visual consistency would improve the professionalism of the website and thus the image of the organisation. This research reveals that in the majority of organisations, there was a deliberate decision to move to one organisational website and a slow integration of the pre-existing sites into this corporate web presence. This account of the movement toward organisational ownership is typical:

I'll go way back...I would have thought, yeah '98, and so there were still a whole bunch of disparate websites with total different looks and

feels and there was no centralised management for it. Then in 2000, Public Affairs got the idea of creating a common look and feel across all the websites, trying to get a lot of the stuff into one common website...There was a funny project which sort of didn't quite work to do that. [Org B]

This study reveals that the corporate owning of the web is an ongoing and maturing process in organisations. It involves a revoking of an earlier tolerance of diverse business units and functions initiating the use the web in ways of their choice in order to represent a subset of the organisation. Taking back some control and ownership of the web after a period of liberality and relative tolerance proved an onerous journey in most organisations. The move to enterprise ownership of the web occurs as a gradual process and this research encountered a number of organisations in various stages of claiming corporate ownership of the web. Many organisations reported that some of these disparate websites were still in existence – the gradual revoking of earlier freedoms and the tension and conflict involved in so doing has been part of the slow steps to corporate owning of the web. One organisation reported that it was still encountering a strong independent spirit in the creation of new web information and a lack of recognition by stakeholders that all corporate information could or should be part of the enterprise site. In the following account of non-compliance, consultants played a part in opposing the enterprise approach to presenting a cohesive web interface to the world:

The perception that a whole new domain name is important, for a program, you know, a new initiative, rather than having that somewhere on our site, so that's a really big level thing, it's a political type thing, you know, a consultant coming in saying it's really good that, you know, to have a really good URL for search optimising or for this reason or that reason so then the whole content which could quite easily and logically sit in the existing structure of a website, you know, gets put onto a new website. [Org B]

Wrestling back some authority and standardisation remains a current and ongoing effort. But progress is also evident. The following quote reveals how organisational owning of the web has evolved since 2005. Where the central website had been an online space for achieving many diverse purposes, it is now a very exclusive and focused communication channel. A growing maturity in owning the web is clear:

So if I were to characterise how the thinking has changed since 2005, is that we have gone from a view that the corporate site will be everything that is web to the organisation, to a view of the corporate site is the premium web communication channel of the organisation. So it is where we will invest the most resources. [Org E]

5.3.1.3 Resourcing

With the owning of the organisational website comes a responsibility to make resources available to achieve the vision and objectives of the enterprise in its use. Many of the web staff that participated in this research were able to acknowledge the funding already in place with a sense of gratitude and relative well being. They measured the resourcing of the web in terms of organisational capacity to provide as well as in comparison to similar organisations. A very swift and strong additional message was that the resourcing of the web was not enough. Two typical accounts follow:

Within the constraints of the overall organisation I think we are reasonably well resourced. Of course we could always use more people and more money. [Org C]

So I think sort of, in general, we are probably not badly resourced compared to some others, but on the other hand we are not well resourced for the complexity and size of the tasks that we are expected to undertake. [Org A]

Even in organisations where there was a full complement of web skills in place, the scope and amount of the work was ever increasing. The demand for new initiatives and support outstripped the resources that were in place. The work of providing an effective website requires more resources than are in place in organisations at any point in time. One organisation with the resources and foresight to employ an in-house web information architect makes the point that web IA and all other web capability is being fully utilised and is challenged to provide further services:

In making the case to other stakeholders who are asking for more, more, more, making the case to them that the only way we can provide more, more, more is with more, more, more resources because we are currently using our resources to the limit. [Org A]

The work that a web team did to improve the web IA of the enterprise site created a greater demand for their services. This occurred by word of mouth within the

organisation. It also occurred when the web team built expectations and worked to more than their capacity. In responding to urgency from the business for new web content and structures, one web team regularly worked extra hours and created an unrealistic set of expectations for their services amongst the business stakeholders in proportion to the staffing of the web unit. In general the staff in web teams in large organisations at their current resourcing levels worked under significant pressure to deliver outcomes sought by the business:

But because we work all this overtime and that to get these impossible jobs you know “quick we need this thing up tomorrow or Monday” and all that type of stuff, people just assume that we’re doing this normally and they don’t realise that we’re in seven days a week...and it’s causing problems, it’s causing health, people with tendonitis, you know all that sort of stuff... and we’re just struggling and we can’t really do anything... [Org B]

Some of the work of the web and web IA was funded on a non-recurring and spontaneous basis. Generous funding for web improvement projects sometimes arose in an ad hoc manner. A web team is required to respond to unscheduled projects that attract funding from any source and for any reason. One research participant discussed, with tones of cynicism, the money that became available for web enhancement in one part of the organisation at the end of the financial year:

And they started doing the project at the end of the financial year when they needed to spend some money, once again, and so they got a person to, to manage the start of the project who, who was a graduate and he was great but it was, it was, it was a way of spending the money and a way of...giving him a job to take up time, so it was make-work, it wasn’t, it wasn’t a real desire of the division responsible for that content ... [Org B]

Web managers and staff were only too aware that resourcing is a political issue. Web staff were advised by higher management to create a stronger and more communicative presence in the organisation and market themselves to obtain funding. There were also mixed messages and confusing advice about the political wisdom of meeting deadlines:

Yeah, so it’s, we get funny messages from our boss, both saying ‘you should say no, you shouldn’t meet the deadlines’ at the same time as he’s saying you know ‘you never want to be embarrassed never

meeting the deadlines’, you know, ‘this is one, this one you can’t not do’. [Org C]

Funding for the resources for effective web IA was particularly vulnerable because of the nature of the work. The processes and activities of organising information on the web are little understood by non-practitioners and outcomes of web IA lack visibility when they are most effective. ‘Good, usable systems disappear almost by definition. The easier they are to use, the harder they are to see’ (Bowker & Star 2000, p. 153). The need to fund IA is not obvious to executives within an organisation when effective web IA is being achieved. Speaking of the information structures on the corporate website, one research participant noted the lack of visibility of the work that is done and the product that is achieved as receiving lower than adequate funding:

At the executive management layer, the fact it just works and the lack of visibility about what it has taken to make it just work is interesting when you start to have debates about resourcing for doing certain things... for the IA point of view...if it doesn’t work then it is obvious, if it does work you take it for granted...so we mustn’t need to invest anymore in this area, because it just works. [Org A]

One politically aware web manager, noting that it was difficult to sell the need for resources to senior executive for things that worked, revealed her strategy in allowing problems to arise. Aware of significant problems due to lack of preparatory work for a new and important website that was being launched, the manager made the political choice to allow the *broken thing [Org A]* to go live. When called upon to remedy the situation, this web manager was able to promote the invisible activities of web IA that go a long way to providing an unremarkable but effective user interaction with the website:

It becomes a challenge for the people who want it to just work. How do you sell that to your senior executives? Sometimes it means allowing a problem to arise. We actually had a good example of that just recently where we knew that there was going to be an issue with the new website that was launched and we did our best to warn the people who were developing the website that there was going to be an issue with it. They went ahead and stuck to their original plan anyway, and they launched it and sure enough there was an issue... we then had to go and fix, but that is another point. But it actually drew a lot

of attention at senior levels in the organisation to what we do and why we do it in a particular way. [Org A]

This study reveals that an organisation is typically slow to respond to the need for additional resources for their website when representation is made to senior managers. At times there was a radically different perception of the organisation's investment in the web between senior managers and those in web management. Organisations still do not realise the extent of resources needed to take full opportunity of the web. There is a time lag between an identified need for resources to create an effective enterprise website and the financial response from the organisation.

Yeah, that's worth mentioning, that his perception, our boss's perception of our team is that we've, we've grown fast, there's a lot of us...Yeah, so he thinks we're big, he, I think he thinks we're a large team. And I think he thinks we should be able to do everything with this number of people. [Org B]

There is evidence too of a mismatch between the funding provided for delivery of information on the web and information from more traditional forms. Some organisations have still not fully embraced the web and its resource implications. This is borne out in comparison with the monies spent in other publishing endeavours within an organisation. Organisations do not fully own the web and their responsibilities for its resourcing:

There's more resources put into some of the print publications ...more resources goes into content for that, it's seen by a couple of thousand people. Yet the website might have 50,000 people visiting a week and yet the disparity between the resources given to one and the other, it's just crazy in that sense. [Org D]

Research participants closely linked the general concern for the web in organisations with effective information structures on the corporate website. A growth in maturity of ownership is needed to fully realise the potential of this universal information platform. A new model and attitude is required to bring the corporate website to its full potential. One research participant calls for a radically different financial model to fund the web, acknowledging the centrality of the web as an information platform

and ensuring that it will be able to provide for current and future initiatives and innovations:

If the web becomes your primary information delivery vehicle then the level of investment that you need to make in the staffing around that, not just at the content level but in general, has to be quite different to the model that has been adopted to date, which is really around kind of maintenance and not generational improvements. [Org G]

5.3.2 Governance for the web

In this thesis, governance is taken to mean formal direction setting, policy endorsement and formal decision making. Governance is the framework that guides the work of managers and enables them to make operational decisions with the confidence that they are acting in accord with the organisation's broad direction and relevant rules. Frequently, a board or committee is formed to provide governance within an organisation.

5.3.2.1 Committees and policies

Governance of websites was minimal in the organisations studied. Only one organisation made mention of an executive board that offered high level strategic directions for the web. Yet the web manager was not a member of that board and an opportunity for mutual information exchange and informed policy setting was lost. This board was well removed from the seat of activity and not involved in any of the operational concerns or policies that might support the development of the web. That committee was described by the web manager:

It is chaired by my manager and by the general manager and it has got some group executives ... there is five of them. There are some people with particular web expertise and that kind of thing. So they're looking very much at a high level strategic view of the organisation and its needs. [Org E]

Only one of the organisations studied had a 'web steering committee' that guided strategic and operational matters, including any changes to high-level web IA. In this instance, IA matters of significance were negotiated by a committee that was representative of key stakeholders rather than the web manager or staff. For the most

part there were few committee structures that offered any governance or formal direction to the web staff in their endeavours to maintain an effective website. Typically:

There was no proactive committee that looks at these things and says 'okay this is where we're going'. [Org F]

It is useful to distinguish between governance and advisory groups. Advisory groups are not empowered to make decisions or policy, but they provide dialogue and feedback to those who must act. Previous web advisory committees were part of the corporate memory in a number of organisations. Research participants in many of the organisations studied had recollections of 'web advisory groups' that had ceased to exist. Advisory committees were especially linked to major launches of new websites: *There was one back around the last launch – there was a web advisory group which was ... we've had a couple [Org D].* There was consensus that, in the form that they had existed, advisory committees were no longer effective in guiding and advising on the work of creating effective websites:

Yeah we have had a couple of stabs. The general feeling what I have heard anecdotally is there was a bit much choosing the colour of the tiles going on, and that actually impacted, I think negatively, on the site that we launched back in 2005. [Org E]

I've seen those committees in the past. They've either been at a too higher level so that they don't have enough technical detail to make a realistic... or they're at a too lower level so there's no power behind them to give them any guidance... [Org D]

Few written and endorsed policies were in place to guide staff across the entire organisation in their use of the web. Reasons for this included no established governance structures to oversee the web, web managers not taking policy issues to committees, stronger management replacing the need for policy, and general confusion within the organisation about these matters.

When guidance to support the work of web IA was sought by web staff, it was often found lacking. In a state of confusion, one research participant who had responsibility for web IA was asked if he felt he had the authority to make a high-level change to the information structure himself. He replied that *there'd need to be*

some sort of committee or some sort of approval [Org D]. But he was not sure which committee or which approval process he could access, and as the conversation developed he concluded that there was no committee from which he could seek endorsement of his change to the web IA. He and other web workers interviewed in this organisation were not part of a web team and did not report to a web manager. They were looking for leadership and direction and would have liked to see stronger guidance in existence.

Conversely, one web manager was aware of the existence of a knowledge management committee, which he thought could take carriage of more of the web policy and direction, but had not used that committee to achieve this purpose. What is also evident in the following statement by that manager is that any promise of a well governed website would originate from him rather than the upper echelon of management within the organisation:

Reactive, we're not proactive about this stuff and, and in theory if we could be proactive, yes, my view is that we would be using our knowledge management committee and developing policies about this sort of stuff to anticipate these needs and we've anticipated these needs for a long time but we haven't been able to do anything about it because we had no time...at the moment because we haven't got around to actually writing all these guidelines and policies and that is definitely a big problem that we have, I'm very aware of it. [Org B]

5.3.2.2 Towards managing

The committee approach to owning the web was being replaced by the authority and responsibility of line management. Maturing traditional line management was present in some organisations and was replacing the previous web advisory groups that were remembered by most web staff. One organisation had rigorous management and accountability in place and saw it as a replacement for advisory groups:

The thinking of the executive is that committees aren't accountable. So yes they can be there and they are very important to review and advise, but from a governance perspective there is one person who is accountable and that is my boss. Yes line management. And me, I am accountable, except for things of course that I pass up to him and make him accountable, which is something I do on a regular basis. [Org E]

Day-to-day operational action by web managers and staff had taken the decision making away from the ‘advisory group’ and put it into the hands of traditional management. Most commonly, decisions to change an IA were made by web staff in consultation with business stakeholders. It was a negotiated, operational decision that was part of the authority invested in web staff. This denotes a maturing in the way organisations are attending to their web presence and offers an efficiency to web work that is afforded to most other areas within an organisation. The majority of web staff managed their work with operational decisions. When asked if she made most of the operational decisions as she managed the website, one manager replied:

Yeah pretty much. So far so good. It has been two and half, three years almost that we haven't had a specifically work-related governance body, but we can use other governance bodies for different aspects if we need to. That is pretty much the approach we have been taking. [Org A]

The provision of web content was emphatically reported by web staff in one organisation as the devolved responsibility of the business stakeholder – but there was no policy position to impose this unwritten rule. There was a strong reliance on the ‘way things are done around here’ and a long standing set of expectations in how the corporate web information structures would be created. The outcome of this hopeful approach was not always effective.

That's always the way it's been and there's not a really, there's nothing written down but yes it generally is, so yeah, we do rely on the line areas to know this is the latest content and we hope they tell us when the content is then out of date and all that sort of stuff, but that doesn't quite happen. [Org B]

Without some organisational form of governance for the many aspects of the web, managers who attempted to increase the cohesiveness of the organisational website through unwritten rules, expectations and ways of working, exerted significant energy in resisting the myriad of other ideas and demands that business stakeholders brought to the web. Significant personal pressure was felt by one web manager who was trying to bring some order to an organisation's website. Speaking of her web manager, who was also part of this narrative group, this research participant explained the determination and fortitude that is required:

And it's true to say, that it's the strength of xxxx, holding off the hordes, you know, that, that stops that from becoming a PR homepage. It's because you've held your ground and said 'no we're going to have this as our policy', and you've articulated the policy about what, what is on the homepage, it's why it's there that, you know, a lesser person would have gone 'oh yeah do whatever you like' because there's a lot of pressure.

He replied:

*I'm getting that way, but again that policy is just, it's not written down.
[Org B]*

Without whole-of-organisation direction and acceptance of the website purpose and a governing approach to cohesive existence, a web manager is left to *hold off the hordes* – those stakeholders with firm and individualistic plans of their own for the web. Defining and articulating rules and policy positions to manage the web in the face of pressure from stakeholders left this web manager weary and strained by the pressure of interacting with the diverse intentions and myriad expectations for the website. He was aware that he was not backed by a policy that was written down and formally endorsed by the organisation and that it was part of the reason for his plight. This web manager spoke of his efforts toward stronger governance and strategy. He attempted to educate his organisation, but had not received feedback on his recommendation to strengthen governance over the website:

I did write an online strategic plan earlier this year, which I'd been promising to do for a long time, and that was really urgent and that got sent to our branch head and we haven't heard a thing, so that's been sitting there. So, we have made some inroads and some steps and the online strategic plan did sort of say you know, 'we will have governance of this and that and we need to do blah, blah, blah', but it's gone into a black hole and I haven't chased it up because...too busy... [Org B]

Very few of the research participants felt constrained by external policy or standards in creating their website. Yet in the absence of internal governance, web managers used the recommendations of external advisory and standards bodies to enforce what they deemed to be good practice. Again there was an invoking of policy that was not strictly in place or enforceable. External governance and regulation was adopted and

used by the web team to establish some order in their endeavours to maintain an effective website.

And that's where xxxxx is good – when public affairs or some other people want to do something which is really scary or 'out there' or we can't do it, it's like 'no we can't so, that xxxxx guidelines, you know, here's the rules or here's W3C' ...we use them like that whether or not, we don't necessarily let public affairs or whoever it is know that they're a toothless tiger, because we need to have an external authority sometimes, so, yeah. So they're handy that way... [Org B]

5.3.2.3 Using technology

Empowerment to enact standards and 'policy' that was locally decided, often came to a web team through technology. There were instances of web policies or standards, especially those for IA, which were constructed by the web managers and their team and claimed therefore to exist in support of that work. These 'policies' were often technically enacted rather than formally endorsed by the organisation. Regardless of a lack of documentation and endorsement by governing bodies, 'policies' and standards for the web and web IA made their way into the organisational reality.

Yeah, and we're trying to, we're trying to develop rules which we haven't really written down around how, how sub-sites, if you like, within the main site are structured in a, as a matter of, as a set of principles... [Org F]

The use of technology was a strong and significant strategy to manage the website information structures. The unwritten decisions that were taken by the web team to standardise and make consistent some aspects of the web IA were most powerfully enforced in a technological approach. One web worker talked of a tool kit as the way of implementing a semi-consistent web interface:

There is no free-standing policy, for want of a better term, that governs a web IA as opposed to anything else. It is more bundled in with the operational concerns – here is a tool kit, if you want to take some short cuts, we will help you take them, but there is no sort of overall document. [Org A]

Another technology that was used to corral business stakeholders into a semi-standardised web IA was a content management system. These technologies proved to be very useful tools for implementing consistency without the need to use policy or

committee. Again the web team was able to work operationally and achieve effective enterprise wide control.

I think the CMS really is kind of the gate, the place where we can act as the gatekeeper to ensure that there is some consistency around the IA. It doesn't necessarily mean everyone has to do it the same way, but there has to be certain themes that are propagated and certain standards that are observed. If for example, that example of the menu with 100 items, in part we can say, 'Well, the CMS is just not going to cope with it. You are going to find it really hard to manage and edit that site, because the CMS is not designed to deal with that many assets listed in one menu'. [Org A]

With little governance in the form of policy, guidelines or strategy in place to guide the work of the web and its information structures, web managers and staff work at an operational level to create as cohesive an environment as is possible. There is much confusion about the use of governance to guide the development of enterprise websites and a lack of clarity in the interplay between the need for authoritative and holistic governance and the operational decisions that web managers can make. Whilst the role of an advisory group was no longer valued and has been replaced by management functions, a number of the web staff who participated in this study were looking for governance and greater guidance to support them in their work.

5.3.3 Web management

One of the key indicators of an organisation taking ownership and control of its enterprise web is the establishment of a web management role to centrally manage the website in its entirety. Five of the seven large organisations in this study had employed a web manager for the corporate site. As a result of such overarching management of the web, a distinct web team with varied skills and expertise existed. Where the role of web manager had not been established, the people involved in the creation of the website did not form a cohesive organisational unit. The research data presents a range of management styles and approaches for the web, and two extremes of web management are discussed to highlight the differences and suggest a continuum of maturity in managing the web.

5.3.3.1 Purposeful management

Strong traditional management was emerging in one organisation that participated in this research. Cox (2007b) reports a similar strength of website management in some organisations in an earlier study. The web manager of this organisation described the web team as a *business unit [Org E]*. He reported traditional management strategies, such as key performance indicators and goals for the website. Evaluation of what had been achieved via the website was measured in this organisation. He described the purposeful management of the site:

We are trying to take what I would call a more rigorous approach. So it is a lot of that narrowing of focus, knowing that this is all about communication; knowing that it is about key message delivery to target audiences and understanding that we... the effectiveness of that we should be able to test. So we want a more evidence-based approach to how we design the website. [Org E]

This web manager, with strong line management links to his supervisor and support from the executive, has a clear defining vision of the purpose of the corporate website and what it was tasked to achieve. This clarity protected the website from the vagaries of all other organisational stakeholders who had individual plans for the website.

The web manager articulated boundaries about what the public-facing enterprise website would provide and hence the work commitments of his staff. He knew what should not be part of the website and volunteered several of those functions that he considered outside his brief. Collaborative technologies for knowledge work within the organisation were not part of the corporate web responsibility, nor were the many documents and presentations that individuals wanted to publish. He stated this with confidence, pushing back against the plans of others:

So, and that is a difficult pill for a lot of people in the organisation to swallow is that we are not here, the website is specifically not the dumping ground for every piece of literature ... not every little powerpoint that was presented at an event conference or whatever. [Org E]

This web manager was also keen to evaluate the success of the work done by the web team and to link it to the goals that they had been set. He was also prepared to claim

success in the big picture implementation of the organisation's requirement of the web:

And the reason I think we have succeeded in part with that is day in and day out, every day when we go and look at our web analytics, one of the top ten pages is 'about us', okay. And to me what that says is we have drawn people in because google brings them because we have written quality content. And I think that is a real success, because if we were still back in the era of 250 separate websites, they would have been going in and seeing about this division, and they would have been getting a very narrow view of what this organisation is when they did that. [Org E]

An active web manager in another organisation was planning to better coordinate the interactions of the central web staff and the devolved business units that called on their services. She was very aware of the limited web resources and was attempting to streamline and quantify the work that was done by her staff. Her rationale for packaging the services of the web team was to protect the limited capacity of her web information architect and other skilled staff to participate in all of the web projects in the organisation. As a manager, she envisaged a new way of working with the business stakeholders to develop the organisation's web presence:

So that's what I mean about commoditising some of our stuff, making some of our consultancy services much more unit-based, so when someone rings up and says, help me with my website, xxx or one of our other more senior staff can say, 'well, we can advise you about this aspect and this aspect and this aspect, we have training programs in these other things, I personally can give you this much of my time about whatever you want the advice on, other than that then we need to negotiate something else'. [Org A]

Providing and using web analytics to evaluate the website and its web IA was noted by most web managers as something that they attempted in their management role. But the effective use of these statistics was reported to be limited by the nature of the tools, poor integration of tools, and the time needed to analyse and interpret the data effectively. Fragments of reporting to higher management occurred, but all web managers were aware of the time that was needed to integrate the data and to achieve a format suitable for their executives. There was little evidence that the use of web analytics technology evaluated or informed the web information structures of the organisational website.

We got stats, yeah we've got lots of sorts of statistics and you know search stats, all those sort of things, but we don't have the time to actually do proper reporting on analytics on those. You know I'd love nothing more than to do that, but realistically we haven't done that... At the moment we have quite fragmented ways of doing web analytics, particularly site traffic analysis and that kind of thing... The process of gathering all those statistics are quite challenging. We're using five or six different sources of data and I've tried to synthesise that into one three-page summary that the vice-principals can talk about once a week. It's quite entertaining. But it's, it is a day, you know, realistically a day's work or something. [Org A]

5.3.3.2 Without a web manager

At the other extreme of the management of corporate websites, there were two organisations that had not yet acknowledged the need for overarching web management. Without the existence of a web manager in these organisations, it followed that there was neither a central web team nor widely available expertise in web IA.

These organisations dispersed responsibility across the enterprise for the functions involved in providing a web presence. It was up to individuals to make the necessary connections with other web participants as best they could when they needed expertise that they did not have. Responsibility for the key high-level pages of the website, including the homepage, resided in a public relations, marketing or communication business unit. There was no indication that higher-level managers in these organisations had the intention or desire to create a role of web manager – nor was there a concern at the organisational level that the web was not being fully attended to in the most effective way. Those interviewed for this research, however, could see a better way of working if the organisation's website came under the purview of a central and dedicated manager:

There's no overarching person looking at the big picture. There's not one person who can make the decision. There's, everyone is a stakeholder and it's... the lines get blurred between, because of the way that the business is structured. It does blur the lines between who makes those decisions and who's responsible for what and that sort of thing. It gets quite confusing at times. [Org D]

5.3.3.3 The Influence of web managers

Where web managers did exist, they often saw themselves as ‘bridges or ambassadors’ (Cox 2007a, p. 776), with a strong desire to enhance website usability and to influence senior management in order to achieve this outcome. One component of the management of a website is to enable a web presence that provides useful and accessible information to its audience. The role of the web manager is critical to this achievement. Web managers and their staff must educate and lobby higher management for resources for this skill set within the organisation.

This study reveals that leadership for web IA in an organisation exists at the level and role of the web manager. Web managers and key web staff all had knowledge of web IA and an awareness that it should be attended to in their organisation. They saw the value of web IA. Web managers take on the role of gatekeeper or leader of how IA for the web is carried out within the organisation – a powerful and responsible position. The web manager decides and enacts what is needed and how it should be obtained. Individuals in these roles are the point at which learning, valuing and knowing about web IA occurs, hence, the value of IA to the organisation is largely the value that the web manager places on it. One web manager said of web IA:

Well it is my responsibility within the organisation both to do it and to drive it. It's not been an interest of the organisation, it's not been an interest of the executive. [Org C]

Strong participatory management located in the web team reduced the impact of mindlessness at higher levels. A strong web manager held sway when proposing and defending the work and resourcing of web IA. But where overall participatory web management in the organisation was weak or non-existent, the impact of decisions and directions set by those who lacked strong cognition of the practice was evident.

This study finding is in keeping with the insights of Cox’s (2007a, 2007b) study of the management of large information-rich websites in the tertiary sector. As Cox reveals, the seniority of the web manager’s role and the strength of the person in that role is critical in influencing upward and convincing senior management of the directions, needs and resources in all areas of website development.

For IA capability to be employed in any form – from in-house to consultant – the need must first be signaled by the web manager. Significant lobbying of senior management for resources, recruitment and other human resources processes are needed to effect the availability of web IA expertise. Strong commitment and determination on the part of the website manager are needed to procure the skills necessary for effective information structures on the website of a large organisation. In the two organisations that did not have an overarching web manager, the battle for web IA expertise and resources was much harder to win. Web staff without a manager did not have the seniority to drive and justify the work of web IA, especially its resourcing.

Again, the picture painted by these research outcomes suggests a growth and progression to central web management and the establishment of a central web team. A continuum of web management maturity is suggested by the discrete instances presented by the seven organisations studied. One web manager reflects on the growth in overall web management over a period of years:

And there were even section web managers, so there was 40, 50 people doing web stuff. No, none or only one or two of them with formal training. Myself, I didn't have any either, and varied quality. It was quite a nightmare so the best thing that came out of the first Public Affairs 2000 redevelopment of it was the move to centralise the team. However, a few divisions were special and couldn't do that so even to this day we have a central web team, but we have three or four, three divisions that still have their own web staff and who in theory work under our direction, but in practice not quite that way. [Org B]

5.3.4 IA as 'new work'

Cox (2007b) points out that the web and its growth opens up need and opportunity for new expertise and explores the work of those with full-time roles in the production of websites in the tertiary sector, with a particular focus on the web manager. In his research, Cox (2007b) establishes that the position of organisational web manager remains an emerging new profession with ill-defined roles, expectations and place in the organisation. The role of the web information architect in this study was found to be even more recent and nebulous.

Web information architects work in new or temporary positions in organisations, sometimes combining their IA skills with allied tasks. As members of small teams, they are often called upon to perform other duties associated with the web. They lack the assurance of a well-defined place in an organisational structure and a traditional and established profession. One permanently employed web information architect was aware that his work and role was little understood by people within and external to the organisation when he said:

When I tell them web information architecture, they straight away go, 'Oh so you are a librarian'. Yeah, so they think 'librarian'. Even my mother said that, when I explained what it was that I did: 'Oh, okay, you are a librarian for the web'. [Org A]

A professional web information architect frequently works as a consultant rather than a full-time employee within an organisation. Only two of the seven organisations studied employed full-time information architects, and only one position existed in each of those two organisations. The absence of the role in many organisations reinforces the lack of understanding and clear perception of web IA as a profession. Even as web IA as a profession becomes more established, it remains remote and indefinite work to many people across an organisation.

Web information architects fit well within Gornall's (1999, p. 48) description of 'threshold people who fall on or between the boundaries of categories' of workers in an organisation. Like other novel organisational roles and work, web IA can be viewed through a lens of liminality, which describes roles that sit 'betwixt and between' traditional organisational structures (Barley & Kunda 2004). Cox (2007b) warns that for some individuals involved in website production, there are real vulnerabilities that arise from the liminal nature of the work. Marginalisation and invisibility in the established order of the organisation are realities that must be overcome. The complexity, the struggle and the uncertainty of the work of web IA can fail if not 'connected up to a valued organisational purpose' (Cox 2007b, p. 166).

The work of web IA is a newly emerging professional role and must find not only its place of best fit within the organisation, but also a way of working that is powerful and productive. This study points to that being a mode of collaboration with the

business owners of websites that continually traverses the entire organisation. This aspect of liminality in the work of an information architect will not be transitory. Barley and Kunda (2004, p. 176) note that ‘for contractors...liminality is a continual condition, indeed a way of life’. Corporate in-house IA professionals will continue to need to work in a ‘consultancy’ role with devolved business units and establish transitory working relationships that enable their expertise in web IA to be used effectively. One research participant outlines her work across the organisation:

I basically just took on jobs with, almost acted like an internal consultant. I went around and saw people who were interested in doing anything about the web and, and got them to work with me to improve the stuff and then, by word of mouth, that would expand to other people saying ‘I heard you did this job for so and so, can you come and help us do that?’. [Org B]

5.3.4.1 Legitimising the work

The vulnerability or marginalisation of the new role is partially overcome with acceptance and improved credibility within the organisation, often borne of improved web IA outcomes. Cox (2007a, p. 776) considers this process of establishing a new professional role as the ‘legitimation’ of a profession. Cox (2007a) describes the legitimisation of the work involved in building and maintaining websites, and such a quest for legitimacy can be applied more specifically to the work of web IA. Legitimising of this profession requires information architects and web teams in general to build credibility and reputation in organisations. One participant demonstrates the growing credibility of the IA work carried out by central experts and gradual acceptance of this new work within an organisation:

It’s been recently, because of the work xxxxx’s been doing, they’ve actually recognised – I think it’s less now, but people worry that they’re the experts of the content, and if we did something, whether we’d change it or do something wrong with it and all that sort of thing – but from the things that we’ve been doing, people realise we don’t, we actually improve it... [Org B]

In some ways it is inaccurate to say that information architecture is new work. Every website has an information structure, and information has been organised and placed on the web for almost two decades. From its beginnings, information structures of the web have been designed by unskilled but enthusiastic workers with no training in

IA. Cox (2007b) labels those that practice website production without training as ‘hobbyists’.

Professionalising this work and wrestling it back from amateurs or ‘hobbyists’ is a gradual and ongoing process and one that needs organisational acceptance of the business value of web IA and recognition of IA as skilled design activity. One participant described sometimes unintended strategies for the legitimisation and professionalising of the work of web IA:

Yeah because we, we went along to the web training, the training for writing for the web and we said, ‘Blah, blah, blah, blah, blah, this is what we can do for you and this is how we do it’, and they thought ‘Okay, right, they’ve got this professional person in teaching us writing”, they seemed to be respecting these people, these people who know what they’re doing and so they started to think that we were professionals rather than, you know. [Org B]

The process of legitimising IA work is complicated by the counter-arguments to the centralisation of the design of information for websites, such as the sheer quantity of information in some large organisations and the desire of organisational sub-units to own and maintain their own information (Cox 2007a).

5.3.4.2 Locating the work

Organisational quandary in regard to the new and liminal nature of the work of the web and its information organisation extends to locating the work within the organisational structure. Several of the organisations studied dispersed centralised web staff across the enterprise. But in the main, a web team with IA expertise existed and required a location in the organisational structure. All research participants discussed the migration of the web team and IA expertise to different places within the organisation over time. Some suggested that this movement had been in order to find, by trial and error, the right place for the web team within the organisation. This account of the movement of a web team within an organisation concluded with a comfortable home:

We sit in the corporate area and we’re under knowledge management. It was information management, oh sorry it’s information, it was KM it’s now IM I think, and I think that’s the perfect place for us as the

web team. So the web team originally was devolved everywhere, got centralised under Public Affairs... I don't think that was the right place for it. We then got moved to a more technical area, who are responsible for keeping the servers up and running, sort of the backend stuff of the web... Then there was another departmental structure change, and then we got moved into the KM area, which I think is the right area. [Org B]

This research reveals that the professional role of web information architects in many organisations is one with a 'liminal' status. There are three aspects of IA work revealed in this study that contribute to the liminality of the work.

1. The work is new and unknown by many in the organisation.
2. The work function and people involved in web IA has often been moved from one organisational unit to another, seeking and sometimes finding a comfortable home within the organisational structure.
3. Expert skills in web IA are usually located in a central position within a web team and used across the organisation, requiring a person in the role to work with many devolved business units, almost taking on a 'consultancy' type role, yet remaining within the social space of the organisation.

5.3.5 Owning web IA concluded

Section 5.3 has identified and described in detail the construct of *Owning web IA*, which addresses the extent to which large organisations take responsibility for their websites and their information structures. It has highlighted the notion that organisations are better able to capitalise on the medium of the web when it is appropriately managed, governed and resourced. It is then that attention can begin to focus on the information structures of an enterprise website. The role of a web manager is one that strongly influences the organisation's approach to web IA. Web IA is relatively new work, not yet fully understood nor legitimised in large organisations.

Owning web IA is enclosed in a broader owning of the web. When organisations 'own' their websites, they provide adequate management, governance, co-ordination and resources to achieve the goals that they have implicitly or explicitly made known in their use of the enterprise web. Rhetoric is followed with actions, attention and

resources in organisations that take ownership of their websites. Within a robust owning of the enterprise website, attention can be paid to the website's information and navigational structures. IA can be singled out as an important facet of the organisation's online presence and duly given the attention required for informing a client base via the web. *Owning web IA* is making time for web IA.

Owning web IA is about setting up structures and environments in which web IA can prosper. Owning takes on hues of managing, governing and engaging, and pragmatic outcomes are required. New roles, authorities, expertise, resources and policies must be put in place to achieve an online environment that effectively informs its audience. Ensuring the work of web IA is enabled within and across established boundaries requires the participation of the entire organisation.

5.4 Negotiating web IA

In this section the research outcomes that have led to the construction of the concept of *negotiating web IA* are discussed. The label was chosen because the research reveals an organisational interaction that goes deeper than the recommended consultation process. Morville and Rosenfeld (2006, p. 213) include consultation as part of the design activities that deliver an IA at the completion of a project. Significant consultation is recommended at various phases of any IA project and is initiated by expert information architects to know the minds of business stakeholders and clients.

But this study discovered that an ongoing, deeper conversation about web IA exists in organisations. This dialogue originates from many parts of the business in its own time. The conversations of designing information structures for the organisational web have a life of their own. They are more aptly described as negotiating because not all is smooth sailing. Bowker and Star (2000, p. 44) write that whatever becomes universal, 'is the result of negotiations, organisational processes and conflict'. Optimal web IA is frequently compromised and the expert in web IA is not always driving the communication and interaction.

Table 6 provides a snapshot of the contributing lower categories of *negotiating web IA* and acts as a list of contents for this section.

Table 6 The major sub-category of *Negotiating web IA*

Major sub-category	Subsequent sub-categories
<i>Negotiating web IA</i>	Responding to the business Compromising web IA Collaborating in web IA <ul style="list-style-type: none"> ○ Across the organisation ○ Tensions arise Gaining acceptance Marketing and web IA

5.4.1 Responding to the business

Research outcomes portray an environment where web information is tightly coupled to both business activity and the involvement and vested interest of business stakeholders who use the web to inform their clients. The business stakeholder with no expertise in IA has a strong sense of ownership of the process and the outcome. The business owner of the information also brings a sense of urgency in the provision of appropriately organised online information. The need for responsiveness to business demands and changing requirements when organising information on the web is clearly demonstrated in the data. The study reveals that organisational use of the web for information delivery is characterised by volatility and a need for reactive changes to online information and its structure.

Business stakeholders are well acquainted with the potential immediacy of web publishing and make significant demands on those who have responsibility for online information delivery. This is revealed in a typical comment from a research participant about his work with business stakeholders:

Now this website needs to be live this Wednesday you know, and so it's like, well okay, let's get it up and we'll worry about it later. [Org F]

Business requirements for change to web IA occur in several ways. Firstly, there are small-scale, frequent changes that might be considered organic in nature. Individuals work together with the combined knowledge, ability and authority to make business responsive changes to web information structures on an almost daily basis. Another type of response needed is to a business change of significant proportion, such as a business restructure, or the acquisition or loss of a function or a business unit that has to be reflected on the web in a time-dependent manner. Those responsible for information structures on the web must respond rapidly to business shifts, large and small.

This study revealed the need for agile and organic change to the information on an enterprise website, in a timeframe that served the organisation's purpose and engagement with the information. Noting the ever-changing and evolving world of organisations, Lambe (2007, p. 11) exhorts information workers to focus on the process of change to information structures rather than the end product.

This study found that change to an IA was often embedded in the daily activity of organisational life. Varied patterns of activity were developed within organisations for the achievement of small changes to an organisation's web IA. These two accounts from different organisations reveal processes that lack formality, but that demonstrate a workable approach that has become the norm and that is effective in responding to a reasonable request for change on a small scale:

Well, let's say if they are developing a new sub-section, they would just do that and I would probably look at it and have suggestions or whatever, but it would not be... it would not probably be a big process. [Org G]

More often they come to us and say, 'We're getting so many phone calls, is there something we can do to our web pages to reduce the work that's coming in, enquiries coming in?'. So basically then we have a meeting with them, and we sit down and say 'Okay, what do you want, what have we got, what do you want to do, what do you want to achieve?' and try and work out the best way and the best way of laying those things out, the most logical, so it's pretty simple. [Org D]

However, there are many occasions when web staff must respond to a demand for large structural changes to web information. One organisation reported a substantial change to the business model affecting the whole organisation and the IA of its website. Innovation, too, will always place a stress on information structures (Lambe 2007, p. 90). Outcomes of budget restriction or expansion, government elections, change of government, reviews, and changes to the business model all made significant impacts on the web information structures. This account of restructure and expansion in an organisation as a result of a budget includes the business need to mirror the change on the website of the organisation:

But I guess it came to a head recently because the department restructured as a result of the budget and xxxxx is now a big thing for the department, and so there's a new division of xxxxx within the department and they wanted that reflected on the homepage. [Org B]

Where business changes are volatile, so must be the work and outcomes of web IA. Hence responsive change is a key characteristic of the practice of web IA in large organisations. At times rapid and substantial changes to the business can occur faster than an information architecture can stabilise, as discovered by this research participant:

Recently two of our divisions shut down and merged with existing divisions and that has generated an enormous amount of workload. We had a joint venture that came back into the fold. So first we had to convert everything through into the new division, and then the decision was made, after the last round of budget cuts, to actually merge that in with other divisions. So it sort of, just as we were getting near the end of the first job, we had a whole new job. [Org E]

Any large information structure can be unwieldy and pose challenges for maintenance and quick response to business needs. The public-facing website of a large organisation demands a level of responsiveness that is not expected of any traditional information structure such as a database or formal and standardised taxonomy. Those with web IA responsibility are well aware of the business changes that may impact on web IA and signal the need to react:

And things might completely change after the election and there might be a new division, a new department and all that sort of stuff. [Org D]

Analysis of research data clearly points to the need and demand for rapid, frequent and flexible changes to the information structures on an organisation's website. There were multiple reports of businesses restructuring, rebranding or setting new directions and the requirement that these changes be reflected on their website in a corresponding timeframe. The immediacy and tight deadlines involved in structuring information on the web is a clear reality for the practice of web IA. This study reveals the need for the practice of web IA to be characterised by agility, flexibility and responsiveness in order to meet the rapidly changing needs of an organisation when using the web to inform its clients. Not only does that need exist, but it is increasingly demanded by the business stakeholders who are cognisant of the close to real-time potential for web publishing. Immediacy is a significant demand from the website business owner.

5.4.2 Compromising web IA

It is evident in this research that the work and outcomes of IA in its situated context of the business world involves a compromise in which best practices and methods cannot always be accommodated. IA practitioners are forced to compromise optimal outcomes that they know could be achieved with the full application of their expertise. Changes to digital information, especially on the web, can be made very quickly – informing a web audience with great immediacy is possible.

But this speed of publishing can come at a cost to the quality of the information structures when responding to the business pressure for websites to go live immediately. One research participant expressed this tension between business deadlines and optimal web IA:

We're so flat-out, we're doing stuff, we're going 'Oh we know this isn't quite right, but you know it's got to be live tomorrow. We'll put it up, we'll worry about it a bit later'. [Org B]

The work of organising information on websites must be agile in order to meet the business demand. It must also be characterised by pragmatism. The power structures in some organisations allow executive-level staff to overrule optimal information structures, and an information professional must know when to concede and

compromise in these situations. Bowker and Star (2000, p. 44) write that the achievement of information structures can involve negotiation or force.

This study found that those who make significant demands of web and IA professionals in requesting immediate and specific change often have the power and authority to request such responses as indicated in these various accounts:

Yeah, certainly here, and when I worked in other places, the boss has a lot of power and it can basically be the boss wants this and to hell with good IA... [Org B]

So the IA that we ended up with for that particular redevelopment was very much a matter of compromise. There was quite a bit in it that was essentially senior executive egos and justifying their own roles. I'm being terribly cynical there, but, to be honest, yes, there were at least three links on that homepage, quite prominent ones, that were there because the relevant senior executive was trying to justify his job. [Org A]

Yeah, we get things imposed, we get told to do things because someone decides that's what it's going to be, like definitely! [Org E]

The following scenario again reveals a compromise in the work and outcomes of web IA brought about by power imbalances in relationships. An information design found lacking by central experts was brought to the table by people working directly to a strong authority figure and its implementation was demanded. An information design decision was made by the more powerful even though that person lacked expertise.

All of a sudden the Minister or the Minister's office wanted a page about xxxxx, yeah and he wanted it structured by topic1, topic2, topic3 and topic4...And it, this was the first time ever, and so I don't think it was the Minister, but I think it was someone in his office, but they kept saying it was the Minister wanted it, so when we went to do it, it was like, well, this isn't practical, you know. It's missing out all these other things. So we did one this way and, 'No, no we don't want that' so we did it another way and 'No, no', and then it's come back 'No we don't want ... and I was like 'No we're not doing that'! [Org B]

It was reported by this research participant, however, that the Minister's alleged requirements, however contrary to best practice and expert advice, were duly implemented. Significant pushback from the expert in web IA was exerted, but to no avail. The availability of expertise was not valued nor considered, and the quality of

the implementation suffered. A rationale for the demanded web IA was not provided. A very reluctant information architect conceded his know-how to the more powerful business stakeholder. ‘Whose voice will determine the outcome is sometimes an exercise of pure power’ (Bowker & Star 2000, p. 45).

Compromise, however, was found to be a well accepted part of the work of web IA. Acceptance that power and political situations would intervene in an optimal information design was widespread amongst research participants. In one organisation, in order to achieve a whole-of-organisation website, there were political trade-offs in the information structures of the new website. Yet there is acquiescence in the situation in the comments of one web information architect, and knowledge that a big picture improvement that accommodates some politically based minor imperfections is a step forward. Compromise is a common part of the negotiation of web IA:

Yeah and xxxxx and yyyyy actually had in the past, going a long way back, had their own domains and their own websites and they were separately managed, and then that was brought together under the departmental banner. So I guess there were some compromises made for political reasons in terms of coming together with the new IA, in terms of reflecting that. [Org B]

5.4.3 Collaborating in web IA

5.4.3.1 Across the organisation

Much of the work of designing a website’s ambiguous taxonomies to serve the business and its clients takes place in small impromptu teams, sometimes with the participation of central IA expertise. There is no predefined membership of these teams – they are formed as needed with the most appropriate membership available at the time.

The possible inclusion of a central web professional with IA expertise in such a team varied greatly across the organisations studied. At one extreme, devolved business units had complete control of their IA and did not involve a central person with greater experience. More often, however, there was an element of collaboration and teamwork between central IA expertise and devolved business units as a new site was

planned or a redevelopment undertaken. Organisations revealed in various ways, a sense of shared responsibility for and participation in web IA:

It is working together. It is us bringing our expertise in web and in design. It is them bringing their expertise in the business and also the communication priorities that they face, and trying to meet in the middle and come up with something. [Org A]

A central web team with IA capability must find a collaborative and integrative approach, working alongside the business units who are the knowledgeable owners of the information that is provided on the site. Centrally employed information architects are often in a position of working collaboratively, encouraging, transferring their skills and mentoring the people in business units to do the work of IA as effectively as possible. This is consistent with the findings of Cox (2007a, p. 776), who writes that ‘this work was carried out in a context where there is little direct formal power’ and required cajoling and winning consent. In this study, one information architect described his work as a *velvet glove* approach to achieving effective IA and continued to say:

It is all about persuasion, horse trading skills. It is not like they say in the textbooks where you can go away and do this research and come out with some wireframes and then that is kind of it. That is the easy bit really. [Org A]

His manager agreed with this approach. Consultation and cooperation is her preferred way of working, and she was very convinced that the work of web IA would not be supported by conflict or confrontation that was initiated by central web staff.

That is the reason why we employed him – seductiveness. Yeah, I think the approach should be consultation first and confrontation as the last resort, and we probably wouldn't bother unless it was something that seriously embarrassed the organisation. [Org A]

Despite the temptation of the simplicity that may arise when an expert in IA designs and delivers an information blueprint for a business unit, there is value in the active participation of the stakeholders in the processes of web IA. The process of the development is shared and the owners of the information develop a more detailed understanding of the processes and complexities involved in organising it. The added

benefit of the co-development of a web IA is the participation of someone steeped in business knowledge and awareness. One information architect was very aware that business units need to be actively involved in the development of an IA:

I have got an IA which I have drawn together... Sorry, 'I' being the local person, and the information architect is just going to come in and go 'yeah' or 'nay' and that will be it. 'They said it was okay, therefore' ... I don't really want to do that with them and just sort of come in and go, 'here!', much as it would be quite tempting to do that so I just try to make it a bit more of a process that they understand where they sort of fit in and what they have to do, make it a bit more active for them, otherwise it is just totally passive. [Org A]

Collaborating proves to be the best and perhaps the only way of practising web IA in large organisations. But it comes at a cost. There is much energy expended in the interactions between IA experts and business owners of information. A great deal of repeated effort is required to convince numerous business stakeholders that there is a better way to approach the task. In one organisation that valued consultation and teamwork there was frustration for an expert because of the ongoing need to convince many staff of the value of his expertise and experience:

If you got an external consultant they would be tearing their hair out, it is so different. I mean I have worked in the corporate world and in a way it is frustrating because you can have the best ideas in the world, but at the end of the day you have got to persuade people as to its merit, and that can be where it can take a lot of time and a lot of effort, and even to get people sometimes to realise that they have a problem, it can take weeks of, I guess of, seduction to convince them. [Org A]

Detailed and contained teamwork is one approach to web IA. Yet the conversation to achieve web information structures occurs within diverse combinations of stakeholders and across many tiers of an organisation. Global debate and participation is likely to occur in many aspects of web IA. It is likely to occur spontaneously, at any stage of the development and ongoing life of an organisational web IA. This segment of data reveals that the choice of a label to describe a section of web information resulted in a lively, cross-organisational negotiation:

A couple of years ago, we had xxxxx, but then all the reporting and everything changed to yyyy, which is probably not a very good user-centred sort of label. But anyway, we had to go and change everything

into that, and that was a big, you know, a bit of a carry-on. But of course we got the division head or the branch head or whoever it was on the sides of that saying 'We should be in line with everything', so that happened. [Org B]

Influences and constraints from the world external to the organisation also impacted on the practice of web IA. The nature of collaboration and involvement had to be flexible and adaptive to the subtle and political situations that arose in the business world. Political situations outside the immediate sphere of the practice of web IA can exert sometimes unknown influences. Wisdom is demonstrated by this web manager who described a political situation that caused his involvement in the negotiation of web IA.

There's another area, a redevelopment there, and that one's sort of gone a bit pear shaped, but not anyone's reasonable fault. The politics maybe also, and I think there it's probably more, what's the word, it's probably better for us to make sure we're there or maybe be seen in a way a bit more, you know, in-between the IA and, and the line area. It's the nature of the content they're looking at and the actual political thing in the real world at the moment. [Org B]

At times working together and *negotiating web IA* was reported with a cooperative spirit. Interactions and communications, although at times lengthy, were frequently harmonious and achieved consensus. Casual communication and discussions about web IA were common place and, when conducted in the absence of formality, reasonableness often prevailed. One web information architect was able to gently negotiate an information design to avoid it being six levels deep, and another reported a cooperative outcome to change in a high-level IA:

I have talked to people, just not formally, and just said, "Look you don't need to have six levels in this menu, it is okay, just let it go". Do you know what I mean? Just explain the issue. Usually it is okay to sort of informal discussion or a chat and they will go... as long as they understand your rationale, I think it is fine. It is when you start making it formal and calling people in for meetings, they can get quite defensive. [Org A]

And that was many months of consultation with all of the various people who were affected and fortunately everybody was really cooperative and the people who needed to move from 'get involved' were happy to... [Org C]

5.4.3.2 Tensions arise

As much as central web staff sought to avoid conflict with business stakeholders about web IA, on occasion tension and conflict arose in the negotiation of web IA. Relationships were not always harmonious. In one organisation, a web team was left to implement the dictates and directions of a senior executive group that were authoritative and unyielding in their requirements of corporate web information structures. An account of an IA implementation that by executive direction did not give prominence to divisions within the organisation, created conflict that was not resolved when the website was made live. The web information structures that were launched delivered legacy tensions and subtle ongoing relationship sensitivities that required consideration in the continuing negotiation of web IA:

So I'll tell you what, when we first launched, the divisions were very down, about five clicks deep into the website, and you wouldn't believe how much angst it caused us. And we ended up pulling them up and giving them a direct link from the homepage... from the foundation layer, so that everywhere has a fly out to all the divisions. Politically, it just wasn't worth it. [Org E]

We've got, we've largely addressed a lot of, I think, relationship issues with other parts of the business, but nonetheless there is still some, I think, bitter memories perhaps, in there, that, those are hard to get rid of... [Org F]

The negotiation of web IA is not restricted to a central web team and business stakeholder alignment. Eschenfelder (2003) firmly establishes that competition between business units for position on the homepage is an inevitable part of the use of the web in many large organisations. She puts this political jousting for position down to the goal conflict that occurs in different units within an organisation. Goal conflict leads to tension and combativeness in the negotiations of web IA.

This study confirms the competitiveness between the sub-divisions of an organisation for prominent presence within web information structures. The business-to-business competition within the processes of web IA can place central web staff in the role of facilitator or adjudicator. As a shift in business focus triggers a need for change in the high-level web IA, the jostling for position in an existing web IA begins anew:

Yeah, in terms of changing that, I guess it would come from the area, normally the area would drive that change and say 'we need something to happen with this'. I guess the problem is that would also mean losing something from those top six positions as well, so they're fighting very heavily that xxxxx should be up there on the top page and yyyyy should still be there and things like that. So it's probably more those areas who would kick up the fuss and say 'Well, why are we being moved down here?' [Org D]

This competition for position in the information structures of a corporate website impacts on the implementation of the web IA. In one organisation, a strategic web team had implemented flyouts, a navigational technique that allows subsequent levels of navigation to appear on the screen when a link is hovered over. There was compromise in this decision, the web manager saying that flyouts were not his preference. But they allowed for the easy inclusion of many sub-sections of the website at a level that, whilst not on the homepage, was easily accessible and visible from the homepage. In turn, the implementation of flyouts rewarded the overall IA by having fewer categories and fewer battles on the corporate homepage:

But it also means that we can have fewer categories because people don't battle for a place on the homepage because they see that they're within the flyout... [Org B]

Collaborations between web staff and business units at times included more than the ostensible creation of a web IA. There were intriguing accounts of cover-ups and conspiracies. In one organisation, the web team worked with a business division to research and design a new IA. This project attracted significant funding and the detailed work that was undertaken was predicated on the advice and definition from the business division on the profile of the key audience of the website. When the IA design was presented, the business changed its mind about the profile of the key audience – someone from the business had misinformed the web information architect and the information design was not appropriate. The way forward was outlined by a research participant:

...and there's no more money to spend on redoing that thing and they would be embarrassed if they had to tell their bosses that they had to redo this thing, so we had to make it up and we did! [Org B]

This cover-up of what had actually transpired created a bond of camaraderie between the web team and the business section. Web information architecture had gained some keen support within the organisation. The resulting website and the process was promoted and defended by a business unit that appeared to bury the memory of the mistake in audience profile deep in their subconscious:

So and then it was bloody promoted as the greatest website and I was like 'God'. And, and the line area people forgot this and then they just said how this was the best process they've every worked in and it was really good..... and all that sort of stuff. Yeah, yeah, selective amnesia, my God! [Org B]

Several organisations had implemented and were trying to maintain a thematic or topic-based organisational scheme (Morville & Rosenfeld 2006, p. 63) at the highest level of their website's IA. The ability to collaborate proved to be essential to lift a website out of an organisation structure and present a thematic scheme. In these cases, multiple divisional units needed to contribute to a single theme and any one division could be required to contribute to a number of themes or topics. Clearly, theme-based structures of information on the web require a collaborative environment. A workplace based on silos and lacking in integrative structures and strategies caused gaps and replication in topic-based web IAs. The lack of collaboration in the workplace is reflected on the web:

Which replicates bits over here so it's like if we try and do it holistically do we take that bit out here, and have it over here or do we bring that bit out there and bring it in here? We don't know. I don't know what the right solution is for that, so that's an issue, so that is a silo type thing and people not talking to each other. [Org F]

The nature of, well the fact that people work in silos within the department influences the structure of the website because, the IA on the website, because day-to-day work is isolated from one another, who should probably work together. They can't see, they, they can't translate into a collaborative effort on the web, because they don't work in a day-to-day manner. [Org B]

5.4.4 Gaining acceptance

There is great value in being accepted and respected within an organisation when engaging in the work of web IA. The presence, the standing and the expertise of an

information architecture professional and the web team in general was reported to be increasingly accepted and valued in most organisations. Fleck (1998, p. 161) notes that ‘demonstrations of competence’ and problem solving is critical to an expert gaining credibility. The growing credibility of the work of web IA smoothed the working relationships with respect and recognition. The growing acknowledgment by others in the organisation of the work carried out by central IA experts was expressed by this web manager:

Yeah I think because I have been here for about five years, it's definitely people's opinion of us now has greatly improved from previously. [Org B]

Within large organisations there are often individuals outside the nominated web team of specialists who have knowledge and opinions about the web. Where there is an avenue for these self-proclaimed web experts to critique the organisational website, the credibility of the information architecture and its designers is always an open debate. Life is easier for the web information architect when a vocal critic is on their side and has accepted their professional expertise:

He always has good reason for his opinions about these things. I did a little dance of joy when he sent an email to the list saying, 'I really like these new web templates' a couple of years ago, 'I really like this, because it works, it is right'. Yes, we won over our harshest critic. [Org A]

Importantly, those practising web IA were conscious of the need to actively enhance their credibility within the organisation. The reputation of the work of experts in web IA is built by choosing winners – people and situations with a greater likelihood of successful outcomes. One web IA professional demonstrated wisdom in building confidence and acceptance across the organisation and cleverly avoided initiating projects and work in difficult areas.

So we've had to, we've had to gain the confidence of the line areas and, and, and so I've been very conscious about choosing winners and, and steering away from the things that I know could blow up. [Org B]

In the negotiating of web IA, the ability to be politically aware and active emerges as a contributing factor for success. Knowledge of the organisation and the people

within it is an asset in building the credibility of web IA. One web information architect used her prior relationships and previous professional standing to carefully select people in senior management who would respond to a conversation about web IA. She selected senior managers who already respected her and had some interest and logical ability as possible proponents of web IA, and she invested time in a political and educative conversation:

I do a lot of that because I understand, because I've been in the department and I knew the politics and I knew who the influential people were. I knew probably where the roadblocks were going to be. I knew where the logical people were who I could, I knew where the people were who would, who would say, who would not even begin to be interested in this stuff and who were the senior people who would get the logic and who I had a previous relationship with so I knew that they understood that I was a conscientious good person. So yeah, I chose that all very carefully. [Org B]

Many research participants noted the importance of champions within an organisation. The ongoing building of acceptance of the practice of web IA is strengthened by individuals who strongly advocate the practice and its expertise. Working and negotiating with the business in all aspects of organising online information is enhanced by a positive reputation and reception. Research participants noted that the existence of champions created opportunities for the practice but that the absence of someone in the role could thwart a project.

And it's getting to the point now where that's becoming a positive thing and we're getting too much work, but we're getting, we're getting champions who are looking for money in their budgets to be able to do real projects with a real amount of money. [Org B]

And from those experiences I learnt about how the, yeah, the absence of champions can completely stop a project. [Org B]

One of the important characteristics for a web team concerned with information structures is to be responsive. It is difficult to win the regard of a business stakeholder if their real-time need cannot be met. In this study, information architects reported that responsiveness and a reputation for being responsive was important for gaining professional acceptance in the organisation. One research participant reported that credibility was established if deadlines could be met:

We want to be seen to be responsive so that there isn't this 'Oh, it just takes so long to get these things done' or something. We're, we're trying to reduce that by being very responsive, which is, you know, a rod for our own backs and all that sort of stuff, but it's one of the reasons why we are so responsive is because, yeah. If they want it up tomorrow and we do, then we get some points, thank God. [Org B]

The ability to be responsive to the needs of business stakeholders of web information has developed slowly in the practice of IA. The evolution and growth in the competencies to facilitate and support web IA within the organisation has occurred over a number of years. Processes and resources have had to be developed and acquired within the central web team to enable them to work with the business. Growth in ability and credibility is demonstrated by this research participant's comments:

But, also I think the fact that we now can do more has helped us have more credibility. Now when someone says 'can we do this?' we can do it whereas for a number of years, you know, they could probably just see on our face that it was not worth asking, it was just too difficult at the time. [Org C]

These research outcomes demonstrate that the negotiation of web IA is enhanced by an organisational acceptance of the practice and professional expertise. Information architects are aware of the need for credibility in their work and that it cannot be achieved without political awareness. The need to select winners, avoid difficult arenas and provide a valued service was reported with awareness of the political implications.

5.4.5 Marketing and web IA

This research reveals a fractious relationship between those responsible for marketing or public relations functions and those whose focus is on optimising the web information space. There were numerous stories of opposing perspectives and unrealistic expectations that could not be achieved by web staff. There were also instances of the boundaries of responsibility for work not being well enough defined to create productive working relationships and successful negotiations of web IA.

Conklin's (2005, p. 30) theory of the 'polarity of design' is at play in the organisational use of the web. He describes these two polarities as 'what is needed' or desired and 'what can be built' or achieved. The research participants in this study expressed the dilemma and difficulty of implementing the espoused marketing needs and desires in information design. They noted the tension around what was wanted by marketing and public relations departments, and what they, as the web staff, could reasonably achieve.

One of the areas of disconnection and discontent was the time-frame of delivering the expectations of the marketing department. In one organisation, the marketing unit required the global implementation of a newly designed, consistent template that housed IA components. The template for achieving this, however, was not driven by a content management system and required manual implementation across the entire large organisation. It was neither plausible nor rational to expect this requirement of the marketing department to be implemented in the desired short time-frame.

Conklin's (2005, p. 30) extremes of what is wanted and what can be achieved in a given time frame were revealed by research participants in their discussion of the realities of organisational life.

The tension tends to be, for marketing communication, centred around speed of execution for certain things like – 'Make all websites comply with this new template'. Well, this doesn't happen quickly, because, well, we don't look after all of them anyway and you need propagate that down to people that aren't necessarily driven in the same sense that the marketing communication...I think that there is also tension around the speed of innovation side where the marketing efforts tend to be fairly short-term focus and very, I guess, driven by response cycles – we need this thing now! [Org A]

Conklin (2005) goes on to say that an individual designer must be capable of viewing the two extremes of design and understanding the perspectives of both. 'Any design problem is a problem of resolving the tension between what-is-needed and what-can-be-done' (Conklin 2005, p. 15). The design of web information structures is no exception. Understanding that the perspectives of marketing/public relations departments were different to those of other business stakeholders and to those of the web team is an important requirement for the negotiation of web IA. One web

information architect demonstrated an awareness of the interests and perspectives of the marketing and communication leadership:

Vice-Principal of Marketing and Communications is particularly interested in visual branding and some of the new content that has been introduced this year, but as for IA and navigation schemes, that kind of thing, not that interested. [Org A]

‘The tendency is for the polarity of design to be reflected in a polarity of roles’ (Conklin 2005, p. 32). The inability of the web team to fulfill the needs and desires of those with a marketing/public relations focus impacted on the relationship between the two areas and the people within them. The diverse perspective and conflicting goals caused tension in relationships – the polarities had not been dealt with effectively. One web manager expressed the difficulty in managing the ongoing extremes of what was wanted by the public affairs department and how it affected his role in managing the web. He was always the one who said *No*, and tensions mounted as a result:

The relationship with Public Affairs is fraught, Public Affairs still sees the web thing, or particularly sees me as the person who won't let them do anything fun. I'm the one that always says 'No, you've got to do, think about accessibility, you've got to think about the Australian Government Standards, web standards, etc'... [Org B]

The perspectives and demands of marketing and public relations departments are just one of the forces that must be kept in balance in designing a website with effective information structures. Those responsible for the design of the web information environment must balance the sometimes competing requirements of multiple stakeholders. The web is considered a platform for many aspects of business improvement and, as a result, becomes a nexus for multiple and sometimes opposing organisational goals. Thus, an organisational website is also a site of competing business forces:

And I think it's fair to say that the, that the Public Affairs staff and, I don't know whether this is true of all Public Affairs staff or just this group of Public Affairs staff, see the web as a vehicle for pushing marketing advertising, that sort of stuff, more than as a business improvement and process medium, so we acknowledge that it's both and many other things and we're trying to engage them in the

*consideration that there's more to the web than, than marketing...
[Org B]*

In the implementation of the integration of all business requirements for a website, a web team is also beset by the need to accommodate technical standards and requirements that exhibit good practice. Accessibility to the web for people with disabilities, privacy issues and compliance with standards all sit in the delicate balance of achieving an effective information delivery platform. These requirements also compete and affect the negotiation of web IA with internal stakeholders, especially those in the marketing and public relations domain:

It is a sort of tense area. Can be. Particularly around the difference between websites as having usability and accessibility issues, so we most often have, you know, disagreements and privacy for example. Disagreements around, yes, this creative concept might work in the print medium, but in fact the contrast is not sufficient to be read on a website, that sort of stuff. [Org D]

There was strong evidence in the data that the boundaries of responsibility for the web between marketing or public relations and web IA were a contested space. Working out the defining boundaries of responsibility and making them explicit proved to be an important balancing action in the negotiation of web IA. In one organisation, a web team presented an example of a well defined set of responsibilities for themselves and the marketing communication function. The components of the homepage could be described in terms of ownership. In these circumstances, with boundaries well established and a shared understanding of who was responsible for the IA, tension between web and marketing staff were minimal.

The Marketing Communications people are particularly interested in the dynamic content that's on the left side of the page. They produce that content, they are responsible for the content and the branding of that stuff, so that's the audio and video podcasts, the newspaper, media releases, that kind of thing, and they're particularly interested in that part of the page. They're also interested in the three graphic ads in the centre of the page that we have only just introduced. They're happy for us to be responsible for the global navigation, the state navigation, and searching and finding kind of tools, and the branding belongs to Marketing Communications as well. [Org A]

But in a contrasting situation in another organisation, the negotiations of web IA were troubled by the lack of clear boundaries of responsibility. The global template for the organisational website was the widely accepted responsibility of the web team. In the process of a consultant-led development of multimedia objects, the public affairs department extended the consultant's commission to include a redesign of the global IA embedded in standard templates. The negotiation of web IA became a *big battle*, with the involvement of executive staff in an adjudicating role:

Particularly with Public Affairs that's the case, you know they want Flash files, they want this and that. We did a consultancy to develop some Flash objects to go into a website redevelopment, and the Public Affairs person sort of turned it all around to get the consultants to totally develop a whole new website design template and all that sort of stuff and it was like 'No, we've already got our templates, it needs to fit in this' and that ended up being a really big battle...that went all the way up to the executive and lots of backwards and forwards and important people involved... and it was very stressful and all that sort of stuff, but it came back on sort on our side... [Org B]

5.4.6 Negotiating web IA concluded

Negotiating web IA highlights themes of multiple perspectives, diverse participants and ongoing dialogue in the construction of information structures for enterprise websites. It expresses the need for ongoing, agile changes to website information in collaboration with the business and in step with the business activity.

Within the many interactions of web IA, concessions are made. The ideals of best practice are frequently compromised in the social everyday world of web IA. Web IA can be a political and contentious activity – elements of competition for information space are revealed as sub-divisions vie for a presence on the organisation's homepage. The polarities and tension between marketing needs for the website and its optimal information design are also revealed.

Negotiating web IA is the human exchange in the space between best laid plans for web IA and meeting the needs, desires and demands of diverse stakeholders in the web delivery of information. *Negotiating web IA* brings connotations of unresolved dialogue and tension. Stakeholders bring myriad perceptions and motivations to the purpose of the enterprise web and the value of web IA. This provides an ongoing

conversation that is fraught with opposing and competing claims. A professional web information architect earns a place of credibility and acceptance over time in these conversations.

5.5 *Enacting web IA*

This section considers the enacting of web IA. The notion of enactment is borrowed from Weick (1995, 2001), who sees action as a component of making sense of the surrounding environment. Enactment fits well with the practice of web IA for two reasons. Firstly, there is a real need to make the information structures of the website a reality. As Evernden and Evernden (2003a, p. 20) indicate, a website will have an architecture, be it an optimal or chaotic information space. This research confirms that improvisations and actions will occur to deliver an outcome – the need for a website beckons the activity that brings it into existence. Secondly, it is pertinent to use the construct of enactment, because the web and its rapid adoption throughout the human world is novel and the development of a corporate website is a relatively new endeavour in organisations. Organisational use of the web to inform clients takes place in rapidly changing contexts that provide fertile ground for further enactment. There is much to learn and much of which to make sense.

Table 7 depicts the contributing lower categories of *enacting web IA* and also lists the contents of this section.

Table 7 The major sub-category of *Enacting web IA*

Major sub-category	Subsequent sub-categories
<i>Enacting web IA</i>	<p>Who does web IA?</p> <ul style="list-style-type: none"> ○ Profiling the practitioners ○ Categories of IA work ○ Layers of IA work ○ Impact on website structure <p>Ways of working</p> <ul style="list-style-type: none"> ○ Business readiness ○ Web content and IA ○ Waiting ○ Opportunism ○ Incremental change ○ Web IA as project <p>Finding restrictions</p> <p>Search – a neglected component</p> <ul style="list-style-type: none"> ○ A reactive approach ○ The technology ○ Managing the problem

5.5.1 Who does web IA?

5.5.1.1 Profiling the practitioners

Two of the seven organisations that participated in this research employed in-house, full-time web information architects whose position titles reflected the work of web IA. Other organisations claimed that they had a reasonable level of IA ability within the web team and that a specialist was not required. Several organisations used consultant information architects as a need for a greater level of skill in IA was recognised. Two organisations acknowledged that their web IA was achieved internally by central web staff with no real training or expertise, other than the knowledge that was gleaned of necessity. Consultants were not employed in these two organisations, and the information organised on these websites was designed and implemented by informed, yet non-expert practitioners. In the organisation that least acknowledged the need for expertise in web IA, a research participant described the situation:

These days everyone thinks that they know what the web's about because we are all in it and we use it so much. If you can get access and permissions to do it yourself, then you will. You will go ahead and do rather than ask other people to do it. [Org E]

Consultants are often employed to carry out the work of web IA in organisations. Of the seven organisations that participated in this study, three used the services of outside experts to design the information structures of their websites on a project basis. The consultant information architects interacted with the organisation for a limited time and finalised their information design recommendations with a documented product in text and diagrammatic form, as Morville and Rosenfeld (2006, p. 291) recommend. The organisations, through some formal process and authority such as a committee or executive decision, accepted the IA design that was proffered by a consultancy.

They came in and worked full time for that, on the project for six or so months, coming up with the new information architecture. It was then rolled out between 2006 in various sections of the site ... I think by May 2007. [Org D]

With the departure of the expert consultant, there is again an absence of skill in the organisation and often a web IA that is often not expandable or flexible. The temporary nature of consultancy forces a discrete IA solution; the solution must emerge in the initial agreed-upon timeframe. Constraints in the time and resources in the form of consultancies were mentioned by research participants as creating imperfections in the design, particularly at lower levels of the website.

Carrying out web IA in this manner is an outcome orientated, time-constrained, project approach. It assumes that established processes for achieving a web IA are effective and that if these common methods are adhered to, then a desirable outcome will be achieved. Organisations that had used consultant information architects noted the void that existed when the commission was complete and the implementation and maintenance of the documented information design was left to them.

If you were to go out and have a consultancy – you really do need the IA skills inside because that thing they leave you with is not set and it changes, so you need to have those skills again to do this sort of stuff. [Org B]

Those organisations that had internal and named roles in web IA were adamant that this was the best approach. The internal information architect would be present at all stages of the work of IA, especially the inevitable changes to an information design that result in a socially complex environment. Small, ongoing, agile approaches to web IA could be fostered. The need for deep knowledge of the specific business context and culture and daily ongoing interactions with business stakeholders were reported as invaluable to the work of web IA. With unsuccessful consultant-led web IA projects behind him, one research participant had questioned his ability to communicate and recruit external short term IA expertise, but concluded that in-house expertise in IA best served the organisation:

And our previous experience was that when we had consultants come in, do a quick job and go, they never, they never understood the culture of the department and quite often they didn't have sufficient sector experience to understand the tensions or the subject matter, the business processes or the nature of the organisation ... and we were wondering if it was because we were writing bad requests for quotes and we weren't actually getting things right, but I don't think it's the case. [Org B]

Yet research participants could also see the benefits of consultants for web IA. The external nature of their expertise provides a credibility (Fleck 1998, p. 162) that internal web staff may not enjoy – subjectivity and internal politics are always at play in the practice of web IA. The central web staff have the option to distance themselves from the information design outcome and place responsibility at the feet of a third party:

Well, it is having the credibility of a third party to fall back on, to say that this was not based on the opinion of any particular internal group. This was based on external expertise, the best we can buy within our budget. [Org F]

5.5.1.2 Categories of IA work

The conduct of web IA can be ill-defined in large organisations. It is complicated by the different components of IA on a website and a much needed sense of ownership of information structures by an organisation's business stakeholders. It is further complicated by the varying degrees of expertise in web IA within the organisation and the need to allow devolved business units autonomy over their sub-sites.

The design components of IA within a large organisation can be divided into two categories (Burford 2008). The first category is the global utility navigation (for example, search engine access, site indexes and privacy statements) and the page layout design that generally appears on every page of the organisation's site. In the majority of organisations studied, these navigational and page layout design decisions were made operationally by the central web staff without the backing of governance or policy. The devolved business stakeholder who takes responsibility for an organisational sub-site accepts that they will not have total IA design control over their sub-site. Some aspects of the navigation and the page layout will be pre-determined by a central design. Central web staff have responsibility and increasing authority for these global IA design features of the organisational website as the widespread expectation for consistency in these aspects of web IA increases (Burford 2008). Authority and responsibility for the implementation of these global aspects of the IA of an organisation's website are enacted technically in the majority of organisations. Content management systems or static page templates go a long way toward ensuring a consistent navigational experience for the users of the entire enterprise website.

This study reveals that, as the status and role of the web team matures within an organisation, the team has gradually assumed responsibility for the global navigation and standard page layout of the organisation's website. Much of the authority for IA has been claimed, grasped or earned by the web team over time. Action, borne of necessity, has driven the implementation of global navigation on large enterprise websites. In discussing the web team's responsibility and authority for global IA and page design, one web manager made the following comments that exude a certain confidence as well as an awareness of the risk that is involved in the assumed authority and action:

Yes, we just did it, yes. I think partly because we've had a change of manager in this group in the intervening period. The previous manager was more about consultation – I'm more about let's just get it done and apologise later. We actually just designed it and just put it out there. We didn't do the consultation thing and everyone's happy – as far as we can tell. [Org A]

The second proposed category of IA work is the construction of unique, ambiguous taxonomies to organise and give structure to the information that is delivered by the entire organisation's web presence. This aspect of web IA requires diligent input from the business stakeholder who has insightful knowledge of the information and the client. Responsibility and authority for the assembly of all corporate web information does not reside centrally and cannot be pinpointed with ease. It is an interplay between IA expertise in the organisation and the business stakeholder, and is achieved by interaction and consensus. One web manager signaled the need for web staff and business stakeholders to work together:

We also don't let people out there very often change those high-level pages. Instead, it is done in consultation and then our team will actually effect the changes. But we never make changes without consulting the business unit stakeholders. [Org F]

Central authority and responsibility did not generally exist for the development of content structures of sub-sites that served the needs of specific devolved business units and their clients. Thus the construction of ambiguous taxonomies of information on a sub-site that is owned by a business unit was very much in the hands of the non-expert. To be engaged in this work, central staff with expertise in web IA had to be invited to participate. A business unit is typically unskilled in developing effective content structures for its website and an organisation will often employ a person whose title is *information architect* or develop that expertise in central web staff. Yet an information architect cannot work in isolation – 'a silo of expertise' will achieve very little (Cox 2007a, p. 776). Centrally employed information architects must interact with business units and form part of a team in the development of information structures for a sub-site.

One web information structure that sits a little aside of these two categories is the organisation's homepage. It houses the highest level of the information hierarchy, has a unique page layout, and may have a unique implementation of the global navigation. In all organisations studied, there was an overall sense of responsibility for the organisation's homepage by the central web staff – but full authority had not been assumed. Changes in the content structures generally required negotiation with key business stakeholders. The nature of this negotiation was more of a political

conversation than a design process. In an exception to the general pattern, one organisation studied used a formal approval process in the form of a web steering committee to change the information structures on the homepage. The following participant revealed the delicate balance of tending the homepage, typical of the majority of organisations:

So we very rarely go up and ask for approval on day-to-day operational changes; we just make decisions about the homepage. So the homepage, I guess you could look at us as being the owner of, but even then I would prefer not to be seen as the owner but rather the custodian of it. [Org F]

5.5.1.3 Layers of IA work

One research participant stated that responsibility for web IA ‘devolves by level’. This was indeed a strong pattern of the work of IA in all organisations. Central web staff were custodians of high-level corporate pages, but as the hierarchy of web information structures reached the business units, central staff relinquished more and more responsibility to the business stakeholders across the organisation. The IA of the lower levels of the corporate website was much less the outcome of the work of specialist information architects. Central web staff encouraged this self-reliance for the information structures of devolved sub-sites of necessity:

It’s mostly self-sufficient, but we look after a few of these; they’re sort of part of the corporate level site. Yeah, mainly we try to make sure that people are self-sufficient. There’s no way we could look after all of that, it would be absolutely impossible. [Org D]

Self-sufficiency in structuring web information was a common practice in devolved organisational sub-units. Central IA experts would often work alongside, but leave responsibility with the owners of the sub-site. The above statement also reveals that the IA of an entire organisational website is beyond the capacity of a small central collective of specialist web staff. Whilst global utility navigation and page design can be readily achieved universally, the ongoing construction and maintenance of ambiguous taxonomies that shape the corporate information was too great a task for central web staff. The volume of this work was extensive and business self-sufficiency was widely encouraged. Thus, devolved business units had to take up much of the responsibility for web IA at the lower levels the website. This was

clearly expressed as a deliberate strategy of the central team and a number of web staff were able to verbalise that this was a conscious approach taken to manage the quantity of work involved in delivering information on the web.

But rather than set ourselves up as a team that goes in and redevelops your website and then hands it back to you, I think we'll probably continue along the lines of a team that comes in and advises you how to do it, so that you never lose control of your site, and you never lose responsibility for your site either, and we don't end up maintaining everybody's website because that's just not sustainable. [Org A]

5.5.1.4 Impact on website structure

The IA of large websites is often accused of being too organisation-centric and organised to replicate the organisation's internal structures. A user-centric approach to web IA is recommended (Morville & Rosenfeld 2006, p. 57). The pragmatic realities of organisational capability and capacity to create and maintain web information structures revealed in this research, however, continue to reinforce an approach to web IA that mimics the organisational structure.

Research participants were able to verbalise deliberate design decisions to structure the information on their website so that discrete sections could be maintained by a specific business unit. As a result, information was purposely organised at a high level to map to the various business units in order to devolve ownership and responsibility for the lower-level IA and web content.

Our website isn't identical with, but is pretty close to the business structure. It's not an IA that is about users; it's an IA that's about really the organisation. I think it was developed partly that way because of the usual tension. If you want to have devolved ownership, which was the idea behind the CMS, then you have to be clear about who owns what. The easiest way to do that is to have sections or portals where that business unit is responsible for that content. [Org C]

Another reason that organisational structure was highly visible on corporate websites was the belief that it was in the best interest of the website user. One organisation that was very focused on its use of the web as a communication channel claimed the need to keep organisational structures as an integral part of the IA in order to serve its clients. Clients, it was claimed, will often need to obtain information from a

particular section of the organisation, and this is facilitated by allowing those organisational structures to have prominence in the overall IA:

There are users out there who interact with us on a division basis, right, and as long as that remains the case, then are we really serving them properly as one of our users by burying, by trying to bury the structure? So, as long as that structure plays an actual role in the way that we engage with people outside the organisation, then I don't believe it's correct to try and completely remove that structure. It's flawed to try and be overly precious about removing organisational structures from the IA. [Org F]

Contrary to current theory and recommendation (Morville & Rosenfeld 2006, p. 57), this study suggests that there may be good reason to intentionally promote the organisational structure of an organisation as a prominent aspect of the website IA. Firstly it clearly assigns ownership and responsibility for a sub-site to a devolved business unit. With this clarity of responsibility for information and its structures, attention to the sub-website is more likely to occur, thereby improving the overall effectiveness of the website. Web IA that reveals the organisational structure may endure – not because user-centric techniques are unknown or that an organisation centric IA is constructed mindlessly – but because it is purposely constructed to enable the organisation to devolve and assign responsibility and ownership to sections of the website. An additional factor that supports an organisationally structured web IA is that within a large organisation, clients are often better served by dealing with a specific section of the organisation. This thesis suggests that promoting organisational structure on an enterprise website can be user-centric.

5.5.2 Ways of working

Clearly revealed in the research data are instances where web IA practitioners have developed their own contextual ways of working – ways that are not foretold by best practice or prescribed methodologies, nor found in textbooks. In developing of necessity their own ways of working, web information architects have enacted their own situated practice. Stories of adjustments to work practices told by research participants may in fact appear at odds with recommended or 'best' work practices. These ways of working are formed and learned with the underlying, if unrecognized, goal of achieving effective web IA for the organisation's web presence. They are

responsive, agile and adaptive shifts in processes and behaviours to fit the environment in which web IA is practiced. They incorporate the subtle and situated negotiation required for the contextual practice of web IA and all of its intricacies. The previous section of this chapter reported some ways of working that delivered agility and responsiveness under the banner of *negotiating web IA*. They were also instances of enactment.

5.5.2.1 Business readiness

Business readiness to attend to its website is a factor that has been revealed in this research to be essential for successfully attending to a website's information structures. A strong commitment of time, resources and energy by the business unit is needed. If an IA redevelopment is initiated and driven from a central web unit without the necessary buy-in from the business unit, it is more likely to fail. The articulation of this learning from a process of 'trial and error' (Weick 2001, p. 176) is an end product of action taken in order to make things work. One central web team described this process of enactment:

We had a person who came in and had skills and knowledge about IA and about user testing and attempted to, to drive from our section a redevelopment of a whole theme and it, it literally took, well, a year and then nothing happened ... The lessons we learnt from trying to do large redevelopments is that unless the line area, the people who own the content are on-board, you'll never get it to happen, and so we're sort of evolving from doing large-scale redevelopments into smaller-scale redevelopments and restructuring of website and parts of web, of the main website according to the enthusiasm of the line area, because we're not successful otherwise. [Org B]

The evolutionary nature of work practices and the learning involved in the practice of web IA is well highlighted. This organisation had come to the point of being able to pronounce: this is the way we do things here; this is the way we work. We do not drive large projects in which the business is not ready to be involved. This position was arrived at by experience and failure, and incorporates significant components of reflection and awareness not borne of theoretical learning or adherence to best practice. Those practising web IA in organisations have enacted a knowing (Weick 2001) that business engagement and commitment to IA work in their area is a prerequisite for success.

5.5.2.2 Web content and IA

Designing optimal information structures and writing information or content that is housed within those structures are frequently presented as separate activities in recommended methods of web IA (Morville & Rosenfeld 2006; Wodtke & Govella 2009; Brinck et al. 2002). In abstraction, an ideal information design is followed by the written content to populate it. This study reveals that the interdependency of IA and web content is much stronger than this ideal sequence of events, to the extent that one research participant believes:

I think possibly, based on my experience, you can't really separate a web writer and an IA person, I think it's just too intermeshed. [Org C]

IA designs are strongly affected by the availability of content. Web teams in large organisations are frequently challenged to implement an IA for which there is no information. One recourse is to revise the IA to match the availability of content. The following account is of a consultant-designed IA that had to be amended because the content to populate the information structures did not, and would not, exist. The optimal IA that had been commissioned and accepted by the organisation was compromised and reworked by internal staff, because not all content was available from the business:

And then they [the consultant] go away and so then it comes to us and we start implementing it. Okay, you start mapping the existing content with the new content, working with the gaps and all that sort of stuff, and you realise that this section here, which has got five or six subsection is really, there's no content! And there's not going to be content! And so you then collapse it back up. So we're changing the IA, yeah... [Org C]

The action taken to implement a web IA design that is lacking in content may lead a web team to write that content themselves, as best they can. There are indications too, that the lack of content to support an ideal IA is a source of tension in the organisation. *Nagging* and getting involved *behind the scenes* [Org G] were actions taken by central web staff to obtain the web content that was required for the website. One organisation reported their approach was to write temporary content themselves:

It's happening right now within the research section of the site. We're trying to get information about xxxxx and registration and the site can live without it, it should be there, but it's not fatal. So we have kind of indicative high-level, pretty wishy-washy content there now place-holding, and we are bugging them to write more in-depth content or to approve it anyway. [Org C]

The information design process is often used to optimise what should be on the web. It is the time for brainstorming, *for lots of good ideas [Org C]*, identifying content gaps and innovative approaches. From the energy and great ideas of the web IA processes *the actual flow through of giving us the content to support those ideas wasn't always there [Org C]*. The balancing of brainstorming and reality is evident in this pragmatic statement:

So it was often more, well, this would be nice but we don't have that content, so this is what we can do with what we have got, kind of thing. [Org G]

The enactment of an IA for which inadequate content has been provided by the business calls on the resourcefulness of the central web team whose counteractions may include coercing the relevant business owners, creating place-holding content and reworking an information structure to solve their dilemma.

5.5.2.3 Waiting

The work of web IA in large organisations can involve a time of waiting, described by participants as *marking time [Org D]*. When significant organisational restructure has been mooted and is being considered by the business, there is a sense of expectancy in a web team for the changes that will be announced. This is accompanied by the knowledge that the organisational restructure will have significant implications for the website, and there will be much work to do in the near future to reflect these changes:

We're almost marking time at the moment because until the end of September and until the government responds we don't really know what the future of xxxx is and it could be... it could be any number of things. It could be maintaining the status quo, changing the structure within this organisation or a new organisation or whatever. We don't want to rush in and do too much new stuff until we know what the

context is that we're going to be operating in, say from next year, 1st of January. [Org D]

Preparations were made in this period of expectancy. Projects that research website users' profiles and their needs and behaviours are critical activities for optimising an IA and were reported by research participants as work that is carried out in times of waiting for organisational change to be announced. A different rhythm of work was reported. It was a time to be reflective, to think big picture and to engage in work that underpins or informs the web information structures. It contrasts strongly with the agile and sometimes frenetic nature of frequent and organic change to the web IA. It was seen as preparatory work that enabled immediate action once a restructure was announced.

It was pointed out by one research participant that constant change in organisational structure in sectors such as government can detract from a website's IA. When 'bits' of an organisation are relocated, their absence can cause noticeable gaps in the website of the previous organisation. Conversely, it can be difficult to accommodate the entity within the information structures on the website of its new parent organisation. This is especially true if there is rigidity in the web information structures in either organisation.

That's the hard bit with government as well. We see bits of old departments taken off and put into this one, and then sometimes they don't neatly fit under the IA of that new organisation. [Org B]

Insightfully, it was reported by a web team member with IA responsibility that when a business entity is moved from organisation to organisation, there is often a cultural misfit and a lack of synergy and cohesiveness in the new organisation. This lack of organisational oneness is often reflected on the website of the newly reconfigured organisation.

Yeah, I think you find that with big government departments that lose bits and gain bits and so on, the culture is different ... It's very difficult to actually just suddenly form a new department with a whole new culture... So it is sometimes an uneasy fit, and that is reflected sometimes in the websites and things where you can see the whole organisation at a glance, but sometimes you don't know quite why

they're there or where they fit. Well, that's because often it's an uneasy fit culturally. [Org D]

5.5.2.4 Opportunism

Those with responsibility for and overarching vision of web information structures are in a prime position to view the information platform as a whole and to notice any aspects of an enterprise website that require improvement. They have a focus and an expertise that enables such scrutiny and an impartiality that comes from not being engaged in a business function apart from the web. Participants reported an awareness of areas in which the organisation's website required improvement. Yet, at times an identified and much needed change to the information design of a website proved to be difficult to negotiate and to enact within the complexity and intricacies of a large organisation. Those centrally involved in web IA had learned to work opportunistically, to wait, to look for the impetus or trigger that would allow a sought-after change. Clearly once an opportunity presented as a result of a shift in the business environment, one information architect grasped the situation and *pushed* to achieve the results that he had envisioned.

It was only when we got the new Minister and we changed from the Department of xxxx to the Department of xxxxx, it actually happened and it was driven mostly because we, a whole bunch of people, came into our department and they wanted their stuff to be seen on the website... Yeah, and so they actually pushed, so we had a champion then and they pushed that, so we madly pushed ... and we did it in a month or two. Basically no user testing, it was all done internally, what were the business needs, who do you think the audiences are, rewrite the content... [Org B]

This web IA professional had learned to seize opportunities and to be expedient in achieving long sought-after goals of improvement to the website. With a strong knowledge of the business context, a set of favourable circumstances was discerned and by *madly pushing* at this point in time, previously intractable information design problems were solved. Again the necessity and preparedness of web IA specialists to wait, to take shortcuts and to make compromises along the way is indicated.

5.5.2.5 Incremental change

When changes to web IA were the initiative of the central web team, there was much support by research participants for an incremental approach. Improvements were often made by reviewing sub-sections of a website with attention to detail rather than a whole site at once. Incremental change to web IA was a strategy adopted by most organisations.

Yep, and so in the old, old time, 2001, we did a redevelopment. We redeveloped the whole site in three months. We all worked madly and did all that... It is the basis for organisation, for organising the structure since then – but we've done lots within each theme to improve the structure... So now we're just, we can't do that, so we're actually doing sub-section by sub-section of the website, improving the IA, reviewing, pursuing all that. [Org B]

Rather than rework the IA of an entire website, some research participants thought it was more productive to deal with a sub-section of the IA, when the business stakeholders in that area were focused and available to attend to their website and the central web team could focus in one area and provide detailed advice, expertise and ongoing improvement.

Yeah, and we've changed. We've changed our goals over the years from attempting to get the perfect website to knowing that this is an incremental step towards something better and we're not ashamed of that anymore, and we explain that to people and we get buy-in from people and approval of slightly imperfect things because we all acknowledge that it's not possible to get the perfect thing... [Org B]

5.5.2.6 Web IA as project

A number of organisations reported that large scale redesigns of their websites had been carried out using the project methodology recommended by Morville and Rosenfeld (2006, p. 348). Due processes and activities that included user research, content inventories, card sorting and stakeholder consultations were carried out and a final design specification was developed for implementation. Research participants saw this project-based redesign of their websites as a significant effort and upheaval:

I guess those top-level categories, I mean getting those top-level categories with the research stuff that was done was the hardest part of

the new site, and where they were and the real estate they had. I mean that was one of the hardest things with the site. [Org F]

This account of a consultant-led, top-level redesign of the corporate website still elicited memories of difficulty and arduous work some four years later. A resource-intensive and funded project such as this is expected by senior management to produce an IA that is durable and capable of being in place for quite some time. There is an expectation of a stable web IA that serves the organisation well at the conclusion of a significant project.

The feeling was to some extent the top level ones were... a lot of work went into those and they were quite detailed, a lot of research and they should stand up at the time, although some of them less so, I guess. It's more an issue of keeping the integrity of what's there, which is difficult. It's little things that chip away at it over time more than any big thing. [Org D]

This individual, with organisational web IA responsibility, revealed his efforts in trying to maintain the coherence and longevity of the information design that was delivered by an extensive project. But the demand and lobbying for change is relentless and comes from the business itself. Lambe (2007, p. 139) points out that provisionality of information structures is at times critical. The tension between the business drivers for changes to the web IA and the need to protect the project outcomes were expressed in this narrative.

Yeah, in terms of changing that, I guess it would come from the area. Normally the area would drive that change and say, 'We need something to happen with this'. I guess the problem is that would also mean losing something from those top six positions as well, so they're fighting very heavily that topic1 should be up there on the top page and topic2 should still be there and things like that. So it's probably more those areas who would kick up the fuss and say, 'Well, why are we being moved down here?' [Org D]

The momentary reduction of a website's IA to an approved design project outcome that is subsequently implemented is noted. The fact that the design outcome is short-lived in its ability to meet business needs is also revealed. Ongoing change to web information structures, both large and small, is the constant.

5.5.3 Finding restrictions

In many cases, the documented web IA that was approved and adopted by the organisation at a particular point in time proved difficult to change as the organisational requirements changed. Research participants reported that ability to change an IA, once implemented as an outcome of a project methodology, was often constrained by rigidity in some aspect of the implementation. Visual design was one way that research participants experienced restriction to change:

I guess we're also limited probably more by the design. We've stuck with that three by two boxes there and now there's seven categories we want to cover in there. So you'll see that topic1 and topic2 are now messily put together in one box even though they don't necessarily go together as such. [Org D]

The way that an IA is technically implemented has an effect on its ease of maintenance and agility for change. Several organisations in this study reported that the technical platform for their website hampered their ability to make timely changes to their website and its information structures. Those organisations in which the website IA was tightly coupled to technology were not able to meet the business requirement of responsiveness and agility in change.

One web manager described a significant new initiative within an organisation that affected the top level IA. It was crucial to the business that this new initiative be added in a prime position in the web IA. Yet the manner in which the IA had been implemented was rigid and required one section to be removed before another could be added. There was not the flexibility to add a new section. This restriction had occurred in the technical implementation of the homepage – scalability had not been considered:

There was a whole new body that didn't exist before when the current architecture, when the current release or iteration of the website was developed – it needed to be accommodated within the main navigational structure, and everyone agreed from the steering committee down that one of the effects of creating a new centre was that it had to be reflected within the website architecture. So then we needed to hunt around for a way to do that without completely changing the design, so we identified the xxxxx section, which wasn't being heavily used, and figured out ways we could put the content that

was in that section in other places within the website that was logical, and then slot the new centre into that navigational position. [Org C]

One organisation reported not being able to physically change the IA of their website for a period of two years – they were reliant on an external vendor and service provider to whom all work was channeled. No changes were being made until the original and agreed information design was implemented. The web IA had been tightly coupled to a technical development for managing the content of the website. The dependency of IA on an external technical development and implementation of a content management system prevented much needed responses to the business initiatives.

There was this kind of hiatus period because once everything was sent for the roll out of the current iteration of the site there was a two-year period where things were kind of locked down and issues that were identified couldn't be addressed and then it took this... everything was kind of frozen because they just wanted to get the implementation done and then change it. [Org C]

In another organisation, as part of a customised content management implementation, an enterprise taxonomy served as a foundation for the overall web IA and new content was first classified in that taxonomy before being positioned in web information structures. It proved impossible to maintain the underlying taxonomy with integrity and to continue effectively mapping content to the web IA.

There were reports of reverse engineering. Distributed contributors of content to the website reversed the process. They firstly decided where within the web IA they wanted to position the web content and then found a place in the underlying taxonomy that would serve their purposes. This affected the integrity of the coupled yet distinct infrastructure of the enterprise taxonomy. Devolved business stakeholders had overturned or circumvented the established processes and technologies that blocked their way. In order to create web information structures to meet their immediate needs they created unofficial pathways and processes. Action, based on business need, overturned a central blueprint or plan for web IA. Suchman's (1987) claim of a disconnect between plans and situated action is evident in this account. Web information structures that are enforced by technology or authority causes restrictions to the need for agile change.

5.5.4 Search – a neglected component

The enacting of web IA did not extend to the crafting and optimising of the information retrieval function of enterprise web search engines. Morville and Rosenfeld (2006, p. 49) include the functionality of searching a website's information provision as one of the four major component systems of an IA. Morville and Rosenfeld (2006, p. 150) and Wodtke and Govella (2009, p. 99) see search interface decisions, adequate metadata and the establishment of featured pages, for example, as the work of information architects rather than a technological function. Yet this research revealed that search is a neglected component of organisational web IA practices. In the realities of organisational life, despite a body of informing literature (Katz & Byrne 2003; Hawkings & Zobel 2007; Wodtke & Govella 2009), the information work involved in optimising a web search engine for information discovery was not a high priority.

5.5.4.1 A reactive approach

Of the seven organisations studied only one had central web staff who spent time crafting the website search engine as a tool for information discovery. Research participants revealed that they did small projects to improve the search capability of their websites *but there wasn't a lot of work done on that on an ongoing basis [Org A]*. A typical response indicated that little ongoing IA work with search was occurring:

I have been saying for years we should be looking at our top ten search terms each month and checking them to see that the content of response to them is at the top of the list, and if not put in featured results. But we, we just haven't done that. We haven't really had the capacity to do it. [Org F]

Thus there were very few proactive efforts to improve the functioning of the search tool by central staff with web IA responsibilities. Rather than strategic work to improve the usefulness of the search engine as part of an information architect's ongoing responsibility (Wodtke & Govella 2009, p. 100), most organisations worked reactively. Organisational stakeholders were attended to on an ad hoc basis as they

signaled that that the searching systems of the website were not performing according to their expectations. An approach such as this one was common:

So instead we respond to our stakeholders, who say 'Hey my content doesn't show', in which case we will get a featured link stuck in there. [Org F]

Only one organisation claimed the slow and attentive style of work needed to optimise a search tool for web information discovery as part of its practice. Web staff were methodically attending to featured pages and metadata; they did not consider this the work of a project, nor expect to finalise an optimal state. The way of working was described as *chipping away at it [Org C]*.

We can do key word configuration. There is a thesaurus that you can construct and there is a best results thing that you can construct, so slowly but surely we are hacking away and trying to both look at what people are searching for and then doing the best match to that. It is a very kind of slow and ongoing, one-by-one process as it is. Xxxxx has done a lot of work on identifying some of the key search results that, you know, actually doing the search, seeing what the results are and then suggesting...actually this would be a better response. [Org C]

The lack of IA work with search engines was largely justified by a lack of resources in the form of available and skilled staff to perform this proactive aspect of web IA. The attention of those with IA responsibilities was continually drawn to the more urgent demands of the business, the web content and its structures. This suggests that organisations are not fully resourcing the strategic and proactive initiatives needed to fulfill the business and client information needs thus, forcing a reactive manner of working:

No time or focus to do that. There is no one sort of thinking about that stuff in a really detailed way. There are other more pressing things that we are just doing in terms of the content all the time. [Org F]

5.5.4.2 The technology

The search function of a large organisation's website is not fully 'owned' by information architects. Delineation of responsibility for the search tool and its implementation remains unclear, many aspects remaining in the realm of IT. A prevailing attitude to the use of search engines was described as *we have always had*

– *this is purely a technology thing [Org A]*. At the same organisation, another central web staff member spoke of the search engine: *At the moment it is basically a black box. It is a black box that is technology oriented*. One member of a central web team reported a lack of technical access to do the work that was required to improve the retrieval of information on their websites. Featured pages were achieved by service desk requests to IT departments. Cox (2007b) discusses the tenuous relationship between the IT departments and website work.

There were reports of search technologies in place that did not meet the organisation's needs. The technology of search did not contain the functions, features or useability to support the work of web IA. Search engines had been purchased with a technological mindset rather than a mind for information retrieval. Recent or imminent replacements of the search tool were frequently mentioned. The search engine commissioned by the IT department in this organisation was described:

The CMS search engine was horrific, even things you knew were there you could never find. It was quite unbelievable. It didn't have any way of prioritising results. So about a year ago, precisely a year ago, we got the Google mini and we are just about ready to get the final template implementation. Everything is all outsourced so tends to take longer than you might think it would. [Org C]

Outsourcing of search engine hosting and implementations occurred in several organisations. Web staff in one organisation expressed initial relief when an outsourced search implementation decision was made, *Well, they'll worry about it all [Org B]*. Quickly they realised that, *No, we do really need to check it regularly and make sure it's working right and all that sort of stuff*. The information work involved in providing a useful search engine could not be outsourced.

5.5.4.3 Managing the problem

The widespread neglect of search as a means of retrieving information on the websites of large organisations was accompanied by an awareness of that omission. One information architect expressed an opinion that search was the leading system of IA – yet it was floundering in that organisation. There was an acknowledgement that a problem existed:

We did some user research and it is by far the number one sort of pain point that people have with our website [Org B].

Numerous accounts of user and internal stakeholder dissatisfaction with the searching function of enterprise websites were revealed in the research. Central web teams were aware of the poor perception that the enterprise search engines attracted. This succinct account of the situation sums up how easy it is to lose the organisational regard for a search engine that is not implemented to meet the information needs of its users: *Search doesn't work, that is it, it is written off, it doesn't work [Org A].*

Other barriers to the success of web search engine implementations were named, but all too often they exhibited and were masked as 'a search is broken problem'. Problems that surfaced during a search experience were attributed to the search but originated elsewhere. One central information architect described the pitfalls for information retrieval that were widely interpreted as a *search is broken [Org A]* problem across an organisation:

There is 'the old content problem' exhibited by, you search for a person in our enterprise search engine, and you find all the minutes of the meetings of that person ever attended. There is the bad metadata. There is the alternative technologies, so non-static technologies don't index particularly well. It is a combination of all those things that make stuff hard to find. [Org A]

Website optimisation for discovery in search engines was poor in organisational sub-sites that were not the responsibility of the central web team. Those with devolved responsibility for sub-sites did not have the competencies to construct a site with appropriate text, metadata or links for discovery. In their ignorance of the source of the problems that they were experiencing, significant conflict was generated in the organisation as they blamed the search engine:

So it went up the chain and I think their manager called and there is a big who-har... you have obviously done something wrong, and when we investigated, the word 'bookshop' wasn't in the metadata. They used a dynamic page, so that wasn't spidered correctly by the search engine. There was a whole lot of things that were wrong. Doesn't even mention the word 'bookshop' in the page, only in the image... [Org A]

One web team backed up their assertion that the search function had become a scapegoat for poor website optimisation in saying that for their search engine, like many external search engines such as Google and Yahoo!, the highest number of pages indexed by term are ‘page title goes here’, which is the place holder from the templates. They claimed:

You will find more results for that query than any other query on our web, because there are more pages out there that have that as a common component than anything else [Org A].

The following quote from a research participant well summarises the situation in the majority of large organisations studied. The web enterprise search engine was considered an item of technology, it was not crafted for information retrieval, the technology was not entirely suitable for the organisation, there was significant dissatisfaction with the search tool and a common strategy to solve the problem was to replace the technology:

The web search lives on a box somewhere that no one really looks after and also it doesn't work spectacularly well and we are replacing it. You know it's the Rolls Royce of enterprise search engines, but because we didn't have a dedicated person working all the time to get it up and running properly, it never worked right. [Org F]

Whilst this study revealed that web search was not well attended to in large organisations, there was a vision for improved and greater attention to this work. There was awareness of what should be done and the process for doing it – a sense that it would soon be enacted:

I would love to be able to do best bets. The current technology doesn't support best bets at all, but it is something that we will be able to do. We are planning on doing it. [Org A]

5.5.5 Enacting web IA concluded

Those with central responsibility for web IA have learned from their experiences in practice that the business must be ready and willing to engage with an IA development or restructure for its successful implementation. Central information architects have learned to operate opportunistically and work with business units when an impetus of any kind triggers the need for appraisal and change to the

information structures of the organisation's website or contained sub-sites. They have also learned to wait when organisational change is imminent, knowing that this change will have significant repercussions for their work. Enactment solves and overcomes mismatches between an information design and the availability of the information itself. Enacting has not stretched to encompass the information work required to optimise an enterprise search engine – it will come. *Enacting web IA* signals improvisation in order to achieve and to learn from experience. These concepts are embedded in the construct of *enacting web IA*.

Enacting web IA is the human endeavour that creates an organisation's website, no matter what the surrounding circumstances. It addresses the existence of information on an enterprise website, but not the effectiveness of its structure. *Enacting web IA* reveals who takes part in web IA. Numerous and diverse people within an organisation participate; hence, uniformity of approach is not ensured. Expectations and norms insist that large organisations do have websites; thus, the work of web IA will be done. *Enacting web IA* is about doing the best that is possible at the time and incorporating the reflective learning of that experience in the next.

5.6 Knowing web IA

The knowing of web IA addresses the notion that knowledge is deeply embedded and reconstituted in its application. This construct follows Orlikowski's (2002) claim that separate constructions of knowledge as artefact and knowledge as activity are not helpful. It embraces knowledge as the 'ongoing social accomplishment, constituted and reconstituted as actors engage the world in practice' (Orlikowski 2002, p. 249). Web IA, as it is practiced in large organisations, is found in this research to be replete with both those understandings that lead to action and those actions that lead to understanding (Huzzard 2004, p. 352). *Knowing web IA*, then, is inclusive of propositional knowledge about web IA and its activities.

This section describes the nature of the knowledge and skills that are involved in the practice of web IA in organisations, how they are located within an organisation and how they are acquired. It explores how existing, explicit bodies of knowledge are

employed, and it reveals that the situated practice of web IA is a large influencing determinant of *knowing web IA*. Lack of knowledge or mindlessness of web IA is a real issue in organisations, often impinging on decision making.

The sub-sections of this section of *knowing web IA*, are listed in Table 8, which also provides a picture of the contributing lower categories of *knowing web IA*.

Table 8 The major category of *Knowing web IA*

Major sub-category	Subsequent sub-categories
<i>Knowing web IA</i>	<p>Knowledge of web IA</p> <p>Locating expertise</p> <ul style="list-style-type: none"> ○ Specialist information architects ○ Web IA by novices ○ Engaging with expertise <p>Learning on the job</p> <ul style="list-style-type: none"> ○ Individual learning ○ Learning from the web ○ Mentoring ○ Sharing knowledge <p>Organisational learning of web IA</p> <ul style="list-style-type: none"> ○ Liminality and learning <p>Mindlessness of web IA</p> <ul style="list-style-type: none"> ○ Executive mindlessness ○ Dubious decisions

5.6.1 Knowledge of web IA

Abstract or propositional knowledge of web IA was acknowledged by the majority of organisations in this study as a valuable precursor to achieving effective online information structures. This acknowledgement occurred at the level of dedicated web staff who were the research participants in this study. Web staff were aware of the increasing body of explicit professional knowledge and theoretical representations in the field of web IA. They were able to name theorists, prominent texts and prescribed processes. Objectified knowledge of web IA and its processes was valued and called

upon in the majority of organisations studied. This knowledge was taken into the organisational practices of web IA and ‘amalgamated’ or adapted to fit the specific context. This is in keeping with Brown and Duguid’s (1996, p. 50) claim that abstracted knowledge of practices are indeed part of situated social practice. Brown and Duguid (1996, p. 50) warn that, although abstract, this knowledge is not universal and problems arise if abstractions are detached from practice. In this research, abstracted knowledge of web IA was mapped back and amalgamated into context-specific practice:

There are things that we can learn by adopting industry standard and best practice models and applying them locally. We don’t actually have to invent them from the ground up... We are affected by best practice. Certainly the projects I have been involved with, the first thing we do is look at all the sort of gurus, the best practice guidelines, the reports, the findings and just try and amalgamate those. [Org B]

Research participants as practitioners could pinpoint where explicit best practice was not enough to support their work. They were very aware that abstracted knowledge and theory about doing web IA did not fully represent their experienced practice. They expressed the limitations of the theoretical renderings of their work in ways such as this:

But what happens after that is you take those wireframes and you try to implement them and apply them and sustain them. That is the bit... it has been a topic of conversation around here in the last six months or so, we need to rewrite Jesse James Garrett’s nine pillars and put in that sustaining and maintain and promulgating of whatever comes out of a consultancy or redevelopment project or whatever. [Org A]

But this regard for the propositional knowledge of web IA was not uniform within the organisations studied. Other staff were perceived as being less than accepting of a theoretical base for delivering information on the web. Web IA was not the focus of their role in the organisation but was something that they had been tasked to do for a specific website within an organisational sub-unit. Their catch-cry was *Get in and do it as best you can with the knowledge you have [Org F]*. With an intuitive approach and pragmatic attitude to this small component of their work, they saw little point in expanding their own knowledge of web IA.

These people, whom Brown, Collins and Duguid (1989, p. 35) conceptualise as ‘just plain folk’, neither expert nor novice, engage in the problem solving of structuring information on a website as the situation demands it of them. They construct meaning and demonstrate an ability to create an adequate outcome, but do not reach outside of their own small set of web information responsibilities. Structuring information on the web is only a very minor part of their organisational identity (Gherardi 2006, p. 67).

Thus, for many staff within an organisation, engaging in the propositional knowledge base of web IA was not part of their practice. Surmising why a body of knowledge in web IA was not always respected in organisations, one research participant commented about a public relations department that had assumed a knowledgeable stance about the organisational website:

It might be that they think that the web isn't different, that the web isn't a specialist thing, you don't need knowledge and understanding about the web, anyone with a logical brain could do this stuff, and I mean, yes, to a certain extent it's true, but there are, you know, emerging things that are really making it a different medium. [Org B]

Yet drawing from explicit and published knowledge and suggested best practice was demonstrated by central web staff in their own developing abilities in many aspects of web IA. Organisations reported undertaking usability testing, developing and using persona, conducting expert walkthroughs, carrying out competitor analysis and designing and conducting user research and accessibility reviews. Where recommended practice in web IA was not carried out due to organisational constraints of any kind, research participants were largely aware of that shortfall.

So there was no, there was no formal blueprints for the information architecture that would be recognisable as professional IA blueprints but there certainly were papers or spreadsheets which contained an idea of the structure which was, were presented. [Org D]

There was a striving to include recommended representational knowledge of web IA processes and perspectives in the work of IA. A meta-cognition of their own work was revealed in that they were aware of their practice in comparison to the proffered

abstractions of that practice. This was encapsulated by the comments of one research participant:

We promulgate the idea that standards are good and at least trying to follow good practice, industry good practice is a good thing. [Org B]

5.6.2 Locating expertise

Following Ericsson and Smith (1991), the notion of expertise is taken to be the overlay of propositional knowledge in a particular field with the practical and sustained experience of a particular activity. Expertise in web IA combines knowledge of useful abstractions and the experience that has fitted them to various contexts in providing effective information structures for websites.

5.6.2.1 Specialist information architects

Two of the organisations studied had in-house roles for specialist web information architects and looked to the person in that role for expertise in web IA. These organisations made strong claims that web IA expertise embedded in an organisational context served their organisations best. They insisted that a strong understanding of the organisational culture supported the work of web IA. It was also noted that the employment of people with this expertise in IA was difficult to achieve:

Then actually finding the good staff! Over the last few recruitment rounds we've done, we found suitable people for, you know, markup and stuff, some great people, but as far as IA, no. [Org B]

Three organisations looked to external expertise in the form of consultants or contractors for any large-scale IA developments or redevelopments. When significant tasks in IA were faced, a decision was made to employ external expertise: *I think we probably would get a consultant at that point [Org C].* Web staff in these organisations maintained that their own level of knowledge and skill were adequate for ongoing and small-scale changes to website information structure:

I suppose if we did a new iteration of it, I would probably contract with an IA person, but on a day-to-day basis, I don't think it's required in the organisation. I mean to an extent we can be self-sufficient, but

we're not going to have the extent of skills that the consultant has. Obviously that's his speciality and that's his area of expertise.
[Org C]

A strong rationale for this approach was presented. Expertise, it was claimed, would wither if housed and therefore isolated within the organisation. The trends and changes in web IA required *someone going back out into the big wide world ... on a really regular basis [Org E]* for exposure to new developments in the field, to embed novel approaches in their repertoire and to safeguard their level of expertise. Without this constant revisiting of the broader world of web IA and ongoing experience in a variety of contexts, it was argued, the investment in web IA expertise would be lost. This web manager claimed:

In a corporate sense it is almost impossible to maintain world-leading expertise in any particular area. The moment you come in, you are only ever focused on the needs of one organisation. So even if you did have that expertise, you will start losing it right away and replacing it with expertise about the organisation itself and its particular needs.
[Org F]

Those with web IA responsibilities who employed external expertise were also well aware that their ongoing involvement was essential in a significant redevelopment project. Their role would be one of collaboration and continuity, working alongside imported expertise. There was a strong internal sense of responsibility for an IA that was developed by an external specialist. In the following statement, a web manager retained a sense of control and responsibility for the IA issues he faced. He incorporated external expertise in his solution, rather than handing over the problems and challenges ahead:

So we have got all those issues and we needed to find a way forward with it. So we decided to let the market help us through that to go and access the best expertise that we could. [Org F]

There was a notion too that expertise in web IA resided in the collective rather than the individual. Expertise was recognised as being embedded in collaboration. Acknowledging that *there was not an IA absolutely focused and expert person*, one organisation went on to express that they were *trying as a whole group to bring it together [Org C]*. Another organisation sought expertise from the collective:

And also a lot of the IA expertise or the way that we develop the IA is through this whole massive collaborative process ...Initially we pulled in librarians and, you know, different bodies from around the place and came up with it, and now we are sort of doing the same thing again, but it is more using these external people. [Org E]

5.6.2.2 Web IA by novices

Two organisations rejected the need for any expertise in web IA. Web staff with developing skills in structuring online information were responsible for the majority of IA work and decisions. This denial of the need for web IA specialist skills occurred at different levels in these two organisations. In one organisation, it occurred at the level of web manager. In the other organisation, which has no web manager, the immediate manager above the cluster of central web staff saw no need for web IA specialist skills. This comment revealed the lack of expertise:

Can be tricky if you have got a bit of information that doesn't really fit anywhere. Shove it in 'about us' seems to be the main... when the information doesn't fit in a logical place. [Org C]

In many of the organisations studied, there were pockets of IA carried out by novices, frequently working on the lower tiers of the enterprise website. These people *think it should be part of their everyday job, doesn't require specialists [Org F]*. An expert represented restriction of what they were doing themselves, someone who might tell them what to do and highlight their inadequacies. One research participant suggested that an expert in web IA *would present a threat to freedom on the web [Org F]* for many novice and occasional web IA enactors.

A centrally employed information architect described his observations of *manager-sent information design* or *ego-led design [Org A]*. This occurred when administrative staff arrived at meetings that were held to discuss new sub-sites, with fixed information designs which were *basically the manager dictating whatever they want [Org A]*. The conveyers of the manager-sent design did not have the experience or language to challenge or object to the desires of their superiors – who also lacked in web IA ability. In dialogue with the central information architect about the design, a typical response was: *I don't know, the boss or the manager or somebody said it had to be there [Org A]*.

Quite often, responsibility for the web was given to public relations, marketing or communication units, especially the sub-sites that were representative of those organisational functions. This organisational function or unit brought a tradition and a historical expertise in print publications and often very little formal training or knowledge of the web environment:

I think from corporate PR I think a lot of the emphasis is on the printed side of things. That's where most of their people are coming from, I think. And that's where their expertise is... Yeah, and they're going out of their comfort zone. [Org D]

Thus, in large organisations, a range of web IA work was carried out by various people with limited knowledge and experience in structuring online information. They were sometimes disconnected from expertise and were intent on achieving web information structures, particularly of sub-sites, by their own initiatives.

5.6.2.3 Engaging with expertise

When business owners of 'bread and butter' sub-sites did seek out available expertise in web IA, there was sometimes a tendency to disengage with the process. *They just think an external person is just going to blow in and fix it and magically sort everything out [Org A]*. Yet the central information architect in this organisation, had other expectations: *they will need to do some thinking and maybe some work and then it will be maybe more of a collaboration*. This was interpreted by one research participant by a fearfulness of IA. Web IA was seen as a mysterious and difficult process, best completed by a *guru with a magic wand [Org A]*. To this end, it was suggested that the practice of web IA needed a *bit of re-branding [Org A]* to be more accessible to Brown, Collins and Duguid's (1989, p. 35) 'just plain folk'.

'Participating in a practice entails taking part in a professional language game' because language transmits propositional knowledge of practice (Gherardi 2006, p. 23). Speech acts are units of action writes Gherardi (2006, p. 23). The language of web IA used in organisational context is then part of the practice, and confusion in language points to a practice that has not reached a fully mature status in all sections of an organisation. In this study, language was found to be problematic in the communications of web IA:

And the whole terminology thing is very confusing to everyone. IA to me means wireframes, you know, structure charts, navigation and all that sort of stuff, but I don't know if that means, that's IA to you or others. [Org B]

Language and hence communication about web IA is fraught. Right at the top of the pyramid of language pertinent to web IA, the term 'architecture' frequently required explanation. *Usually I'll mention in an email, 'information architecture (structure)' and I usually say structure and navigation but [Org B].* Quickly a short, pre-emptive attempt at clarification may need re-explanation:

And then I say, if they still don't understand, 'you know, like a table of contents in a document, this is how it's laid out, this is how the information is related, you know, these are a subset of this bit,' etc. So, and you know that might not be technically correct but... [Org B]

Web staff are aware that their language may not be appropriate for other organisational staff involved in website information provision, and the special words and metaphors of web IA form barriers to communication in collaboration. This awareness triggered attempts to improve communication by clarifying and softening the language of web IA.

And so when people say, 'Oh, we need to design a new site', I say, 'Okay what do you mean by design?', you know, 'Oh we just need a new look and feel', so there's all those different terminologies which are being used by different people and mean completely different things. So we're trying to get a common vocabulary across for all of the organisation... [Org D]

The mystique of web IA continued in the tools and artefacts that were used to communicate design to stakeholders. It was noted that wireframes, site maps and taxonomy diagrams did not convey a conceptual picture of information structures to the majority of people with an interest in the design, especially those who made decisions:

It's not enough for them to feel confident that if they approve that thing they've done the right thing. It's not until they actually see it in the design, in a graphic design, it's not until they see that that they are happy to sign off on the structure. [Org D]

The conceptual leap to understand a skeletal, yet logical, information design separated from its eventual website was frequently not possible. *They want to, they can't go there [Org B]*, reported one research participant. Low fidelity diagrams of web IA outcomes were not useful in dialogue with 'just plain folk' who could not separate information and visual design. When presented with a higher fidelity design, there were other abbreviations and short-cuts that caused concern:

even to the extent "why is it in Latin?" you know back to that sort of thing, it's, it's a real big problem. [Org B]

5.6.3 Learning 'on the Job'

5.6.3.1 Individual learning

Without any formal or practical learning, an intuitive, yet logical, approach to web IA was taken by central web staff and staff in business units in many organisations. One central web team member, extensively involved in web IA, described her beginnings in the work of structuring web information: *I just used logic, I didn't know anything about information architecture [Org B]*. She brought her knowledge of the organisation and its business to the task:

I had lots of knowledge about the business of the department, and so because I knew the content and because I am interested in logical, transparent order communication to the world about what government does, so I had an, yeah, an idea that I could improve the structure of these sites, and so I just used that logic to improve the structure and improve the language. [Org B]

From such neophytic beginnings in web IA, the potential and the necessity for individual learning was established. Within a central web team, a significant amount of learning about web IA was occurring over time and by simply doing the work: *we have to learn these things to an extent as we go, it's more on the job, and it is a bit of a journey that we are on [Org C]*. Knowledge and experience were being actively sought and acquired in the activity of web IA. This IA practitioner described his journey of experience and learning:

Probably just been more just sort of on the job learning really, and when things come in and there is no sort of logical place, thinking

through where to put it and looking at other websites and just learning from other people's experience and users. [Org C]

Learning web IA whilst participating in the practice was achieved in formal learning situations that included the presentation of abstracted knowledge, as well as in the mundane work of finding a logical place for new web content. Research participants across all of the studied organisations reported that their ways of learning included lots of reading, *just experience on the job – I've been through a lot of website redevelopments [Org C], picking up stuff from external people that we have had in [Org D],* joining IA email lists, attending conferences, attending workshops and talking about web IA with other practitioners.

There was expression, too, of self-responsibility and initiative for expanding individual knowledge of web IA. *Most people who work in web teams are interested in the web and so they are educating themselves about what best practice is [Org D].* More than responsibility, there was evidence of a growing desire and a significant motivation to learn and know more about web IA. One research participant reported that *I used to dedicate an afternoon a week to research for that sort of thing [Org C].* And another said:

I'm really quite passionate about it, so I can quite happily spend my Saturday on the web and in libraries or looking at books and things like that. And that's grown to a point where I feel like it's, you know, I've got to get to know more about information architecture and follow a more structured process... [Org D]

5.6.3.2 Learning from the web

The web itself is a training ground for much learning in the ways of web IA. Research participants frequently reported learning from close examination of the open web. *We spend a lot of time in front of computers trawling the web, figuring out how it works [Org F].* The use of the web to learn more about web IA was sometimes focused and necessity driven and research participants reported that if they were investigating particular functionality or way to structure content, then they would use the web to see how it had been achieved by others. More generally, for specific yet complex purposes, the websites of others were fruitful learning fields:

In terms of the information architecture work, we have identified a need. Because we are aware that that is difficult to do, we have looked around at other websites and are aware of ways that other people are addressing those same issues. [Org G]

At other times, in a more general investigation of how the web itself was revealing best practice and optimal functionality took place. By observation and interaction with the larger web, practitioners of web IA continually keep abreast of current practices and new developments. This account is of the preferred learning model of one research participant:

I think mostly, though, to go to other websites and look. I do a lot of surfing and I'm always aware of what's going on with the architecture and what seems to work and what doesn't. It is an ongoing process. [Org G]

A more comparative use of the websites of others is highlighted when formal *competitor analysis* is named as intentional strategy. One organisation proudly displayed a wall of 40 homepages from all other organisations in the sector from which they continually compared their website and gained ideas for continuous improvement.

We haven't done a formal comparative study for a couple of years, but yeah, probably early next year will be the time to do that again and see where the industry is going. Yeah, we do competitor analysis. [Org A]

The websites of direct competitors were closely scrutinised, but learning took place by visiting websites from outside the sector. For a specific business purpose, such as attracting and informing visitors to the organisation, any number of diverse websites were scrutinised for the ways in which they performed particular business goals.

Not only of this sector, but also when we're looking into, for example, visitor information, that kind of thing. A few years ago we were looking at sites that attract people, sporting facilities, museums, other public institutions, and how do they provide information? Not only in Australia, but overseas as well. [Org A]

Gherardi's (2006, pp. 225-226) inclusion of materiality (and assuming the web as object or material) in practice is suggested here. She attributes the status of intermediary to materiality in practices and sees objects, tools and artefacts as

connective, active and inductive of change. There is ongoing inclusion of the web itself as an intricate part of the social practice of learning and carrying out web IA. It provides rich fields for the learning needed for its own ongoing reproduction. This research finds the web as ‘agency’ (Gherardi 2009, p. 354) for the practice and learning of web IA, as well as its call of purpose.

5.6.3.3 Mentoring

A strong theme of intentional mentoring in the work of web IA was evident across many of the organisations in this study. External and resident expertise was used in a deliberate way to develop the IA capability of others involved in structuring web information.

[The consultant] actually did it as a mentoring type thing, specifically the aim of building up seven or eight people across the organisation with those skills, so that when he left that wasn't lost. [Org D]

Mentoring was in addition to the incidental learning that frequently took place during practice, which was described as *just picking up stuff from the external people that we've had in [Org D]*. It was a planned and purposeful strategy for acquiring knowledge of web IA on the job. Those being mentored were aware that it was in place: *Yeah and she's mentoring me so I'm getting more skills to understand [Org B]*. One participant described situated learning where an expert's given role was to impart their knowledge to several others:

It was between the three of us, you know, so that all that kind of clarifying as you're working the thing out, he was really good because he could say 'Okay, this is the IA, this is the structure of the site, these things aren't within that structure and you wouldn't include them in those structures. These are things which appear on the homepage and they are on a page and they float around, but they're not structurally related to these things'. [Org B]

Another learning practitioner of web IA described an ideal situation for him. He was undertaking a tertiary course of instruction in web IA and simultaneously working alongside a specialist information architect in real life. This consultant did not do the work of web IA for the organisation. Rather he tutored the web team in situ in their practice and achievement of web IA:

So [the consultant] wouldn't do any of the IA work but he'd come in and say 'Well okay, we're going to do user interviews, we're going to focus on that'. Everyone would listen in and see how he did it, got some tips. He would go away for a month or two, come back in for a day, sit down, 'Okay, where did you get to with your interviews? What problems did you find?'. [Org D]

Confidence was instilled in those doing the work of web IA by mentoring. Bringing more than just instruction, a specialist mentor brought confidence and a sense of capability. Feedback that IA work was of an acceptable quality to the expert led to greater success:

A lot of the time you think you're doing the right thing, but just having someone there to say, 'Okay, yeah, you are on the right track' – that was important. [Org D]

Gherardi (2006, p. 111) introduces the concept of a 'situated curriculum' to describe what is being taught in practice. Situated curriculum is tacit in nature and embedded in practice (Gherardi 2006, p. 113). It shifts and morphs according to specific workplace situations. Those being mentored by experts in web IA are students of a situated curriculum.

5.6.3.4 Sharing knowledge of web IA

Web staff with responsibility for IA valued the learning gleaned from dialogue with other practitioners. Recognising their relative isolation, those in the practice of web IA sought out conversations about their work with others involved in web IA. *I have friends who talk about it [web IA] all the time so I get to hear the lingo or whatever and ask them [Org C].* Some participated in existing knowledge sharing communities, whilst others called for greater use of such a community. Gherardi (2006, p. 108) holds that practices create communities. It is in the activity and process of doing that aggregates a nascent community:

There used to be some sort of web people group within the organisation. Why don't we regenerate that, and I'm all for that because I'm learning all the time. I need to be taught by people and hear the conversations about websites that I wouldn't normally hear. [Org D]

Importantly, this research points to the desire for informal conversation that might lead to the acquisition of incidental and novel learning about developments in IA. The work itself presented opportunity for much dialogue, but always in the achievement of a specific task or project. Wanting to throw off the constraint of real work, there was a desire to discover, through conversations that took the research participants outside their local sphere of interactions. As such, the community sought by research participants fits best with Constant's (1989, p. 232) notion of community of practitioners that traverses organisational boundaries and specific work, rather than Lave and Wenger's (1991) ideas of 'community of practice' that focuses on the activity of work.

So we do talk to each other, but it's often ad hoc and project based and that doesn't give you...it doesn't give you the opportunity, yeah, to have conversations about what could be or what someone saw that's on another website. Not so much reporting, but more knowledge sharing and that the intention is I'm going to try and find out what people have been up to on the site, if they've done anything crazy and inventive that someone else might want to know. [Org G]

The web staff in one organisation, recognising the devolved nature of web IA practice in their very large enterprise, facilitated these conversations in communities of practitioners. They led a loosely knitted community of practice for web staff where on a fortnightly basis *you just go down to the local cafe and sit around and talk web, and anybody is welcome to come and join us [Org A]*.

This form of learning also occurred outside the organisation. A number of external associations, regular conferences and workshops provided a community in which the discourse of web IA could take place. Gherardi (2006, p. 87) writes that 'conversations on practice were occasions to take one's measure with others and to self-reflect on one's own competences'. One participant that reported that:

It actually reinforces what we're doing in a way that we are sort of trying to do the right thing and, and that's really good to go out and see other people having the same battles and all that sort of stuff and that maybe we are a bit further along than some other people, or we're behind other people but all that sort of stuff is really good confirmation and that, it sort of supports me when I'm ready to give up... [Org B]

5.6.4 Organisational learning of web IA

Following Gherardi (2006) and acknowledging organisational learning as metaphor and noting, as do Aryguis and Schon (1996, p. 188), that ‘individuals are the only proper subjects of learning’, it is a clear outcome of this research that organisations were in ‘the process of improving actions through better knowledge and understandings’ of web IA (Fiol & Lyles 1985, p. 803). Research participants expressed that learning about web IA was taking place at the organisational level, in addition to their individual acquisition of knowledge. There was consideration of the growth in the level of organisational maturity in web IA and notions of increase in organisational capability to effectively structure online information over time. One research participant reflected on the change in an organisation’s knowledge of web IA during his employment and reported that it was much more mature than five years ago when he arrived. There were signs of learning at another organisation in 2007:

This organisation is very mature in many ways, but web is not one of them. But we are catching up. One of our staff said just recently after we launched the latest version of the homepage – you know it, looks like we have now got a mid 2006 corporate website. Like we have finally got there, it looks like we know what we are doing. [Org A]

There were reports that an increasing awareness and consciousness of the importance of web IA had built over time in the majority of organisations particularly within the collective of the web staff. Having been employed web work for a number of years, one research participant reported this evolving recognition of the value and place of web IA in her web team: *So it sort of, it’s changed to being conscious of structure according to our increasing experience [Org C].*

At times, the processes that led to effective information structures were being learned from external experts and adopted within the practices of the web team. Speaking of a preliminary research strategy for web IA, one research participant’s learning within the web team and a repetition of actions that have borne increasingly successful outcomes:

Certainly it’s part of the projects that [the consultant] is working on and, to a certain extent, the redevelopments that we’ve managed to do

ourselves ... and that's, we've done that more and more and more successfully... [Org C]

In one organisation, the web team and the organisation itself had learned enough to recognise its need for a full time information architect: *That's culminated really in, in getting xxxxx on to be a professional information architect [Org B]*. The appointment of an in-house web information architect is a significant milestone in an organisation's acquired understanding of web information structures and the processes that produce them.

Argyris and Schon (1996, p. 197) write that learning and its outcomes can be fragmented or pocketed in organisations and remain outside the organisational mainstream. They note that learning can occur at varying 'levels of aggregation' (Argyris & Schon 1996, p. 200). In this research, the web team represented an aggregation or collective in which the learning of web IA thrived 'on behalf of the organisation' (Argyris & Schon 1996, p. 191) and to the benefit of the organisation. Central positioning in an organisation and a purpose that crystallises on the very visible enterprise homepage enhances the owning of web team learning by the organisation.

An understanding of the processes and value of web IA was gradually disseminated in an abbreviated manner, from the web team to all organisational staff who participated in web IA. There was clear evidence that web IA was gradually being learned across the organisation. From significant learning within the web team collective, research participants noted the outcomes of understandings and awarenesses of web information structures that were shared across the organisations. Devolved departments were gradually acquiring a maturity in constructing information-rich websites:

We've reached that point of maturity, and that perspective is starting to appear on the departmental sites as well. The idea that their ... particularly their homepage and other bits of their sites need to have a clear purpose involved...there is starting to be more awareness ... so I think we will see changes over the next few years. [Org B]

A common thread of optimism for the ongoing learning of web IA was present in many organisations – for the web team itself and for those at the periphery of web IA

across the organisation. The processual nature of learning, the necessity of organisational readiness to learn and a wise patience was demonstrated in this account from a central information architect:

I would love them to get them to do card sorting and task decomposition or whatever; it would just be fantastic in an ideal world ... They are not really that mature and the organisation really isn't that mature yet to be able to do that. It will come. [Org A]

An enterprise website presents an interconnection information structures that result from knowledgeable web IA and those that result from much less experience and learning. One in-house information architect acknowledged that amongst the improvements, all was not perfect and joked that the website was *held together with chewing gum and bailing wire [Org A]*. He was aware – exhibited a meta-cognition – that organisational learning of web IA was incomplete despite some gained understandings:

But at least we have the underlying concept that the homepage is our public face online and it should be public-facing. It should not be a list of bookmarks for staff. [Org A]

Visible organisational progress in improving its information structures on its enterprise website had its drawbacks. It was reported that people in one organisation who had been employed for a substantial length of time were generally seeing progress in their websites. *In their minds they're thinking they're coming along, they're doing the right thing; they see the progress that has happened [Org F]*. Despite the observance of progress, *they might not quite realise that it is not acceptable in 2009 [Org F]*. Demonstrated in actions and outcomes, there was a lag between individual learning about web IA and its transfer to the organisation.

Organisational learning of web IA was revealed to have a slow pace and to be embedded in practice. Web staff with a desire to extend organisational knowledge and participation in web IA exhibited wisdom in acknowledging the gradual nature of its adoption and recognising that 'hearts and minds' must be won. *It is not something that is quick to achieve, but it is worth plodding away at [Org C]*. Change was being won at a deep level of conviction and learning. A risk in organisational learning,

claim Argyris and Schon (1996, p. 198), is that action is not the results of real learning but is a strategy of control. This was not the case in this study.

Organisation learning of web IA took place in one organisation as it examined its actions of the past that led to severe limitations and aspects of failure in the ensuing years. Significant past decisions for a web IA implementation had ongoing and regular detrimental consequences for current web staff and the organisation as a whole. Rather than continue in this way, the organisation itself was examining the situation. Argyris and Schon (1996, p. 7) warn of mistakes that are ‘too big to admit’ at the organisational level – especially when large-scale investment is involved. ‘Double-loop learning’ requires an admission that ‘they cannot deal with it adequately by doing better what they already know how to do’ (Argyris & Schon 1996, p. 23). The preconceptions and norms that led to the situation were recognised in this organisation and a new knowledge of web IA emerged. Much internal reflection and inquiry had taken place.

So... and you know we are not casting blame or anything. It was an experiment, and I think it was a bad one. The other problem that it introduced is we... as it turns out, this isn't the way that the core product works, right, so it took extensions to the product to make all this stuff work. [Org E]

Another historical instance of double-loop learning of web IA was reported. In the early days of the establishment of the web team, it was discovered that a lot of managers in the organisation *had no clue what to ask their web staff to do and they didn't know whether they were getting anything useful out of them [Org A]*. The central web team took on the unexpected responsibility and role of:

Educating managers in how to talk to their web staff and about what to expect from their departmental, you know, other website in terms of how it would support business and help them get their jobs done. [Org A]

5.6.4.1 Liminality and learning

Tempest and Starkey (2004, p. 508) apply the liminality lens to organisational learning that occurs at the periphery of organisational boundaries – to better understand ‘the benefits and challenges of learning between or at the margins of

organisations'. Such a lens could also be applied to the new knowledge work, team work and learning that occurs at the internal boundaries of large organisational structures. It is an appropriate frame for conceptualising the work of web information architects as they consult and collaborate with business units across an entire organisation to carry out the design method of web IA.

In the organisations in this study with formal IA expertise, the person in that role worked with business units to design information structures for sub-sites. The new skill sets and expertise of IA are working 'betwixt and between' (Garsten 1999, p. 601) organisational divisions, creating temporary teams and working relationships, transferring skills of IA processes and enabling informal learning within the devolved business unit. Tempest and Starkey (2004, p. 512) suggest that teams and networks involving mobile workers may create 'particularly rich learning environments that increase the possibility of innovative knowledge combinations'. This learning opportunity for IA occurs as web information architects work with diverse business units on specific web projects.

In terms of disseminating it, I suppose the major dissemination is through me, going through me to the steering committee or to whoever, and all of us as we work with various people just negotiating it with them but also suggesting that actually this would probably work a lot better, you know, blah, blah, blah. So I think it is an ongoing process of just trying to teach people how a web page can be clearer, easier from the user's point of view. [Org C]

One of the metaphors that Inkson, Heising and Rousseau (2001) present to understand and describe the way that mobile, liminal workers relate to the various organisations in which they work is that of a 'bee'. A mobile worker is capable of pollinating the organisation in which they work with their expert knowledge – as does a bee in its work and movement. As mobile workers move from work location to work location, they collect knowledge and skill and transmit them to people in the next situation.

This metaphor can be comfortably applied to the way that information architects work with dispersed business units. An information architect's knowledge and expertise, always being developed by their activity, is 'serially pollinating

organisations with learning' (Tempest & Starkey 2004, p. 276) in IA. Knowledge of structuring web content is transmitted to where it is needed in an organisation, as the organisation gradually and successively learns to achieve effective web IA.

5.6.5 Mindlessness of web IA

5.6.5.1 Executive mindlessness

Organisational managers above the level of web manager are generally disconnected from and unaware of the need for effective web IA. One research participant stated succinctly, *They don't understand it [Org C]*. This was recognised by the majority of web managers and staff who participated in this research. The web team also took on a degree of responsibility for knowing and leading the processes of IA in their organisation. One web manager indicated this organisational situation:

Well, we are it...So does my manager know that [about IA] specifically? Probably not. She is not a web person. Does the general manager know that specifically? Again, probably not, that is not her job. So whoever is at my level would have the responsibility for owning that knowledge within the organisation ...so the people with that responsibility do know it. The people who would depend on the advice of people like me, if you asked them that question, they might even say: 'What is information architecture?'. [Org C]

This research reveals that higher-level managers tend not to know about the processes, purpose and value of web IA in their organisation. The work history of these managers has often not given them experience of information organisation in any paradigm. The evolutionary nature of web development and use as an information delivery platform has been gradual and smooth and has not demanded strong management intervention to ensure the publishing of vast quantities of information. There is little discontinuity in organisational use of the web to challenge and disrupt the high level manager. Hence, *getting the mind share piece at that senior executive level is a challenge [Org A]*.

Because managers above the web team are not involved in the work of IA, they do not enact their way to an understanding of the practice. In the absence of any participation in web IA, they do not develop the cognitive constructs and categories for understanding this work and the benefit it brings. Weick's (2001) framework for

sense making requires an active engagement in the stream of experience that is the practice of web IA. The individual scripts of behaviour and schema (Saetre et al, 2007) are not available to those that do not participate.

This leads to a state of mindlessness (Langer 1989, 1997) about web IA in people in management positions above the level of web manager. They also conform to Weick and Sutcliffe's (2006) extension of Langer's mindful/mindless construct, in that they do not have the time or intention to focus their attention and maintain a conscious awareness of web IA. One research participant stated this plainly:

I don't think that the importance of an IA and the issues that we have with the website are recognised or understood, we've tried to raise them as kind of fundamental problems that need to be addressed because there is a general dissatisfaction with our website, that people can't find things... [Org D]

This lack of knowledge and mindfulness about web IA in higher managers has consequences for the organisation's goal for an effective website. At times it becomes a significant problem for the web team as they strive to improve the IA of the organisation's website. Research participants suggested that higher-level managers needed to be persuaded and educated that attending to IA is important and necessary. Web staff looked for ways to overcome this lack of mindfulness on the part of senior executives. They turned to educating their managers:

We deliberately included important stakeholders like our branch head, so I did some card sorting with him individually because I wanted to educate him about what it was, why it was important, how it, how it meant that what he wanted wasn't the thing that was going to happen, but it was going to be a thing which was what the users needed to have as their structure. [Org B]

IA practitioners, who are immersed in their practice and ways to achieve outcomes, experience a disconnection from their higher managers and other organisational stakeholders. A dialogue cannot be established. Acknowledging that this lack of mindfulness about web IA affected communication and collaboration with stakeholders outside of the practice, one research participant expressed her dilemma:

*I can't go to a meeting and say, 'Hey we have worked out our IA' and they say 'Isn't that fabulous', but I can say 'Hey look at our videos'.
[Org F]*

Mindlessness to the practice of web IA and the provision of web content is also exhibited by other stakeholders whose involvement is crucial to any successful IA implementation. This remarkable story of not knowing, not considering and not engaging by a business unit with responsibility for the provision of web content in their area was told by a central web team member:

when we first spoke to the xxx people, we sat in a room with people who assumed that there was a web fairy, they didn't even assume that it was us who owned the content, changed the content, published it, decided what pictures were going to go, we were sitting in the room and they were complaining about the out of date nature of the web content – and it was their area of responsibility! and it was the subject matter that they were experts in! They didn't even think that there was a human being who did this stuff, it was really, it was so far removed, they didn't see, they didn't know who it was who did the stuff, it was just amazing. [Org B]

Believing in the 'web fairy' is an apt description of mindlessness in those who simply do not conceptually engage in web information and its structures.

Web IA suffers in its ability to be known and understood by all in the organisation, partly because of its 'invisibility'. Some justification for mindlessness of web IA rests in the notion that effective information design should not be conspicuous (Morville & Rosenfeld 2006, p. 390). It should allow a seamless user experience in accessing required information. Research participants were well aware of this phenomenon as they expressed:

Good IA enables people to find what they are looking for or do what they want to do, without realising they have been facilitated. If we had perfect IA we wouldn't have anybody complimenting on it, apart from web nerds; we just wouldn't have any complaints, I guess. People would be just like, ah, there it is. [Org A]

This raises the point that attention and ensuing engagement often follows disruption and disturbance. 'We attend to things that aren't working properly more than we attend to things that are' (Spool 2009, para. 8). The outcomes of web information architecture were most visible when they were most problematic and prevented a

seamless user experience. In severe situations, senior management were then obliged to engage and respond to web IA inadequacies:

One of the things I think we have found possibly difficult, but I am not quite sure why, is selling the value of IA to the senior executive level of the organisation. So they care when something doesn't work, they don't necessarily care when something does. [Org A]

Morville and Rosenfeld (2006, p. 52) note that some components of a web IA 'run completely in the background', feeding other components and providing underpinnings for the aspects of web IA that can be noticed. They go on to say that 'there is no question that our discipline suffers from the iceberg problem. Most of our clients and colleagues focus on the interface, without appreciating the underlying structure and semantics' (Morville & Rosenfeld 2006, p. 390). This was well supported in the data of this study:

Someone, somewhere, has had to work out all the complicated details about how that works, but it is not you. I think that is indicative of that symptom that at the executive management layer, the fact it just works and the lack of visibility about what it has taken to make it just work... [Org B]

If web IA provides underpinnings and underlying information infrastructures to the outward-facing website and is not noticed when it is most effective, it will not be an easy subject for discourse with those with a weak conceptual understanding. It will not be subject to quick wins and easily demonstrated outcomes. In its low visibility, web IA finds it difficult to compete with more conspicuous and exciting new tools and media. High-level managers are distracted, claims one research participant, by the more 'bright and shiny' aspects of the web:

Information Architecture isn't kind of bright and shiny and you go like information architecture versus multimedia, they are all over the multimedia, video and utube. [Org F]

5.6.5.2 Dubious decisions

This research establishes a significant disconnect between the knowledge of those who practice web IA and their more senior managers who make decisions and provide resources. The senior organisational managers who do not enact web IA

suffer from a lack of conceptual understanding of the practice, which was found to affect their decision making and direction setting abilities. Sub-optimal decisions are made to the detriment of web IA practices and processes.

The quality of decision making is affected by mindlessness (Weick & Sutcliffe 2006; Langer 1994). Langer (1994) calls for active decision making that must include the generation of options by the individual making the decision and a generation of self knowledge. This is not the case in many organisations when decisions that effect web IA are frequently made by those lacking in mindfulness about the practice. Decisions made by higher management in some organisations were deemed counter-productive to the work of IA by some research participants.

This was highlighted in one organisation when senior management made a deliberate, reactive decision to relocate the content writing, approval and publication responsibility within the organisation in response to the fact that *there was some content that accidentally went live that caused some embarrassment to the organisation [Org D]*. Web content was placed in a corporate public relations section to prevent any similar embarrassing publication in the future. Where web content and IA had previously been in one team, they were now widely separated in different branches of the organisation. The repercussions of this action for web IA were not considered. Separating responsibility for information creation from the responsibility for its structure into two diverse organisational groups is questionable in its mindfulness. It was deemed a problem for those with IA responsibility:

Yeah, the web content stuff is now in corporate. All the content updates primarily go through them. Probably more of our IA skills are in the xxxxx branch, as opposed to being in the web content branch...and 'web content' are seeing all these changes and often we're not brought in on them or not involved. So a lot of these decisions are being made without any reference to these skills at all, so that can make it difficult, and I don't think anyone in the web content has particular skills in that area [web IA] which is, I suppose, a little bit of a concern. [Org D]

The outcome of the decision to reposition and separate the development and publication of web information caused problems. Changes to IA went hand-in-hand with content development, and an increasing amount of web IA work was being

carried out, of necessity, by unskilled staff in the corporate public relations area. A disconnect between web IA and the information that it structured had been introduced by those with little awareness of their actions.

The wide-scale effectiveness of the website and a solution for improvement can be blocked by a lack of mindfulness about web IA. A web team had put a proposal to develop a new IA for the website as a primary and urgent task to their immediate manager in marketing and communication, and the response they received was described:

I was told, that really wasn't where my manager's head was at because he didn't see how that would significantly improve our web capabilities... [Org E]

Revealingly, the manager was almost able to articulate his lack of mindfulness about web information structures and their achievement. Web IA wasn't where 'his head was at'. Yet this manager was pivotal in decision making and direction setting for the organisation's website.

Those who are in IA roles in organisations do what they can to enact a usable website for their organisations, and part of that experience is to interact with managers and stakeholders who lack mindfulness of web IA. Where mindful IA practitioners can act and achieve they do: *We are left to ourselves, we strangely enough make sensible decisions most of the time [Org A]*. Through their practice and their active engagement, much is achieved by IA professionals.

5.6.6 Knowing web IA concluded

Knowing web IA has been the conceptual focus of this section. Abstracted knowledge of processes, strategies and techniques has a supporting role to play in the work of web IA. The activity of web IA is also the site of learning and knowing and much individual knowledge of web IA is acquired on the job.

Expertise in the construction of online information spaces and being aware of when that expertise is needed is an aspect of *knowing web IA*. Locating that expertise within or external to an organisation is part of the organisational knowing. When the

knowing of web IA is weak in organisations, mindlessness exists. Organisations have much to learn about web IA, and mindlessness amongst senior management frequently produces detrimental decisions and outcomes.

Knowing web IA, composed of abstracted knowledge and knowledge in activity, is an essential, integral and fluid ingredient in the effective use of an organisation's website to inform its clients. It is applied to individuals and the organisation itself. *Knowing web IA* is an aspect of the practice that includes and uses representational knowledge in the dynamic, social and material achievement of web information structures.

5.7 In conclusion

This chapter has laid the foundation for the construction of the theoretical outcomes of this research. It has individually attended to the four foundational constructs or categories that emerged from the analysis of data collected in the field. Those four constructs and their sub-constructs have been described using segments of data to illuminate. They are listed now to conclude the chapter:

1. *Owning web IA* occurs when an organisation takes responsibility for web IA and is a pre-condition for its effective practice.
2. *Negotiating web IA* is the human exchange in the space between best laid plans for web IA and meeting the needs, desires and demands of diverse stakeholders in the web delivery of information.
3. *Enacting web IA* is the human endeavour that creates an organisation's website no matter what the surrounding circumstances.
4. *Knowing web IA*, composed of abstracted knowledge and knowledge in activity, is an essential, integral and fluid ingredient in the effective use of an organisation's website to inform its clients.

This chapter leaves these foundation constructs as separate aspects of web IA. Chapter six continues to build the theory, integrating these foundational constructs and presenting an overall theoretical framework for the practice of web IA.

6 CHAPTER SIX *THE THEORY OF THE SITUATED PRACTICE OF WEB IA* AND ITS IMPLICATIONS

6.1 Overview

This thesis now offers its theoretical conclusions in the form of an integrated theoretical framework of the practice of web IA in large organisations.

Encompassing all conceptual outcomes of this research, a grounded theory of *The situated practice of web IA* and its implications is presented in this chapter. In the preceding chapter a detailed discussion of the foundation discoveries of this research was framed by the four constructs of *owning*, *negotiating*, *enacting* and *knowing web IA*. Building on this, an integrating construct of *practising web IA* is outlined, raising the level of abstraction offered in the construction of theory.

This chapter examines the practice of web IA through the lens of complexity theory and considers it as a complex adaptive system. In doing so, greater understandings of the situated practice of web IA are achieved, distinguishing it from other forms and traditions of organising information. The implications of this research and its outcomes for managers, information professionals and researchers are discussed to conclude the chapter.

6.2 Practising web IA – the central construct

The four major sub-constructs of *owning*, *enacting*, *negotiating* and *knowing web IA*, previously discussed in chapter five, give rise to the higher-level, central concept of *practising web IA*. The four foundational constructs are recapped prior to a more detail discussion of the core concept and final level of abstraction – *practising web IA*.

6.2.1 Reviewing the foundational constructs

1. Owning web IA occurs when an organisation takes responsibility for web IA and it is a pre-condition for its effective practice. Owning web IA is enclosed in a broader owning of the web. When organisations ‘own’ their websites, they provide

adequate management, governance, co-ordination and resources to achieve the goals that they have implicitly or explicitly made known in their use of the enterprise web. Rhetoric is followed by actions, attention and resources. Attention is paid to the website's information and navigational structures. IA can be singled out as an important facet of the organisation's online presence and duly given the attention required for informing a client base via the web. *Owning web IA* includes making time for web IA.

Owning web IA is about setting up structures and environments in which web IA can prosper and pragmatic outcomes are required. New roles, authorities, expertise, resources and policies are put in place to achieve an online environment that effectively informs its audience. Ensuring the work of web IA is enabled within and across established boundaries requires the co-operative participation of the entire organisation.

2. Negotiating web IA is the human exchange in the space between best laid plans for web IA and meeting the needs, desires and demands of diverse stakeholders in the web delivery of information. Even with a set of constructed practice norms in place, human nature and politics intervene and that dynamic is captured in *negotiating web IA*. A website must mirror the real time shifts, large and small, in business activities and decisions, and this responsivity brings conversation and controversy.

Timelines for completions, immediacy of change to information structures and the shape of information itself all give rise to debate and possible contention in an organisational context. Diverse and sometimes competing business demands bring bargaining and conceding to the fore. As a result, the information structures are not always optimal; rather, they are the result of compromise.

Negotiating web IA brings connotations of unresolved dialogue and tension. Significant interest in web information structures exist across an organisation. Stakeholders bring myriad perceptions and motivations to the purpose of the enterprise web and the value of web IA. This provides an ongoing conversation that

is fraught with opposing and competing claims. A professional web information architect earns a place of credibility and acceptance over time in these conversations.

3. *Enacting web IA is the human endeavour that creates an organisation's website no matter what the surrounding circumstances.* It addresses the existence of information on an enterprise website, but not the effectiveness of its structure. Expectations and norms insist that large organisations do have websites; hence, the work of web IA will be done. *Enacting web IA* is about doing the best that is possible at the time and incorporating the reflective learning of that experience in the next.

Enacting web IA talks of those who undertake the activity of web IA. Diverse and un-named actors within an organisation participate and, as such, uniformity of approach is not ensured. Such is the connective nature of hypertext that every component enactment constitutes the whole website creating an outcome that is the contribution of many.

Enacting web IA signals improvisation in order to achieve. Acting to reconcile a mismatch between information that is included in a design but that is not made available by the business is the nature of enactment. Slowing or stopping a process of web IA is an enactment that may be required. At other times a favourable confluence of business circumstances see opportunistic web IA enacted.

4. *Knowing web IA, composed of abstracted knowledge and knowledge in activity, is an essential, integral and fluid ingredient in the effective use of an organisation's website to inform its clients.* It is applied to individuals and the organisation itself. *Knowing web IA* is an activity that uses and embodies representational knowledge in the dynamic, social and material achievement of web information structures.

Knowing web IA involves learning, both from instruction and from doing, and the subsequent and ongoing transformations of the way the practice is carried out. Various facets of teaching are embedded in the organisational knowing of web IA. Intentional mentoring, coaching and collaborative work all contribute to the imparting

of knowledge in the practice of web IA. More instructive vehicles, such as training courses and conferences, increase the knowing of web IA.

Expertise in the construction of online information spaces and being aware of when that expertise is needed is an aspect of *knowing web IA*. Locating that expertise within or external to an organisation is part of the organisational knowing. When the knowing of web IA is weak in organisations, mindlessness exists. This lack of mindfulness impacts on decision making to the detriment of effective information structures.

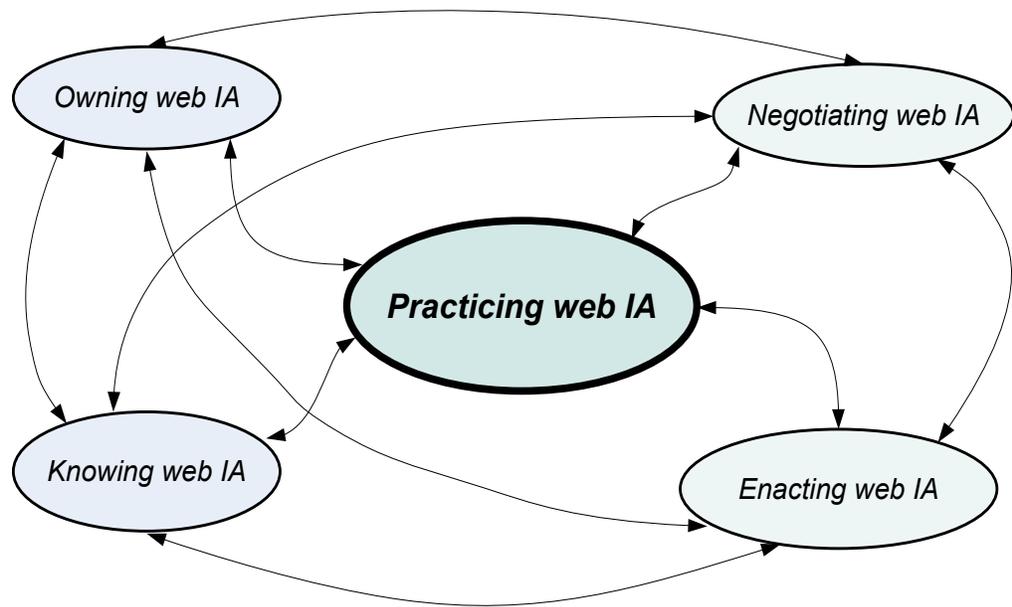
6.2.2 Practising web IA

Practising web IA sits at the core of this theoretical framework and assembles the foundations of *owning, negotiating, enacting* and *knowing web IA*. This central construct continues the use of gerunds in the development theory to denote the active and ever changing nature of this work as a practice. Bjorkeng et al. (2009, p. 147) write that ‘the practice-based vocabulary is filled with gerunds’, signifying that practices are always in the making. The practice of web IA is no exception. It is changing and evolving as the practising takes place.

One grounded theory approach to presenting its outcome is to firmly delimit the concepts and be satisfied with a diagram that depicts firm structure, clear boundaries and directed relationships. Such a diagram is shown in Figure 6.

However, this emergent theory does not permit clear divisions and stable structures. Encouraged by Charmaz (2006, p. 126) to offer an ‘imaginative interpretation’ of ‘emergent, multiple realities; indeterminacy; facts and values as linked; truth as provisional; and social life as processual’, this conceptual research outcome will be better presented as a less boundaried space as depicted in Figure 7.

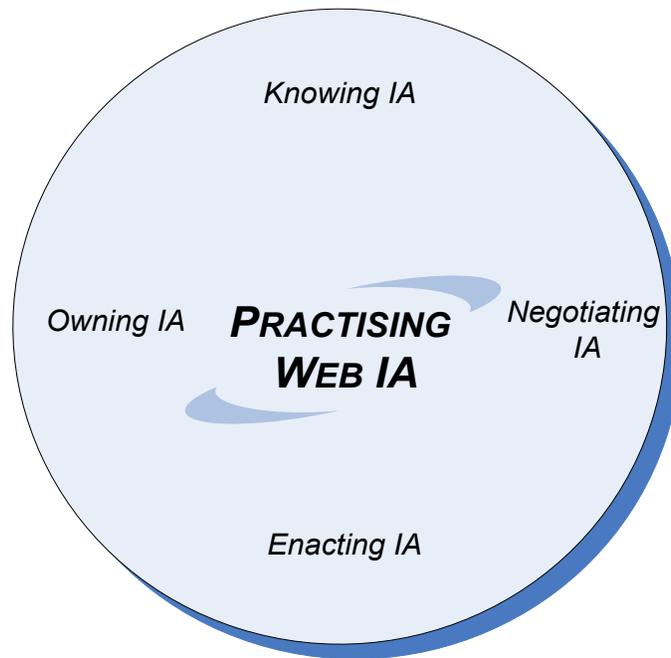
Figure 6 The major constructs of the practice of web IA



Charmaz (2006, p. 145) writes that an integrated substantive theory should be ‘sufficiently abstract to cover the range of empirical situations’. Late in the analysis, Charmaz (2006, p. 139) looks for constructs that have ‘theoretical reach, incisiveness, generic power and relation to other categories’. *Practising web IA* is such a construct. It unifies the activity of web IA and provides a mechanism for any combination of the foundational constructs to be the focus of practice at any one time.

Figure 7 depicts that *practising web IA* collects the four foundational constructs of *owning*, *negotiating*, *enacting* and *knowing web IA* and draws from them as needed. At times the activities in *practising web IA* focus on the level of recognition and resourcing for IA found in *owning web IA*. At other times it builds *knowing web IA* in deliberate situated learning activities. At any time *practising web IA* combines activities from any of the foundational constructs. It may focus on the negotiations needed to create temporary information structures - thereby meeting critical deadlines - and thus reach into and draw from the constructs of *negotiating* and *enacting web IA*.

Figure 7 The central construct of *Practising web IA* and its foundations



An incident in the data demonstrates a strong and specific co-incidence of two foundational constructs – those of *owning* and *negotiating web IA*. Section 5.3.1.2 of this thesis reports that in order to take greater ownership of the enterprise web presence, one organisation embarked on a project to merge 250 disparate websites to a central web presence with common aesthetic design. *Owning web IA* was maturing in this organisation but in order to achieve it, a strong call was made on *negotiating web IA*. The organisational liberty that had led to multiple websites prior to this year 2000 decision was being revoked to a centralised process and authority – a sensitive negotiation and re-adjustment was required. It is not possible to talk of this instance of *owning web IA* without acknowledging *negotiating web IA*. *Practising web IA* focuses strongly on both of these foundational constructs in this incident of practice.

The notion of *practising web IA* does not give centrality to any of its constituent components – be they expert information architects, abstractions of best practice or effectively structured websites. Rather, it places all of the multifaceted components for achieving web IA in the milieu of specific, purposeful activity and sees them as collectively constituting the practising of web IA. The elements of *practising web IA* include the intellectual, social and political pursuits of individual and collective

human endeavour, as well as the materiality of the practice including websites, design documents, policies and templates. *Practising web IA* is a unifying and integrating construct.

The practising of web IA always take place in a specific context, each organisation being different from the next. This embedded situatedness in the practising of web IA means that this construct is always found in the activity of web IA rather than its abstraction. In each context or specific situation, *practising web IA* emerges anew and with uniqueness due to a particular instance of work.

Whilst each instance of *practising web IA* is unique, the construct itself is rich with specific ‘conceptual aspects’ or ‘properties’ (Glaser & Strauss 1967, p. 36) that are suggested by the continual comparison of data. Charmaz (2006, p. 103) sees these properties as further ‘elaborations’ of a concept. From these properties or aspects of *practising web IA*, more is gleamed about the practice in general terms and at higher levels of abstraction. Three properties of *practising web IA* are identified from the data collected. Firstly, *practising web IA* takes on a variable shape or form within an organisation. Secondly, the maturity of the practice of web IA varies across organisations, yet demonstrates an overall youthfulness. The third property of *practising web IA* is the use of the web itself in the activity.

6.2.2.1 The shape of *Practising web IA*

Within contextual influences, constraints and realities, the work of web IA arranges itself within an organisation in an incremental and evolving manner. It continually finds its place. The practice comes without a recommended or standard shape within an organisation and is formed by its organisational context. In any one locale, the shape of the practice is dependent on its surroundings and is deeply embedded in the organisation in which it resides.

At one extreme web IA forms a thin layer spread loosely across an organization. At the other extreme it is pulled tightly to the organisation’s centre. When *practising web IA* has a strong central aspect to its shape, it is frequently manifested in a central web team. At other times a significant core of responsibility and leadership for web IA is difficult to discern – organisation D bears testament to this. The outreaches of

practising web IA spread to occasional stakeholders and peripheral practitioners and to influencing political figures and transient consultants. Hybrids of these two extremes are more likely and of the organisations studied, A and E practiced web IA strongly from the centre as well as from periphery of the organisation.

As a practice, web IA operates with great variability at its fringes where people create web information structures as they must. Many people at the periphery of the practice come and go, attending to the information structures on the website of a devolved business unit and then moving on, perhaps handing the work to another. There are few restrictions as to who may step into the fringes of this practice.

Whatever shape web IA takes in an organisation, it is not static or containable. It changes and shifts on an almost daily basis. Over greater periods of time it morphs considerably as the practising of web IA evolves. Even when tightly centred, web IA is not contained within a closed unit in an organization; there are no discrete boundaries for web IA. Within an organisation the practice does not find a characteristic or defining location for itself and may lodge in semi-permanence in information management or marketing territory. It is not consistently housed in any one place – such as a knowledge management or a marketing department.

Practising web IA means connecting and intertwining with many other practices. It occurs alongside marketing and information management practices and is deeply connected to the practice of web visual and aesthetic design. *Practising web IA* has dependencies on the practices that surround the infrastructure and technological systems that create a backbone for the information structures. Web IA is connected to and affected by these other work activities and in its turn has impact on other practices around it. The edges and boundaries of the form of web IA are fluid and inclusive.

6.2.2.2 An emerging practice

Practising web IA is a set of activities imbued with learning and self-formation. Chapter five reveals that *owning web IA* and *knowing web IA* are constructs that contain variation between the studied organisations. The availability of expertise in web IA, for example, is revealed as a continuum across the studied cases. Whilst a

progression of maturity in web IA is noted, the practising of web IA in large organisations as a whole presents as a fledgling practice. In its infancy, it is required to attend to its growth and maturation. The web is two decades old, but close attention to its information structures is more recent.

Practising web IA currently offers many and varied routes to achieving its goals. The data presented in chapter five attests to great variation in the authority for web IA, the resourcing of activity and the locating of expertise. The practising of web IA is still coming to a place of stability; it is finding its way and constructing itself. Shared understandings of the way that things are done are being formed (Gherardi 2009a, p. 356), and much learning about web IA is occurring.

There is great variation, too, in the extent to which the activities of web IA in organisational life are acknowledged and understood outside the practice itself. That significant variation ranges from organisations that create roles titled ‘web information architect’ to places where the words ‘information architecture’ are little understood. Gherardi (2009a, p. 356) talks of a practice stabilising and becoming institutionalised and legitimised ‘even when its institutionalisation is contested or challenged’. Data collected in this study establishes that the legitimacy or organisational acceptance of the practice of web IA is still in the making. It is in the practising that such legitimacy will be reached.

The practising of web IA has not yet come to a comfortable position or status within an organisation. Among senior executives and others in the organisation, the activity of web IA is not acknowledged as a known and stable practice with a well formed identity. *Practising web IA* is still in the process of building a consistent and recognisable role in work environments.

Affecting the emergence of this practice is the influence of other practices as web IA establishes its boundaries and identity. Well-meaning practitioners from other disciplines enter into the practice of web IA with prior perceptions and abstract advice. This input is part of the maturing of web IA. Practitioners of web IA themselves come to it from other established practices with prior perceptions and ways of knowing. They are building a new practice and developing new shared

understandings within an organisational context. Part of this establishing of the practice of web IA is letting go of the shared understandings and traditions of previous practices.

6.2.2.3 Using the web

Web IA is considered both process and its outcome that can be pointed to on the web (Morville & Rosenfeld 2006, p. 4). Yet it is useful to isolate and look at the material, albeit virtual, components of *practising web IA*, as well as the social. One major object that sits outside human-to-human interaction is the web itself. Practitioners of web IA have strong interactions with and dependencies on the web. As a matter of course, it is deeply integral to the practice of web IA. The web gives impetus and reason for the practice and houses the outcomes of the work of web IA.

In addition, the web gives back to the people who develop its information structures. It informs and rewards them with a display of suggestions, exemplars and possibilities that are openly shared on a global basis. Chapter five reveals that the web presents bold new ideas and innovations, as well as emerging consistencies, to the practitioner of web IA. It provides a market place for comparison and learning in which practitioners immerse themselves.

At times, *practising web IA* is very intent on the design documents of blueprints and wireframes, taxonomies and content inventories that are presented prior to the construction of an information design on the web. At other times, it shuns these objects and uses the web itself to prototype, display and communicate design outcomes. The web proves to be a more palatable medium for the presentation of information design in greater fidelity to interested stakeholders.

The materiality of the web offers a place in which decisions, consistencies and norms can be technically enacted, bypassing committees, policy and high-level decisions. *Practising web IA* is supported by the web's material authority as it enforces the placement of sub-components of an IA by enactment rather than governance. With the wise use of web technologies, those practising web IA rapidly create and modify structures that immediately become an organisation's defacto standard.

The demands of different spaces or components on a website dictate to the practising of web IA. Many global aspects of an organisational website require consistency and cohesiveness. Someone must tend to the overarching components, such as search and sitemaps, and assemble them cohesively across a web presence. Yet, local information structures require a contextually focused and responsive approach. Attention to the specifics and volatilities of information structures on organisational subsites demands an inward focus, detailed attention and a unique and localised approach to practising web IA.

The large organisational website, as a site of intense engagement for practitioners of web IA, is not a simple object. It is not bounded and can grow in an unlimited way through the extensions of hypertext; it never reaches completion. Any sense of attainment is a momentary phase before changes in the web are required. A large website is complex and always inducing scrutiny, inquiry and evaluation. Its complexity and incompleteness continually evoke the active engagement of practitioners of web IA.

6.3 *The situated practice of web IA*

In this section the grounded theory of *The situated practice of web IA*, constructed in the analytic process of this research, is presented in its entirety. Emergent from the patterns inherent in the data collected, this theory provides a new and conceptual understanding of the way web IA is carried out in the everyday world of large organisations. It makes visible the characteristic realities and patterns that lie dormant in the work of web IA in large organisations.

6.3.1 An integrated theoretical framework

The theory of *The situated practice of web IA* is represented diagrammatically in Figure 8 as an integrated theoretical framework. ‘Theory’ and ‘theoretical framework’ are used synonymously in this thesis. The theoretical framework builds and expands an understanding of how information structures on websites are achieved. In presenting this framework, the researcher notes Weick’s (2001, p. xi) concern that ways of seeing can easily become ways of not seeing. When a

theoretical framework is built it is but one construction of a set of circumstances, it is but one way of looking at the world and offering comprehensibility.

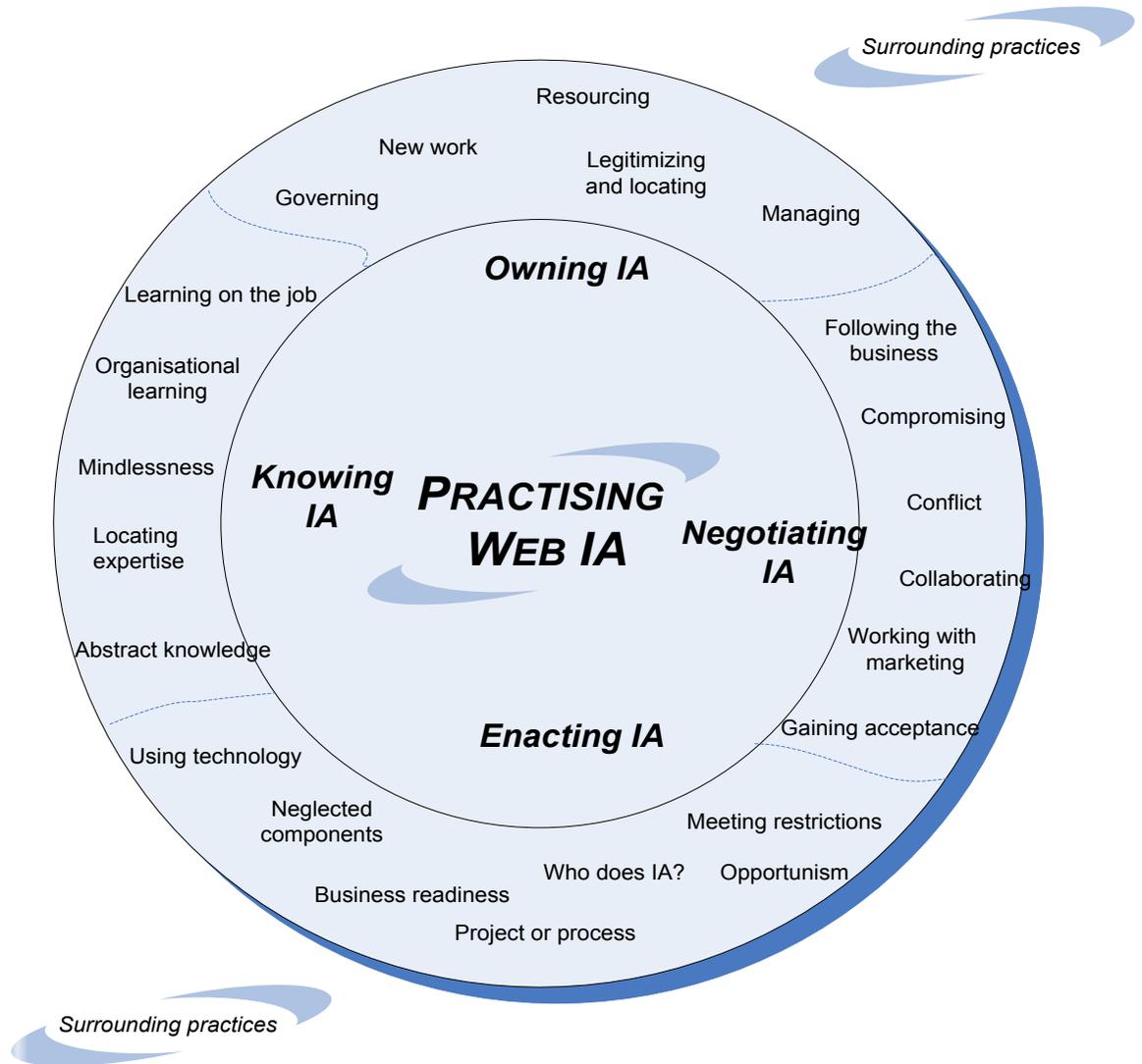
The framework presented in Figure 8 has a central emphasis on *practising web IA* denoting purposeful and integrative activity. Four supporting constructs provide major views of the practice: *owning*, *negotiating*, *enacting* and *knowing web IA* all have a story and a perspective to tell and through them attention is drawn to the more specific conceptual outcomes of this research. Utilising the four foundational constructs, the framework enables a broad yet detailed view of the practice from a particular perspective or outlook. Each of these supporting constructs offers a vantage point to view the particular activities and understandings that comprise *The situated practice of web IA*. The framework depicted in Figure 8 acknowledges the connectedness of web IA to surrounding practices.

6.3.2 The nature of the theory

Grounded theory methodology gives rise to this conception of *The situated practice of web IA* – it is a theory strongly grounded in the data that was collected. But the codes and categories of grounded theory analysis fade and give way to the more open and fluid construction of this framework in keeping with Charmaz's (2006, p. 126) call for interpretive theories that allow for indeterminacy.

The theory offered is not a strongly delimited theory. The four sub-constructs, of *owning*, *negotiating*, *enacting* and *knowing*, occupy a 'space' in the framework with *practising web IA* at the centre. None of these constructs are contained; rather, the spaces in this framework are unrestricted, allowing fluidity and connections to occur. The vantage points of *owning*, *negotiating*, *enacting* and *knowing* can be called into use as a theoretical rendering of practice is required. Use of this theoretical framework, provides an opportunity to look at *The situated practice of web IA* as a whole. It attends to the social, intellectual and material aspects of the practice of web IA.

Figure 8 Theory of *The situated practice of web IA* – an integrated theoretical framework



With the unique construct of *practising web IA* at its centre, this fluid theoretical framework allows for multiple views or vantage points for understanding the phenomenon of web IA. Particular aspects of practice may be simultaneously illuminated by any four of the foundational constructs that can shift to overlap or overlay each other. Thus, intricate and multifaceted understandings and illuminations of practice are possible, revealing a richer interpretation of the complex practice of web IA. The ability to consider specific aspects of web IA through multiple views enriches understanding and provides a more integrative rendering of the practice.

This theory for the everyday activities of web IA also encompasses and reveals the ongoing tensions and movements in the practice and how a weakness or absence in one aspect can cause an imbalance in *practising web IA*. There can be tension between *knowing web IA* and *negotiating web IA*. Expertise in web IA and the knowing of theory and best practice methods must sometimes give way to negotiating with the business and conceding to the dictates of more powerful stakeholders. The theory also accommodates a tension between *owning* and *enacting web IA*. *Enacting* brings an organisation's website into being by any means possible, whilst *owning* suggests planning, management structures, resourcing and provision of expertise. In the absence of *owning*, *enacting* is empowered and dominates. Thus, whilst offering synergy and multiple perspectives, the theory also captures the tensions and imbalances in the everyday practice of web IA and becomes a valuable tool for understanding a specific environment.

6.3.3 Practice

This research begins and concludes by placing great importance on the notion of practice. It set out to examine the activity of web IA in its organisational environment in order to come to a greater understanding of how best to achieve effective online information structures. At the beginning of the research 'practice' was used as a general and everyday term – it was part of the questioning. Journeying through the research endeavour has given rise to new understandings and a greater prominence of the notion of 'practice'.

Informed by the practice theory of Gherardi (2006, 2009a, 2009b), Knorr Cetina (2001) and Bjorkeng et al. (2009) the practice of web IA has become a theoretical construct that produces insights and understandings that were not visible at the commencement of this study. 'Practice' is no longer used lightly. The theory presented offers a general and abstracted account of the situated practice of web IA. It should be added that this research did not set out to be a 'practice-based study' (Gherardi 2009b, p. 115). The notion of practice emerged during the analysis of data and has become part of the theoretical outcome.

This thesis claims the importance of acknowledging web IA as a practice. It is within this new recognition of web IA as a practice that it can be more fully understood and progressed. *The situated practice of web IA* in large organisations is now portrayed with a growing identity of its own. This research offers new knowledge about the shape of the practice, the fledgling status of the practice and how the web is used.

Gherardi (2006, p. xiii) writes that practices are organised around shared practical understandings and that ‘forms of individual activity depend on the practices in which people participate’. Thus to practise web IA is to take up the activities that are specific to web IA and to enter into a shared understanding of the practice. Like other practices, web IA does not stand still. In the performance of web IA in specific situations, the practice is constantly adapted and modified, while retaining a recognisable practice-based identity.

Web IA is a deeply contextual practice. Not only does it pull together a set of activities and shared understandings that can be used by practitioners across organisational settings, it also differentiates itself in each situation and morphs and changes to suit the prevailing conditions. The practice of web IA embeds itself in an organisation and becomes engrained in that milieu. Variations due to different situations are significant and are a distinctive facet of this practice.

To practise web IA is to perform epistemic or knowledge work. The process of designing a structure for the information on an organisation’s public-facing website is not routine or regular work, nor is it intent on the production of physical objects. The information structures of the web are claimed as epistemic objects following Knorr Cetina (2001). This practice is about reshaping organisational knowledge and information and making it explicit, publicly available and easily accessible via the web. In the practice of web IA, extensive communication and interactions with others are required. Analytical and critical skills are needed to transform diffuse organisational knowledge and information into structures suitable for the web and its audience. Both the techniques and the outcomes of this practice are virtual and volatile.

The practice of web IA inevitably brings influences from previous practices and a short history of its own. When the internet and web technologies entered organisational life, participants in established practices of the time tried their hand at structuring information on the web. In the early days of the organisational use of the web, the contributing practices were largely those of information technology. Influences from librarianship, information systems and marketing practices were felt, as the activity of web IA began to crystallise as a practice in its own right.

A rich, active, theoretical interpretation of *The situated practice of web IA*, which allows for multiple emergent realities (Charmaz 2006, p. 126), has been presented. It reveals a practice that is dynamic and still emerging. Intricate relationships and responses, connections to other practices, and ongoing change characterise the practice of web IA. Organisations can feed the practice of web IA with strategies such as resources, expertise, and governance, but it continues its responsive life and its emergent shaping from within.

6.4 Applying the theory

Charmaz (2006, p. 54) and Glaser and Strauss (1967, p. 238) claim that on completion, a grounded theory should fit and explain the studied world and be highly applicable to the daily realities of the situation under scrutiny. Glaser and Strauss (1967, p. 261) emphasise that ‘the theory should fit the data’. Fitness is the primary and underlying property of a well constructed, grounded theory (Glaser & Strauss, 1967, p. 238). In the tradition of grounded theory, *The situated practice of web IA* has been ‘carefully induced from diverse data’ (Glaser & Strauss 1967, p. 239). Yet it must fit and provide a ‘plausible account’ (Charmaz 2006, p. 132) of how web IA is practised in any one of the organisations studied. Constructed from the collective data, it must be applicable to each single case study.

It is thus appropriate to overlay the constructed theory of *The situated practice of web IA* onto a particular instance of the studied world of this research to examine its fit. Two of the case study organisations, organisations A and D, are profiled in Table 9 and are examined with a view to applying or fitting the grounded theory to them. The

two organisations selected for this examination of fit were chosen for the difference in the way that they practice web IA.

Table 9 Profiles of two studied organisations

Org	Web manager	Central web team	Centrally employed web information architect	Location of web team (if applicable) in organisational structure	Forms of governance for web?	Consultants
A	Yes	Yes	Yes	Knowledge/Information Management unit	No	No
D	No	No	No	NA	No	Yes

Organisation A

Owning web IA was well established in organisation A. This organisation employed a web manager and a web information architect and had a strong central web team in place. Whilst there was no strong form of governance, there was decisive and coordinated direction occurring at the level of web manager, which was frequently acted upon using technology to enforce.

Negotiating web IA is a recognisable part of the everyday work in organisation A. The web team worked with the marketing department to share the custody of the homepage in a relatively harmonious relationship. An awareness of the political nature of web information structures was present, and it was reported that some high-level layers of IA were as much the dictate of powerful stakeholders as they were the best endeavours of the web team – compromise was a part of the practice. Research participants from organisation A spoke of ‘seductiveness’ in their approach to collaborative work with devolved business units.

Enacting web IA can also be used to illuminate the work of web IA at organisation A. The web team boldly and with minimal consultation launched a redesigned homepage, assuming authority and responsibility in the process. They also stood apart from *enacting* when they considered it appropriate. They took on the role of advisor for the information structures of sub-sites allowing *enacting* to be devolved to

peripheral practitioners. *Enacting* became powerful in its absence, in the admitted neglect of web searching systems.

Knowing web IA was also firmly in place. This organisation had decided that its culture and complexity was part of web IA and that it could not be captured by consultant web information architects. It had employed an in-house information specialist with the title 'web information architect'. This organisation embraced the learning of web IA through conferences, literature and external communities of practitioners. The central web team catered to the organisation's peripheral practitioners of web IA by conducting workshops to promulgate knowledge across the organisation.

Practising web IA at organisation A is found to comfortably exist within the overlaid constructed theory created from this research. Applying the theoretical framework to the activity of web IA in organisation A reveals a 'plausible account' (Charmaz 2006, p. 132) of the practice.

Organisation D

As Table 9 indicates, organisation D has a contrasting profile in its approach to the practice of web IA.

Owning web IA is a construct that locates a weakness in the practice of web IA at organisation D. This organisation does not have overarching web management and, as an inevitable outcome, has no centralised web team. Functions that would be achieved by central web staff were dispersed across the organisation. Thus, there was no champion for web IA and no one to influence the decision makers who had unwisely separated content publishing and IA functions into two very separate business units. Responsibilities for web IA were very confused in this organisation.

Negotiating web IA was in full strength, particularly at the top tiers of the information structures of organisation D's website. The homepage was revealed to be a place of strong competition and jostling for position, particularly as organisational structures changed. Without expertise in web IA and without clear lines of authority and

responsibility, this organisation was not well placed to handle conflict and a strong debate raged over positioning on the homepage.

Enacting web IA was a strong aspect of practice at organisation D. Responsibilities for web IA were very confused in this organisation. The divide between content publishing and web IA was conquered in the doing. Those with responsibility in these areas would, of necessity, undertake the work of the other. Web staff at organisation D pulled away from action when organisational change was being considered. With purposeful intent, *enacting* took on an air of ‘marking time’ – preparatory work was done in readiness for a possible restructure of the organisation, which would have great impact on the website’s information structures.

Knowing web IA was weak but with signs of potential at organisation D. Expertise in web IA was provided by transient consultants interacting with the organisation for a short time. A hiatus was felt when they left. Yet web staff were enthusiastic and motivated to learn about web IA and acknowledged its importance. At the organisational level, however, knowledge of web IA was all but absent.

Practising web IA in organisation D is revealed as a practice that requires improvement in some areas. With weaknesses in *owning* and *knowing web IA*, *negotiating web IA* flared and *enacting web IA* flourished. *The situated practice of web IA* provides a framework of guidance and advice to this and other organisations as they approach the activity of web IA. As an explanatory tool, the constructed integrative theoretical framework fits well to the practice of web IA at organisation D.

6.5 Complexity theory and *The situated practice of web IA*

The theoretical offerings of this research provide novel insights and understandings of the complex and ecological nature of *The Situated Practice of web IA*. This thesis now draws on complexity theory to further explore the implications of these discoveries for web IA. It uses the Cynefin framework (Snowden 2002) to position the practice of web IA in the complex domain and then discusses the practice using

the metaphor of complex adaptive systems. The theories of complexity, the Cynefin framework and complex adaptive systems were reviewed in chapter two of this thesis.

6.5.1 Web IA in the cynefin framework

Snowden (2002) offers the Cynefin framework as a tool for making sense of the environment and the nature of organisational activity. Kurtz and Snowden (2003) claim that activity in each domain of the Cynefin framework should be undertaken with full awareness of the nature of that domain. Organising information is no exception. The nature of the environment and activities of web IA should be known before responding. *The Situated Practice of web IA* has been found in this research to be the scene of much complexity. In particular, the negotiation, volatility and unpredictability of the activity that shapes the delivery of business information on the web is an aspect of web IA from which complexity arises.

The involvement and demands of the business stakeholders and peripheral practitioners pull the practice of web IA from the total influence of ‘specialist knowledge and expertise’ (Lambe 2007, p. 138), which is the Cynefin ‘knowable’ domain or quadrant. The taxonomy work of web IA cannot be achieved by expert central staff consulting business stakeholders at an appropriate stage in a project. The dynamic does not allow for a finite period of consultation and subsequent closure. It does, however, require ‘an alert and responsive awareness’ (Lambe 2007, p. 144) in an ongoing relationship in which web information structures are continually negotiated. The social complexity (Snowden & Stanbridge 2004) of the activity of web IA is a necessary consideration for successful practice.

The Situated Practice of web IA reveals environments that defy anything but a momentary determination of exact state of an organisation’s website. Rapid development, volatility and multiple, interacting issues and influences are key characteristics of the business use of websites. Compromise, negotiation and politics play out in the practice of web IA. Due to the nature of the medium itself and the way that organisations use the web, the environment in which information is organised lacks stability. Lambe’s (2007, p. 137) suggestion of ‘constant disposable taxonomy building’ aptly describes the realities of the construction of ambiguous

taxonomies that convey organisational knowledge within the website information structures of large enterprises.

Accordingly, this thesis places the practice of web IA in large organisations in the ‘complex’ domain of Snowden’s (2002) Cynefin framework. This positioning can be seen as an extension of Snowden’s (2001) claim that intranets in organisational contexts can be viewed as complex ecologies or complex adaptive systems.

The placement of web IA in the complex domain of the Cynefin framework brings a new acknowledgement of environment and activity and allows the practice to be considered from an unordered perspective. From the realm of complexity the organisation of web information in large enterprises can be approached with new awareness and in ways that better fit the nature of the endeavour. Thus, having established a picture of complexity from the research outcomes and mapped the practice of web IA to the complex domain of the Cynefin framework, there is merit in examining web IA through the language and lens of complexity and *The situated practice of web IA* as a complex adaptive system.

6.5.2 Web IA as complex adaptive system

This study reveals that the organisational use of ambiguous taxonomies to present information on the web occurs in rapid cycles of change – development and dismemberment of the IA. The impetus for change to web IA can occur in unpredictable ways. The number of practitioners and stakeholders is large and perspectives and interactions of these actors are myriad and sometimes intense. The large number of stakeholders and emerging interactions during the practice of web IA does not allow an identification and reduction of web IA into known component elements. As a complex adaptive system, the practice of web IA has mutually entangled components and the effect of changes to any one component is potentially felt throughout the interconnected system in ways that are not predictable (Gershenson & Heylighen 2004).

A fully negotiable taxonomy and an ongoing dialogue are needed in the complex arena of web IA, and they are required long past the end of any project. This study

reveals that web IA needs an ongoing agile and responsive approach to unpredictable business requirements and that ‘desired end states are not available’ (Snowden & Stanbridge 2004, p. 143). This is in keeping with Lambe’s (2007) call for a living, evolving and responsive taxonomic response in the modern organisation.

Morville and Rosenfeld (2006, p. 8) acknowledge that a library is a ‘relatively well-defined environment’. They go on to contrast websites as ‘complex, adaptive systems with emergent qualities’ and ‘rich streams of information flowing within and beyond the borders of departments, business units, institutions, and countries’ (Morville & Rosenfeld 2006, p. 23). They characterise the practice of web IA as ‘messiness and mistakes, trial and error, survival of the fittest’ (Morville & Rosenfeld 2006, p. 23).

The practice and the information space of web IA find a comfortable home in the metaphor of complex adaptive systems. Elements of emergence, unpredictability, inability to control, diverse and multiple agents and changing relationships in *The Situated Practice of web IA* are identified in this study. The task is now to consider the implications and consequences of this portrayal of web IA and its practice.

6.6 Implications of this research

6.6.1 Implications for information organisation theory

Viewing web IA as a complex adaptive system allows us to explore the notion that the traditional ordered processes for structuring information is not the most appropriate ways of approaching this instance of information organisation. In a complex environment it is not possible for decisions based purely on order, cause and effect, and rigour to be effective. It is obvious that any planned, objectified and previously agreed-upon solution for organising information does not meet the demands of the complex practice of web IA. Noting that the widely used design methods for web IA originated from an LIS tradition, their usefulness must be reconsidered. It must be questioned whether it is possible for website information to be effectively organised using processes that are grounded in the taxonomic work of the ordered and known domains of the Cynefin framework.

Morville and Rosenfeld (2006) propose a structured methodology for the work of web IA. Their approach to practising web IA is sequential, rational, formulaic and project based. It is generally assumed (Brinck et al. 2002; Garrett 2003; Wodtke 2003; Batley 2007; Wodtke & Govella 2009) that the established, structured processes for web IA are effective and that if these established methods are followed, a desirable outcome is achieved in the structuring of information on websites. Influenced by the LIS tradition, the proposed and published design methods or methodologies that are characterised by structured and linear processes are claimed by Snowden (2001) to have ineffective outcomes in complex online environments. Morville and Rosenfeld's (2006) methodology is project based and occurs in discrete, intensive blocks of time, delivering finite solutions. It is relevant to ask if Morville and Rosenfeld (2006) have succumbed to the pitfalls of mismatching a taxonomic solution with its environment (Lambe 2007, p. 135).

This widely accepted structured design method for the practice of web IA does acknowledge the need to involve the many stakeholders of the website in the process of constructing an IA. The website users are researched, consulted and involved in design activities such as content mapping and card sorting. The relevant business stakeholders are consulted and re-consulted in an iterative manner during the research phase of the development process and at times there is an element of negotiation.

Yet the overall nature of the structured methodology ensures a largely sequential process and consultation comes to a close. The IA design is fixed, delivered and implemented and negotiations cease. Snowden and Stanbridge's (2004, p. 143) description of an ordered system solution fits this approach:

In an ordered system one determines a desired outcome or end state, assesses the current situation and then set out a series of steps or stages to close the gap between the two. All things being equal the end state should be achieved.

There is an assumption that if due process is followed, an effective solution will emerge. Yet in considering the practice of web IA as a complex adaptive system, such an outcome is produced where no outcome can or should be produced. Unwisely, the situation is momentarily reduced to the design documents produced by

an expert and those IA design outcomes are almost immediately rendered inept and outdated. Within a very short time, the complex system of organisational use of the web has adapted or changed.

Snowden (2000, 2002, 2003) repeatedly warns of the misuse of established best practice in complex situations. Whilst there is a place for best practice in the known domain of Cynefin framework, it is only in this stable and predictable environment that it is possible to establish a predetermined and repeatable set of processes (Snowden 2002). But in a complex system, the myriad interactions between actors do not demonstrate linear cause and effect, and hence are not repeatable. Snowden (2001) suggests that it is not possible to pre-define a best way to deal with a complex situation. Hence the practice of web IA as a complex adaptive system may not be well served by the establishment and the guidance of best and predetermined modes of practice.

Another warning comes in the form of the limitations of expert communities who are susceptible to entrainment of thinking and ideas in their area of expertise (Snowden 2000). Expert communities build their own language, which in turn provides a vehicle for the easy communication of abstract concepts within the expert group. It is within this isolated environment of unique language, skills and experience that expertise exists. The danger in any closed community of experts is that the opportunity for new and creative thinking may be lost. Habituation in thinking, processes and patterns may produce a reduction in creativity and innovation. Shaw (2002, p. 96) also notes and warns of 'the enabling trap of professional practice'.

This thesis suggests that the entrained thinking of information professionals traversing from one practice to another has not allowed a full exploration of the practice of web IA and recognition of the complex environment in which it occurs. The influence of prior traditions of information organisation practices may have persuaded or blinkered experts in the field into thinking that there must be a rational framework to follow whenever they organise information and that complex information environments can be reduced to effective, stable solutions via a set of known, structured processes. This dominant thinking and discourse of previous

practices has prevented a more applicable theoretical framework for the practice of web IA from emerging.

Noting that organising information on corporate websites occurs as a complex practice, it is now possible to make an aware and appropriate response. Solutions, best practice and design methods from another practice cannot automatically be applied. Methods of the ordered practices are not appropriate for the complex domain of designing information structures on public-facing websites. In the practice of web IA, practitioners do not become librarians for the web. Librarians, argues Lambe (2007, p.xvii), do not typically construct taxonomies in their professional role. They may not have the competencies to construct taxonomies in any domain, especially the complex.

Crossing the boundary from order to un-order and claiming complexity as the nature of web IA, increases understanding of the practice. It is relevant to note, however, that the Cynefin framework holds firm to the place of order and Lambe (2007 p.137) maps some taxonomy work to the ordered domains. It is acknowledged that other practices, at times, may be appropriately served by more orderly approaches to organising information.

Snowden and Stanbridge (2004), state that humans have the ability to create pockets of order within complexity and to move between these different contexts. That being the case, it is very likely that the skills and knowledge from other areas of information organisation will continue to be of value within the larger picture of complexity when designing information for the web. But a greater awareness of the way in which they are embedded is needed, and dominant thinking should be continually examined and challenged as the practice of web IA is approached.

It is suggested that a dominant discourse in information organisation, particularly the discourse in LIS, is one that expects to achieve relatively stable outcomes via predetermined methodologies that are carried out in orderly environments (Lambe 2007, p. 137; Bowker & Star 2000, p. 288). Hence, the introduction of complexity theories to situated information organisation practices may challenge and unsettle the prevailing approaches and mindsets and raise many questions. The work of the web

as a novel and emerging information space demands further creative and lateral inquiry.

Having established the complex nature of the practice of web IA, this thesis suggests that the practice itself continues to progress in maturity and in establishing its emergent design approaches and shared understandings. The implications of the claim that web IA is a complex, situated practice are significant, especially to practitioners and the organisations in which they practice.

6.6.2 Implications for practitioners and organisations

A grounded theory approach to research promises a theoretical outcome that resonates with practitioners (Glaser 1978, p. 142). This thesis presents new knowledge about the situated practice of web IA that benefits its practitioners and those who carry management responsibility for it. From a position outside the practice of web IA, this research offers its outcomes as abstracted and propositional knowledge that can be taken into the complex space that is *The situated practice of web IA*.

This section makes suggestions to managers and practitioners that are of practical benefit. The constructed understandings and conceptualisations about web IA, created by this research in organisations, are offered back to the enterprise for its consideration and to enrich and advance its practice. The insights and outcomes gained from this research are now presented, firstly as key points.

6.6.2.1 Web IA is social and responsive

Key points

- The practice of web IA must allow an agile response to an organisational need for almost real-time delivery of information on the web.
- Negotiation and compromise of optimal information structures are everyday facets of this intensively inclusive information practice.

Web IA is best embraced as a negotiation with business stakeholders who have strong interests in the timely delivery of information to web audiences. This draws the work

of web IA very close to the business of the organisation. Other information practices are characterised by information professionals who take an authoritative lead and consult the business. But this is not a suitable balance for the practice of web IA where the business stakeholder is intrinsic to the work in an ongoing interaction – consultation is too remote. The demand for immediate and agile responses to the information structures that inform the organisation’s clients creates the need for close liaison with the business. Responsive and integrative work with the owners of information for the web is essential to the practice of web IA.

The work of web IA requires an agile and adaptive stance. In its intricate connection to the information that it houses, information design must match the volatility of web content. Waiting out times of uncertainty, making expedient design decisions to enable an agile response and being opportunistic in choosing the time for IA improvement when the business stakeholder is ready are all effective strategies in the practice of web IA in organisational life. The complexity of the environment requires an ongoing and appropriate adaptive response to enable the practice.

Compromise is another key characteristic of the practice of web IA. There are occasions when timelines, politics and power win out over optimal information design. Information on public-facing websites is allied to an organisation’s political stance in the world, and web IA is affected by the worldliness of the information that it houses. Similarly, internal organisational politics has its impact on information design. Restrictive timelines for web information structures and lack of content to fill those structures that require it contribute to compromised assemblages of information on the web. The practice of web IA does not always reach the ideals of its expert practitioners.

An exception to the social and negotiable nature of web IA should be noted. There is an expectation and a need for cohesion and consistency across an enterprise website that allows ease of navigation to its audience. The responsibility and authority for the global utility navigation and page layout is best located in a central web team who can expertly enact their work without broad consultation.

The social nature of the practice of web IA comes into play with the information and its arrangement. It makes good sense to expect the negotiation, the compromise and the close liaison with business stakeholders in the practice of web IA. Attending to the social complexity of web IA leads to more valuable outcomes.

6.6.2.2 The dilemma of best practice

Key points

- A project approach to web IA that promises a stable end state will not succeed – web information structures should not be built to last.
- Structured, predefined solution methodologies are not suitable for the ongoing practice of web IA.
- Fixed-term consultants increase the take-up of structured methodologies and fixed information design outcomes.
- The practice of web IA is carried out by experts and novices alike in large organisations. It has escaped the confines of the information specialist and should be supported accordingly.

The dynamic and complex nature of web IA as an information practice has ramifications for the use of design methods. Design methods introduce sequence, control and discipline (Morrogh 2002a, p. 110). The lack of stability and predictability in the structure of web information and the activities and demands that achieve them do not lend themselves to sequence and order. Complexity brings an inability to pre-determine routines and methods within the practice of web IA. A sequenced, structured methodology does not meet the needs of the ongoing practice of web IA. Whilst defining a solution approach or a methodology is the dominant discourse in information organisation, this research attests to the fact that web IA is a fluid and emergent environment and one that defies linear and rational solutions.

A project with end state is not applicable to the activity of web IA. Web information designs are highly provisional and as soon as a ‘project’ concludes, changes to its outcomes should be expected. Responsive and frequent changes to the structures are required. Web information structures are not built to last. They are not buried beneath the interface built for human interaction – they lie on the surface and become

the interface and are the means of traversing the website. Thus, organic and agile change to web information structures is highly desirable and should be catered for by the practitioners of web IA.

Expert information architects who are employed as contractors or consultants compound the problem. Employed for fixed periods of time within an organisation that is redeveloping its web information structures as a project, consultants are expected to deliver a design product documenting the web IA at the conclusion of their work. The fixed term nature of the work of consultants contributes to the demand for an outcome or product.

Yet heuristics and known ways are the toolkit of experts, whether or not they are made explicit. Whilst web IA does not fit an ideology of control or regularity, the accumulated abstracted knowledge of this practice is valuable and has a role to play. It is best envisaged as a part of the practice that can be considered, modified to fit the context and adopted as required. Accumulated and propositional knowledge of web IA is a component of its practice rather than a blueprint for it.

The complexity of the practice of web IA should be acknowledged and de-coupled from the rationalist disposition and traditions of information organisation. This paradigm of information organisation means that orderly images of IA, conducted as project with defined end state using structured methodology in the custody of information professionals, are no longer useful.

6.6.2.3 Managing web IA

Key points

- The practice of web IA is young and requires greater attention by organisations. Senior managers are mindless of the practice and are prone to making detrimental decisions.
- Web IA is knowledge work, and whilst its outcomes are enmeshed in visual design and aspects of technology, it benefits from being acknowledged as an epistemic practice.

- Overarching management of web IA must embody the traditional aspects of resourcing and apportioning responsibility, as well as understanding that complexity cannot be managed by rationality alone. Noticing the patterns of how an organisation is practising web IA and acting to foster or disrupt those patterns is a necessary capability of management.

Web IA requires greater attention in organisational life. It is a new practice that is still in its formation and is not widely understood. The identity of the practice of web IA is not well established within organisations. Those with overarching responsibilities for the delivery of information on the web need to focus their attention and increase their knowledge of web IA. An executive mindlessness of the practice of web IA and its resultant detrimental decision making must be overcome in large organisations for successful use of the web for information delivery.

Information infrastructures are representational and intangible, and are not in the forefront of the mind of those who regularly use them. When working well, their lack of visibility is compounded by a seamless experience of their use – they do not draw attention. Information structures in general and on the web become more visible when they are ineffective and contentious and in some way block access to information.

The flow-on effect of highly useable, invisible information architectures on the web is that the work required to construct them is also invisible. Optimal web information design occurs as if by magic. Invisibility of the work and its outcome hampers the conversations with higher-level managers and requests for resources, staffing and supportive governance and organisational structures are difficult to achieve.

Many practices of information organisation are separate from the general populace of an organisation. Some information infrastructures are made ‘standard’ before they arrive at an organisation, and others are buried deep within the layers of an information system. Expertise can be isolated in libraries and at the desk of business analysts. In contrast, web IA places its practice in the hands of the everyday peripheral practitioner with little expertise in structuring information. The work of

web IA is widely distributed and the situated practice takes place in many locales across an organisation.

Thus, web IA is conducted by the masses as well as the experts – an organisational website is a collage of these two extremes and all of the information design that occurs between them. This research points to the reality that many people across an organisation are undertaking web IA and some are doing so reluctantly. It disrupts the tradition of information organisation as the closed domain of the specialist information professional. The practice of web IA is obliged to acknowledge and make room for peripheral practitioners with little identity, expertise or commitment to organising web information. As organisations call on staff, whose key responsibilities and abilities lie elsewhere, to do the work of structuring information on websites, that call should be accompanied by awareness and supportive underpinnings that facilitate the way.

As engagement in the practice of web IA is undertaken by many and diverse contributors, organisations are required to adopt new ways and thinking about organising information as they approach the online environment. The new approach must cut across organisational structures and facilitate people working collaboratively and temporarily in structuring web information. The nature of the web and the ongoing change in the way that organisations are using the web call for a new way of utilising expertise in information organisation practices. Expertise in web IA cannot be remote or distant from the many practitioners. If the practice of web IA is considered as a participatory one, frequently taken up by the non-expert, yet strongly influenced by expertise and knowledge, then web IA must be recognised as an intensively inclusive practice and fostered within organisations to function in that form.

Web IA draws together organisational information and tacit knowledge and repurposes it to a form consumable by a web audience. Whilst it has close dependencies on the practices of visual design and marketing for its outcomes, web IA is inarguably knowledge work and should be supported as such. A clearer perception and explicit acknowledgement of the work of IA as knowledge work is needed to hasten the developing maturity and identity of the practice. With such

acknowledgement there comes the chance of understanding it better and examining it at a higher level of abstraction.

This research has established that web IA is a complex practice. Information structures are always provisional and are highly volatile. A large number of people of varying backgrounds are involved in the *owning, negotiating, enacting* and *knowing of web IA* in large organisations. A complex, epistemic practice has management implications. Balancing the management requirements of the practice of web IA in organisational life is a delicate act. Traditional management functions of resourcing, providing expertise and governance are required in increasing amounts to support the work of web IA. Acceptance of the responsibility for the information structures of enterprise websites is demanded by the practice for its legitimate place in organisational life.

At the same time the complex and emergent nature of the practice of web IA is better supported by a style of management that allows the practice to flourish by noticing and influencing its patterns. Rather than pre-determined strategies and specified approaches, there is need for those responsible for facilitating the work of IA in organisations to observe in some detail the patterns of interactivity and process that have developed, possibly without intention or reflection. It is then that the practice of web IA can be managed by disrupting or promoting those patterns (Snowden 2002).

Web IA represents a new paradigm of information organisation in large organisations and a new pattern of knowledge work that is inclusive of many people across an organisation. Managers and practitioners of web IA should heed the suggested probing behaviour of Kurtz and Snowden (2003, p. 469) for complex situations: ‘Stand still (but pay attention) and gain new perspectives on the situation’.

6.7 In conclusion

This chapter has concluded the presentation of the theoretical outcomes of this thesis. It has offered the grounded theory of *The situated practice of web IA* and an integrated theoretical framework that promotes the central construct of *practising web IA* as its core. That theoretical framework embodies the *owning, negotiating,*

enacting and *knowing of web IA* as major constructs of practising, and emphasises the interconnected and ecological nature of this way of conceptualising and generalising web IA.

The practice of web IA is placed in the complex domain of the Cynefin framework (Snowden 2002) and is examined as a complex adaptive system. As a result, rational and orderly expectations in the practice cannot be realised – web IA is not achieved by controlled plans and blueprints. The implications of this theoretical conclusion to the research for practitioners and managers have been discussed. The emphasis in these implications is that web IA is social and responsive, there are limitations to abstracted offerings of best practice and the management of web IA requires an engaged and delicate balance.

7 CHAPTER SEVEN CONCLUSION

7.1 Overview

This chapter concludes the thesis, attending first to the achievement of research aims and objectives. The research aim, to *better understand how large organisations carry out web IA*, and its associated objectives outlined in chapter one are addressed individually. This chapter outlines the actions and outcomes that contribute to the achievement of the research goals.

In designing and scoping this research, delimiting yet enabling boundaries were established. Those boundaries and approaches also established limitations to the research and they are noted. A summary of the thesis is provided, prior to a discussion of future and continuing allied research to expand the limits of this study and build on the research results.

7.2 Achievement of research aims

This thesis now reviews its initial aim and objectives in order to consider the achievement of the research intentions.

The research aim:

The aim of this research is to better understand how large organisations carry out web IA.

True to the aim of the research, this thesis outlines a new and broader understanding of web IA by exploring how it is carried out in the everyday world of organisations. A research approach appropriate to this problem was designed and data was collected from sites of the studied phenomenon and analysed to produce a substantive grounded theory. This new theory promotes the notion of *practice* to a theoretical construct that captures and conveys the activities and understandings of web IA within organisational life. Practice becomes the vehicle for a fuller conceptual picture of web IA and this thesis proposes and fully describes an emergent theory of

The situated practice of web IA. This theory offers a ‘plausible account’ (Charmaz 2006, p. 132) of how web IA is practised in large organisations and an increased understanding of this phenomenon.

Research objectives:

As stated in chapter one, the research objectives are to:

1. Determine how organisations use existing design methods, guidelines and best practice in the work of web IA.
2. Reveal aspects of the organisational environment in which web IA might flourish
3. Provide a theoretical framework to describe the situated practice of web IA

1. This study reveals that practitioners in large organisations are aware of the published design methods and best practice claims for web IA. They use this proffered abstract knowledge of how web IA should be carried out as it fits and earns its way into their situated practice. Established design methods inform the practice of web IA but do not present a blueprint for its achievement. They function as adaptable components or objects in the practice.

This study of the practice of web IA reveals a complex and volatile landscape in which propositional knowledge about web IA co-exists with its imperfect application to and partial unsuitability for practice. Design methods and best practice that are presented as structured methodologies prove too linear and inflexible to guide the complex work of web IA. This thesis suggests that web IA is constrained by best practice recommendations that have originated from more ordered practices of information organisation.

In determining how organisations use existing design methods, guidelines and best practice for the doing of web IA, the first research objective is thus achieved.

2. This thesis reveals some of the environmental conditions in which web IA is more likely to flourish. The engagement and understanding of higher-level management is required. Without mindful executive attention to the web and its information

structures, the practice of web IA is vulnerable and lacks organisational legitimisation. Fully acknowledging the need for expertise in web IA and, at the same time, fostering and supporting the work of the many peripheral participants is another ideal in the environment of web IA. Embracing the social and political nature of organising information for the web in a negotiated practice strengthens the outcomes.

Throughout this thesis, many patterns and insights *reveal aspects of the organisational environment in which web IA might flourish* and achieves the second research objective.

3. A theoretical framework, grounded in research data, and that describes the situated work of web IA in large organisations has been presented in this thesis. This framework takes into account the *knowing, enacting, negotiating* and *owning* of web IA which build to the all encompassing construct of *practising web IA*. The practice of web IA emerges as being in its infancy and so deeply contextual that it is characterised by significant variation from one locale to another. A framework for the practice of web IA has emerged as fluid and multifaceted. It reveals the tensions of competing actions and perspectives in the practice.

The rich and all encompassing conceptual outcome of this research achieves its third and final objective of *providing a theoretical framework to describe the situated practice of web IA*.

This research adds to the existing knowledge and literature base in the area of web IA. It also offers new insights and concepts to the practitioners of web IA that guide the practice within organisations and enable positive changes in the way that the practice of web IA is managed. Positioned within the complexity of an organisational context, it begins to fill the current research and knowledge gap in the organisational practice and management of IA processes.

7.3 Contributions of this research

This research adds to the existing knowledge and literature base in the area of web IA. It offers a theoretical framework for the practice of web IA in large organisations that conceptualises and structures a situated complex practice. The research reveals the complex nature of the practice and its environment – a consideration that has not been previously factored into recommendations and methods for good practice. Through a lens of complexity theory, it reveals that simplistic approaches to web IA are not possible. The research offers new insights and concepts to the practitioners of web IA who are best positioned to enable positive changes in the way that the practice of web IA is managed. This research offers a theoretical base that begins to fill the current research and knowledge gap in the organisational practice and management of IA processes.

7.4 Limitations of this study

This study of how large organisations achieve web IA has sought the input of organisational staff who have responsibilities for web information structures, particularly at the higher levels of enterprise websites. The stories, accounts and interpretations of those people who are significantly involved in the practice of web IA have been interpreted and further data from documentation about web IA that exists at a whole of organisational level has been sourced. Thus this study has obtained data from a group of people with similar perspectives within each organisation. It has not sought the opinions and interpretation of staff whose work does not focus on the web or the website audience. Because this research phenomenon is new, complex and little studied, the greatest amount of rich data could be gathered from the group of people whose work focuses on the enterprise website.

Should this research be extended to collect data about the reality of web IA for all people within an organisation, additional insights may emerge. This would usefully include those with overarching responsibility for web IA, such as chief information officers and significant stakeholders such as marketing practitioners. The myriad peripheral practitioners of web IA and the everyday users of the website, inside and

external to the organisation, have perceptions that might broaden this research outcome. The stories of consultant web information architects who work in many and varied large organisation may also provide additional insights. The researcher accepts that there are perceptions and understandings of web IA that could provide additional dimensions to the research outcomes.

This research outcome does not automatically transfer to organisations of other proportions, medium or small. Nor does it apply as significantly to large organisations that emphasise the marketing or transactional capability of their enterprise web presence. In that most websites are multi-purposed, this research has only attended to the intention of information provision.

The researcher's thorough engagement with each of the seven organisations in this study was at a particular 'moment' in time when the organisation was in a particular state in its evolving practice of web IA. Together, the researcher and research participants looked back on the history of how web IA had evolved in each organisation and looked forward to new possibilities and desired improvements to the practice. There was a consideration of the way that things were and the way that they could be better. But there was no capture of longitudinal data within the organisations studied that might chart the changing nature of this practice. The collection of data is best considered a snapshot in time giving restricted temporal insights to the theoretical outcome of the research.

This research is anchored in the ongoing and significant quandaries of web 1.0, as web 2.0 technologies create a second wave of innovation and opportunity in organisations – it was intentionally scoped to do so. Yet it proves a limiting feature of the study, as increasingly web 2.0 tools are grafted onto information-rich enterprise websites. The use of web 2.0 technologies continues to capture the imagination and attention of many organisations, and the use of these tools has implications for online information structures.

The result of web 2.0 approaches, advances and increasing uptake is that audience contribution and conversation are now a desirable addition to the information delivered by large organisations to the website's audience. Hybrid websites of

enterprise information delivery and user contributed and structured content should be incorporated into the existing debate of how information is best organised on the web. Blogs, wikis and RSS feeds must all take their place in the information design of enterprise websites. The paradigm of participation and interaction that society is now experiencing becomes an expectation of the future and add an additional layer of complexity to web IA.

7.5 Thesis in summary

This thesis reports a research endeavour that set out to understand more fully the ways in which large organisations achieve the structuring and organising of information on the web, formally defined as the practice of web IA. The structure and design of the information on any website is an important criterion in the successful use of the online environment. A maturing methodology for web IA, pioneered by Rosenfeld and Morville (1998) is claimed by Hider et al. (2009) and Dillon and Turnbull (2005) to have significantly influenced the practice. But few contextual studies have been carried out to examine the work of web IA within organisations. This study explored how large enterprises go about organising information on their websites to inform their audience in the contexts, realities and complexities of everyday life.

The literature reviewed in this thesis noted the call for research in this field and a hiatus in the literature for this practice of information organisation. A research design appropriate to the exploration of this relatively recent phenomenon was developed. Grounded theory and multi-case study methodologies were used to study the complex, social environments in which web IA outcomes are achieved. In true grounded theory tradition, theory has emerged from the reality of how organisations approach, support and attend to the process of developing IA for their public-facing website. Research methods of group narrative, semi-structured interview and document analysis have enabled the collection of data, which was undertaken in keeping with the grounded theory tenet of theoretical sampling. Using a grounded theory approach, seven large organisations were investigated and the data was analysed for emerging patterns and concepts.

The theoretical outcome of this research is presented as a grounded theory of *The situated practice of web IA*. The situated activity that creates the information structures on an organisational website is best regarded as a practice. The situated practice of web IA is one that can be considered as knowledge work. It arranges and focuses enterprise information and knowledge on websites. The growing identity of the practice of web IA is based on shared activity, knowledge and understandings and the material objects that have become integral components of the practice.

The constructs of *owning, negotiating, enacting* and *knowing web IA* within this grounded theory are well described and illustrated by the data. They are summarised:

- *Owning web IA* occurs when an organisation takes responsibility for web IA and is a pre-condition for effective practice
- *Negotiating web IA* is the human exchange in the space between best laid plans for web IA and meeting the needs, desires and demands of diverse stakeholders in the web delivery of information
- *Enacting web IA* is the human endeavour that creates an organisation's website no matter what the surrounding circumstances
- *Knowing web IA*, composed of abstracted knowledge and knowledge in activity, is an essential, integral and fluid ingredient in the effective use of an organisation's website to inform its clients.

These four constructs form the foundation of the central notion of *practising web IA*. The theory is presented via an integrated framework that allows and encourages fluidity and provisionality as a means of understanding the complex practice of web IA.

This research reveals that the practice of web IA is characterised by unpredictability, multiple perspectives and a need for responsiveness, agility and negotiation. Web IA occurs in and contributes to a complex environment and there is value in examining the practice as a complex adaptive system. Using this metaphor, the practice of web IA is portrayed as irreducible, emergent and self-determining. A documented, deliverable, stable, information design for the website of a large organisation is not

possible, and dominant and traditional thinking and practice in the organisation of information is challenged.

Current approaches to web IA bear the legacy of entrained thinking of information professionals from pre-existing practices. A focus on stable, final solutions or end products as in other traditions of organising information does not benefit the work of web IA. The business need for ongoing, agile change to information structures on the web does not permit this approach. A structured design methodology for web IA proves cumbersome when organising information on the web in the complex business world. In complex environments, pre-determined processes do not lead to effective solutions.

Recognising that the practice of web IA constitutes a new and continually evolving field of information organisation, this research has constructed a theoretical framework from which the situated practice of web IA can be generalised and better understood. In constructing this conceptual account of how organisations are practising web IA, this research is significant in establishing a deeper understanding of the complex social and material interactions involved and how they might be more effectively supported. There are benefits and potentials in explicitly acknowledging the complexity of web IA.

The use of the web in large organisations began and continues with the enactment of an enterprise web presence. Much professional activity has preceded research in this field. Yet research is needed and called for, and this thesis makes a contribution to the accumulating knowledge base of web IA and its practice.

7.6 Further research in the field

The grounded theory of *The Situated Practice of web IA* is a theory that can accommodate change. Glaser (1978, p. 5) claims modifiability is an important and desirable characteristic of a grounded theory. As new data comes to hand it can be considered, and minor or significant modifications can be made to an existing grounded theory. Thus the theoretical outcome of this research lends itself to

extension in both small and large proportions, which is an ideal situation for this fast-paced field of study.

As previously mentioned in this chapter, this research has been centred on organisations making information available to their clients via the public web. In the first chapter of this thesis, the tools and technologies of web 2.0 were placed out of scope for this study. Extension to this research could usefully include the design of information structures of enterprise website that embeds the tools of web 2.0 for organisational and audience use. Further research must accommodate the presence, positioning and integration of the functionalities of web 2.0 on enterprise websites and take up the notion of information structures that are created by their users. This expanded consideration of web IA would include the tools that foster the participatory web, as well as the web of information delivery.

In its fluidity, the constructed theory of *The situated practice of web IA* may be applicable to small and medium-sized organisations. The notions of *owning*, *negotiating*, *enacting* and *knowing web IA* may well apply to organisations of a smaller size, even though many of the details, issues and constraints may differ. But this possibility of transference to organisations of differing size must be the subject of further research rather than claimed on the basis of this research which only considered large organisations. The same can be said of large organisations that use their websites less intensively for information delivery, focusing rather on marketing or transacting.

This research has revealed many facets, dimensions and components of the practice of web IA which beckon closer scrutiny. Further research might focus on any of the constructs within *The situated practice of web IA* and study them in greater depth. Greater knowledge and understanding, for example, would benefit the tense polarity of the centralised and devolved work of web IA and how organisations might best house the practice of web IA within an organisational structure. The impact on website information structures of the work of the peripheral practitioners identified in this study is worthy of greater attention.

As noted in Chapter 3, this research does not take in the perspectives of the audience of the website of a large organisation. There is scope to expand this study to include a user-centred approach. Usability studies of websites, the outcome of the practice of web IA, would expand the knowledge base in this field.

A website is an outcome of a number of practices. Closely meshed visual displays, information and its structure, and technical underpinnings form the virtual entity of a website. The intensely close proximity of other distinct and different practices and their outcome should be examined and their impact on and interplay with the practice of web IA more fully understood.

With the new knowledge and understandings offered by this research, further studies in how large organisations practise web IA can follow. This research has placed web IA in the complex domain of the Cynefin framework and interpreted the practice as a complex adaptive system. It has established that structured methods for ordered practices of information organisation do not serve the complex environments of web IA – they present a mismatch of environment and solution approach.

Lambe (2007, p. 152) outlines a methodology or an approach for taxonomy work in the known and knowable domains of the Cynefin framework, but wisely reports that it is not suitable for the complex domain. Acknowledging that taxonomy construction in the complex domain is dependent on provisionality and constant change, Lambe (2007) offers no advice on how to proceed in a complex arena such as web IA. It would now be valuable to know more of the minutiae of web information architecture within the acknowledged complex space of large organisations in order to explore more suitable approaches for this complex practice.

Noted earlier in this chapter, this research did not pursue a longitudinal capture of data in any of the organisations under scrutiny. Greater insights of the complex situated practice of web IA might be developed by spending an extended period of time in one or more organisations and capturing data as the practice of web IA changes and evolves. The situatedness of the practice and outcomes of web IA requires greater attention.

With the advances in the knowledge of web IA brought about by this research, the practice of web IA is now poised to embrace its complexity and uniqueness. In this, there is opportunity for future researchers to construct a deeper knowledge of the practice and to smooth the current incongruent and fragmented thinking and approaches that abound. The task of researchers and practitioners now, in responding to these research findings, is to continue to explore and extend this new conceptualisation and theoretical framework for the practice of web IA.

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9 APPENDIX A INFORMATION AND CONSENT

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INFORMATION STATEMENT

Research Project Title

A determination of factors that contribute to organisational ability to enable effective Web Information Architecture for public facing information-rich websites.

A PhD research project at Charles Sturt University

Contacts

Investigator: Sally Burford, PhD Student at CSU, School of Professional Communication, University of Canberra, phone 02 62015958, email sally.burford@canberra.edu.au

Principal supervisor: Philip Hider, Senior Lecturer, School of Information Studies, Charles Sturt University, phone 02 693323536, email phider@csu.edu.au

Purpose of this Research

The web is now an important interface for modern organisations to communication with their clients, providing the necessary information and services to meet their business objectives and to meet the demands of their clients – and this trend is set to continue.

The structure and design of the information on any website, that is, its Information Architecture, is an important criteria in the successful use of the web – both for the organisation and its clients. The information ‘space’ should allow intuitive and easily navigable access to information. Whilst there is now a well defined process for optimising the information structures on large information rich websites few management models exist for achieving best practice in staffing, organizational structure or resourcing. This research is seeking to explore the organisational factors that support web IA processes - what are the factors and choices that allow an effective IA to be developed within an organisation?

In contributing to a theoretical framework for web IA, this research will seek to build a set of criteria that will, more specifically, enable successful organizational implementations of strategies to support IA for the web.

How the Research will be conducted

Case studies of large organisations with information rich websites will be conducted. The investigator will use a qualitative approach and ask key people within the organisation to tell the story of how they ‘do’ Web Information Architecture. These stories will be followed up with structured interview questions as necessary to further the development of theory. All stories and interviews will be conducted on site at your organisation and tape recorded and subsequently transcribed. The data (the narrative and

interview transcripts) will be coded to allow concepts and their relationships to be established. The pattern inherent in the data will suggest or allow a theory to emerge. It is this pattern or emergent theory that will be the subject of dissemination as a result of the research.

It is expected that the initial open group narrative or story telling of how IA is done will be conducted in less than 3 hours – and that follow up interviews of 2 hours may be needed with you. It is possible that another follow up interview of 1 hour may be required with some participants. The nature of the grounded theory approach is that theoretical sampling is taken as necessary – to support the development of the theory and exact data collection time commitments are difficult to predict. At most it is expected that an individual will contribute one working day of his/her time to the project.

All interviews will be recorded.

The research will also examine web IA documentation that exists within your organisation – be it policy, process or best practice documents. The investigator will require access to those documents.

Confidentiality and Security

The recordings of interviews and narratives will be kept in a locked filing cabinet at all times during the conduct of the research. Digital copies of the recordings and transcripts of these recordings will be kept electronically on a password protected computer.

You will not be identified in the coding of data. Organisational responses will be examined and codified rather than that of the individual. Neither individuals nor organisations will not be identified in the publication of research findings.

Your participation

You are invited to participate in this research which may take up to one working day of your time. Interviews will be conducted at your organisational site. There is no compulsion to participate in this project and you can withdraw from the research at any time. If you are willing to participate, please complete the enclosed consent form and return it to:

Sally Burford
Room 1C108
School of Professional Communication
University of Canberra
ACT 2601

NOTE: Charles Sturt University's Ethics in Human Research Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the Committee through the Executive Officer:

The Executive Officer
Ethics in Human Research Committee
Academic Secretariat
Charles Sturt University
Private Mail Bag 29
Bathurst NSW 2795

Tel: (02) 6338 4628
Fax: (02) 6338 4194

Any issues you raise will be treated in confidence and investigated fully and you will be informed of the outcome.

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CONSENT FORM

Research Project Title

An exploration of factors that contribute to organisational ability to enable effective Web Information Architecture for public facing information-rich websites.

A PhD research project at Charles Sturt University

Contacts

Investigator: Sally Burford, PhD Student at CSU, School of Professional Communication, University of Canberra, phone 02 62015958, email sally.burford@canberra.edu.au

Principal supervisor: Philip Hider, Senior Lecturer, School of Information Studies, Charles Sturt University, phone 02 69332536, email phider@csu.edu.au

I agree to participate in this research and to attend the necessary meetings and interviews for data collection. I am aware that interviews will be recorded and may take up to one day of my work time.

I understand that I am free to withdraw my participation in the research at any time, and that if I do I will not be subjected to any penalty or discriminatory treatment.

The purpose of the research has been explained to me and I have read and understood the information sheet given to me.

I understand that any information or personal details gathered in the course of this research is confidential and that no identifying information will be used or published without my written permission.

Charles Sturt University's Ethics in Human Research Committee has approved this study.

I understand that if I have any complaints or concerns about this research I can contact:

**Executive Officer
Ethics in Human Research Committee
Academic Secretariat
Charles Sturt University
Private Mail Bag 29
Bathurst NSW 2795**

Phone: (02) 6338 4628

Fax: (02) 6338 4194

Please sign and date this form to consent your participation in this research.

Signed by:

Position in the Organisation:.....

Date:

10 APPENDIX B - INITIAL CODING

Named Open Code	Sources	References	Created	Modified
acceptance of web IA by business	3	20	2008-1-3 11:01 AM	2008-9-1 3:05 PM
agility to change	3	6	2007-10-29 5:17 PM	2008-9-10 1:11 PM
any one can do it	2	2	2008-8-27 5:03 PM	2008-9-9 8:07 AM
arrogance	1	2	2008-1-3 10:20 AM	2008-1-3 10:21 AM
authority for IA	4	54	2007-10-22 3:35 PM	2008-9-10 1:01 PM
Avoiding conflict	3	16	2007-10-31 5:35 PM	2008-9-10 2:16 PM
barriers to IA	2	8	2008-7-21 10:54 AM	2008-9-10 1:01 PM
being proactive	2	4	2008-8-20 12:52 PM	2008-9-10 2:09 PM
best practice	3	17	2008-1-3 10:51 AM	2008-9-1 4:07 PM
bias and ignorance by business	3	21	2008-2-19 8:52 AM	2008-9-1 3:05 PM
business readiness for IA improvement	2	15	2008-7-9 4:49 PM	2008-9-10 2:17 PM
centralisation of web management	2	5	2008-7-9 4:25 PM	2008-9-8 12:46 PM
champions	1	1	2008-7-9 5:53 PM	2008-7-9 5:53 PM
change	4	15	2008-1-4 4:49 PM	2008-9-9 7:53 AM
choosing winner	1	1	2008-7-9 5:20 PM	2008-7-9 5:20 PM
co-location	3	6	2008-2-20 3:09 PM	2008-7-22 4:36 PM
communicating IA	1	5	2008-8-27 12:53 PM	2008-9-1 2:52 PM
communication	1	5	2008-7-21 10:28 AM	2008-9-1 4:18 PM
community	1	1	2008-1-3 10:53 AM	2008-1-3 10:53 AM
competitor analysis	4	12	2007-10-22 2:13 PM	2008-9-10 2:09 PM
complaints	2	2	2008-2-19 9:54 AM	2008-9-1 2:56 PM
conflict	2	9	2008-7-22 4:42 PM	2008-9-9 8:19 AM
consistent look and navigation	2	6	2008-7-9 4:18 PM	2008-9-9 7:57 AM
consultation	2	9	2007-10-22 3:37 PM	2008-9-1 3:05 PM
content	4	26	2008-1-4 5:02 PM	2008-9-10 2:17 PM
credibility of web team	4	25	2007-10-22 3:34 PM	2008-9-10 1:22 PM
culture	3	13	2007-10-31 5:58 PM	2008-9-8 12:57 PM
design patterns	2	4	2008-1-3 12:49 PM	2008-7-22 5:10 PM
documentation	1	1	2008-9-10 2:04 PM	2008-9-10 2:04 PM
Doing the IA later	2	5	2008-7-9 5:19 PM	2008-9-4 5:35 PM
enforcing standards	4	13	2008-1-3 10:28 AM	2008-9-9 8:51 AM
enterprise IA	3	13	2008-1-4 5:06 PM	2008-9-9 8:55 AM
evaluation of IA	3	14	2008-7-9 3:41 PM	2008-9-10 2:09 PM
expertise in IA	3	11	2008-6-30 1:42 PM	2008-9-10 1:08 PM
external IA community	1	1	2008-8-26 9:31 AM	2008-8-26 9:31 AM
external standards and bodies	2	10	2008-7-9 4:20 PM	2008-9-9 8:39 AM
following business change	3	11	2008-1-4 4:25 PM	2008-9-8 1:10 PM
good IA invisible	2	4	2008-2-20 11:56 AM	2008-8-27 12:51 PM
governance	4	27	2007-10-31 5:39 PM	2008-9-9 8:24 AM
history	4	12	2008-1-3 12:10 PM	2008-9-10 1:11 PM
how to implement global IA	3	14	2007-10-31 4:31 PM	2008-9-9 7:57 AM

IA by non IAs	4	33	2007-10-31 4:50 PM	2008-9-10 1:08 PM
IA by stealth	2	4	2008-7-9 5:40 PM	2008-9-10 2:09 PM
IA consultants	3	11	2008-1-3 11:10 AM	2008-9-9 8:07 AM
IA organisational schema	3	9	2007-10-22 3:32 PM	2008-9-10 2:09 PM
ignorance web management	1	1	2008-9-1 2:54 PM	2008-9-1 2:54 PM
impact of CMS	4	17	2007-10-31 4:53 PM	2008-9-10 1:01 PM
impact of technology	3	9	2007-10-31 4:26 PM	2008-9-10 1:01 PM
importance of web	2	7	2008-1-3 11:58 AM	2008-7-9 4:59 PM
incremental change to IA	4	23	2007-10-22 2:15 PM	2008-9-10 2:09 PM
influence of IA discipline	2	10	2007-10-31 5:55 PM	2008-8-26 9:31 AM
influence of web design on IA	1	1	2008-9-1 4:13 PM	2008-9-1 4:13 PM
influencing business units	3	18	2008-1-3 10:57 AM	2008-8-27 4:16 PM
information management	4	20	2007-10-22 3:39 PM	2008-9-8 12:50 PM
infrastructure and IA	2	2	2008-9-1 4:21 PM	2008-9-10 2:11 PM
inhouse IA skills	2	6	2008-1-3 11:15 AM	2008-7-9 5:04 PM
interest in visual design	3	7	2007-10-29 5:13 PM	2008-9-1 4:13 PM
interference	2	10	2007-10-22 3:27 PM	2008-9-1 2:49 PM
IT support	3	4	2008-7-9 4:05 PM	2008-9-10 1:01 PM
knowing about IA	2	7	2008-7-9 5:17 PM	2008-9-9 8:12 AM
knowledge management	2	2	2008-8-20 12:44 PM	2008-9-8 12:50 PM
knowledge transfer	3	11	2008-2-19 9:53 AM	2008-9-10 1:08 PM
large IA redevelopment	3	5	2007-10-22 3:17 PM	2008-9-10 1:01 PM
leadership	4	10	2008-1-3 10:52 AM	2008-9-9 8:51 AM
learning about IA	3	9	2008-7-9 3:49 PM	2008-9-10 1:08 PM
learning IA on the job	2	10	2008-7-9 5:06 PM	2008-9-10 1:08 PM
lifetime of an IA	2	5	2007-10-22 3:30 PM	2008-9-4 5:35 PM
making it work	4	19	2007-10-31 5:48 PM	2008-9-10 1:08 PM
Managing IA	1	2	2008-7-21 10:33 AM	2008-7-22 5:02 PM
management of website	3	7	2008-7-9 3:54 PM	2008-9-10 1:01 PM
Marketing communication public relations	4	25	2007-10-22 3:40 PM	2008-9-10 1:16 PM
maturity in IA	2	2	2008-2-20 3:36 PM	2008-2-22 1:46 PM
meeting business needs	3	8	2008-2-20 1:32 PM	2008-8-27 1:42 PM
merging static-dynamic	1	5	2008-2-20 11:29 AM	2008-2-20 11:53 AM
mode of authoring	3	10	2007-10-29 5:18 PM	2008-9-8 12:59 PM
motivation to improve IA	2	2	2008-7-21 10:50 AM	2008-9-8 12:35 PM
multiple audiences	2	2	2008-2-19 8:33 AM	2008-9-1 3:05 PM
new initiatives	2	2	2008-8-27 4:32 PM	2008-9-8 1:10 PM
ongoing improvement	2	5	2007-10-31 4:34 PM	2008-9-10 2:09 PM
ongoing maintenance	2	6	2008-1-3 11:26 AM	2008-9-10 1:08 PM
opportunism	2	9	2008-2-18 5:15 PM	2008-7-9 5:45 PM
organisational acceptance of IA	3	18	2007-10-22 3:34 PM	2008-9-1 3:05 PM
organisational change	4	18	2007-10-31 5:31 PM	2008-9-9 7:53 AM
organisational structure	4	30	2007-10-22 3:39 PM	2008-9-10 1:11 PM
outsourcing	1	1	2008-9-10 1:15 PM	2008-9-10 1:15 PM
physical working area	1	3	2008-2-22 2:01 PM	2008-2-22 2:04 PM

politics	2	15	2008-7-9 5:52 PM	2008-9-10 1:20 PM
power	1	1	2008-9-1 2:47 PM	2008-9-1 2:47 PM
presenting IA design specs	1	1	2008-8-27 12:44 PM	2008-8-27 12:44 PM
process or product	4	9	2008-2-20 3:25 PM	2008-9-10 1:01 PM
processes	3	11	2008-2-19 8:45 AM	2008-9-1 3:05 PM
publications on web	1	2	2008-8-27 4:30 PM	2008-8-27 4:30 PM
recruiting IAs	1	1	2008-8-26 10:16 AM	2008-8-26 10:19 AM
reporting	3	6	2008-7-9 3:44 PM	2008-9-10 1:16 PM
research	2	2	2007-10-22 3:31 PM	2008-9-1 3:05 PM
resourcing	4	31	2008-1-3 11:12 AM	2008-9-10 1:20 PM
responsibility	4	27	2007-10-22 3:39 PM	2008-9-9 7:53 AM
scholarship in IA	2	7	2007-10-29 4:59 PM	2008-7-9 5:20 PM
search	3	4	2008-1-4 4:41 PM	2008-9-10 1:13 PM
senior management	4	34	2007-10-22 3:25 PM	2008-9-10 1:20 PM
separating from IT	3	11	2008-1-4 4:41 PM	2008-9-10 1:22 PM
service models	1	3	2008-2-22 8:58 AM	2008-2-22 9:19 AM
strategy and planning	1	3	2008-8-20 12:49 PM	2008-8-20 12:55 PM
time for a redevelopment	2	2	2007-10-22 3:24 PM	2008-9-8 12:35 PM
training	2	12	2007-10-31 4:57 PM	2008-7-9 5:43 PM
trust	2	2	2008-2-20 3:42 PM	2008-9-9 8:09 AM
understanding IA	1	6	2008-8-27 12:46 PM	2008-8-27 1:42 PM
usability	4	30	2007-10-22 3:18 PM	2008-9-9 8:07 AM
user centric design	4	21	2008-1-4 4:21 PM	2008-9-10 1:04 PM
user expectations	2	3	2008-8-26 10:07 AM	2008-9-10 1:04 PM
user research	2	10	2008-8-26 10:00 AM	2008-9-10 2:09 PM
web management	3	18	2008-2-22 2:02 PM	2008-9-9 8:51 AM
web team	3	4	2008-7-9 3:54 PM	2008-9-10 1:11 PM
working across units	4	38	2008-2-18 5:19 PM	2008-9-8 1:03 PM
working intuitively	1	1	2008-7-21 10:33 AM	2008-7-21 10:33 AM

11 APPENDIX C - PRELIMINARY ANALYSIS

Name	Sources	References	Created
Enacting IA	0	0	23/10/2008 3:10 PM
Name	Sources	References	Created
IA processes and components	0	0	23/10/2008 3:30 PM
Name	Sources	References	Created
competitor analysis	4	12	23/10/2008 3:33 PM
consistent look and navigation design	2	6	23/10/2008 3:39 PM
patterns documentation	2	4	23/10/2008 3:40 PM
enforcing standards	1	1	23/10/2008 3:41 PM
evaluation of IA	4	13	25/06/2009 10:00 AM
external standardsAnd Bodies	3	14	23/10/2008 3:41 PM
how to implement global IA	2	10	25/06/2009 10:03 AM
IA organisational schema	3	14	23/10/2008 4:11 PM
influence of web design on IA	3	9	23/10/2008 3:43 PM
interest in visual design	1	1	25/06/2009 10:09 AM
multiple audiences	3	7	25/06/2009 10:10 AM
processes	2	2	25/06/2009 9:59 AM
publications on web	3	11	30/10/2008 2:08 PM
research	1	2	2/11/2008 6:18 PM
search	2	2	2/11/2008 6:07 PM
User centricity	3	4	23/10/2008 3:44 PM
	0	0	30/10/2008 1:52 PM
Name	Sources	References	Created
usability	4	30	30/10/2008 1:53 PM
user centric design	4	21	30/10/2008 1:54 PM
user expectations	2	3	30/10/2008 1:54 PM
making it happen	0	0	9/04/2009 1:40 PM
Name	Sources	References	Created
barriers to IA	2	8	25/06/2009 9:51 AM

	being proactive making it work	2	4	9/04/2009 1:32 PM
		4	19	9/04/2009 1:43 PM
	service models	1	3	9/04/2009 2:00 PM
Project or ongoing process	0	0	23/10/2008 3:36 PM	23/10/2008 3:36 PM
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	agility to change	3	6	23/10/2008 3:31 PM
	Doing the IA later	2	5	30/10/2008 1:59 PM
	IA by stealth	2	4	23/10/2008 3:59 PM
	incremental change to IA	4	23	23/10/2008 3:50 PM
	large IA redevelopment	3	5	23/10/2008 3:54 PM
	lifetime of an IA	2	5	23/10/2008 4:05 PM
	new initiatives	2	2	2/11/2008 6:17 PM
	ongoing improvement	2	5	23/10/2008 4:01 PM
	ongoing maintenance	2	6	23/10/2008 4:03 PM
	process or product	4	9	23/10/2008 3:49 PM
	time for a redevelopment	2	2	30/10/2008 2:13 PM
publishing and content	0	0	23/10/2008 3:55 PM	23/10/2008 3:55 PM
	Name	Sources	References	Created
	content	4	26	23/10/2008 3:58 PM
	mode of authoring	3	10	23/10/2008 3:59 PM
structuration	0	0	30/10/2008 2:11 PM	30/10/2008 2:11 PM
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	co-location	3	6	2/11/2008 6:04 PM
	organisational structure	4	30	30/10/2008 2:12 PM
	physical working area	1	3	2/11/2008 6:03 PM
	separating from IT	3	11	23/10/2008 2:51 PM
technology and IA	0	0	23/10/2008 2:36 PM	23/10/2008 2:36 PM
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	enterprise IA	3	13	23/10/2008 3:29 PM
	impact of CMS	4	17	23/10/2008 3:42 PM
	impact of technology	3	9	23/10/2008 3:42 PM
	infrastructure and IA	2	3	23/10/2008 2:54 PM
	IT support	3	4	23/10/2008 3:54 PM

		merging static-	1	5	23/10/2008
		dynamic			2:54 PM
who does IA	0	0	0	23/10/2008	23/10/2008
				3:13 PM	3:13 PM
		Name	Sources	References	Created
		any one can	2	2	23/10/2008
		do it			3:14 PM
		IA by non IAs	4	33	23/10/2008
					3:34 PM
		IA consultants	3	11	23/10/2008
					3:35 PM
		inhouse IA	2	6	23/10/2008
		skills			3:46 PM
		outsourcing	1	1	23/10/2008
					3:47 PM
		recruiting IAs	1	1	23/10/2008
					4:07 PM
		working	1	1	23/10/2008
		intuitively			4:08 PM
Knowing IA	0	0	23/10/2008	23/10/2008	
			3:12 PM	3:12 PM	
		Name	Sources	References	Created
		Information and	0	0	30/10/2008
		Knowledge			2:00 PM
		Work			
		Name	Sources	References	Created
		information	4	20	30/10/2008
		management			2:01 PM
		knowledge	2	2	9/04/2009
		management			2:02 PM
knowing about	0	0	9/04/2009	9/04/2009	
IA			1:51 PM	1:51 PM	
		Name	Sources	References	Created
		best practice	3	17	9/04/2009
					1:52 PM
		expertise in IA	3	11	25/06/2009
					10:01 AM
		external IA	1	1	25/06/2009
		community			10:02 AM
		maturity in IA	2	2	9/04/2009
					1:44 PM
		understanding	3	15	30/10/2008
		IA			2:05 PM
Learning IA	0	0	23/10/2008	23/10/2008	
			3:51 PM	3:51 PM	
		Name	Sources	References	Created
		community	1	1	23/10/2008
					3:52 PM
		influence of IA	2	10	25/06/2009
		discipline			10:08 AM
		knowledge	3	11	23/10/2008
		transfer			3:54 PM
		learning about	3	9	23/10/2008
		IA			4:00 PM
		learning IA on	2	10	23/10/2008
		the job			4:00 PM
		scholarship in	2	7	9/04/2009
		IA			2:01 PM
		training	2	12	30/10/2008
					1:51 PM
		user research	2	10	30/10/2008
					2:04 PM
Negotiating	0	0	23/10/2008	23/10/2008	
IA			3:11 PM	3:11 PM	
		Name	Sources	References	Created

Communicating	0	0	30/10/2008 2:02 PM	
	Name	Sources	References	Created
	communicating IA	1	5	9/04/2009 1:57 PM
	communication consultation	1	5	9/04/2009 1:58 PM
		2	9	25/06/2009 9:57 AM
	presenting IA design specs	1	1	30/10/2008 2:09 PM
gaining acceptance in org	0	0	30/10/2008 2:16 PM	30/10/2008 2:16 PM
	Name	Sources	References	Created
	choosing winner culture	1	1	25/06/2009 9:55 AM
		3	13	25/06/2009 9:58 AM
	organisational acceptance of IA trust	3	18	2/11/2008 6:07 PM
		2	2	9/04/2009 1:59 PM
Marketing and PR as stakeholders	0	0	30/10/2008 2:08 PM	30/10/2008 2:08 PM
	Name	Sources	References	Created
	Marketing communication public relations	4	25	2/11/2008 6:19 PM
Politics and Power	0	0	23/10/2008 3:57 PM	23/10/2008 3:57 PM
	Name	Sources	References	Created
	arrogance	1	2	9/04/2009 1:24 PM
	interference	2	10	23/10/2008 4:01 PM
	politics	2	15	23/10/2008 4:04 PM
	power	1	1	23/10/2008 4:05 PM
Working with the Business	0	0	23/10/2008 2:37 PM	23/10/2008 2:37 PM
	Name	Sources	References	Created
	acceptance of web IA by business	3	20	23/10/2008 3:09 PM
	Avoiding conflict	3	16	9/04/2009 1:28 PM
	bias and ignorance by business	3	21	23/10/2008 3:12 PM
	business readiness for IA improvement champions	2	15	23/10/2008 2:50 PM
		1	1	25/06/2009 9:53 AM
	change	4	15	25/06/2009 9:55 AM
	complaints	2	2	9/04/2009 1:57 PM
	conflict	2	9	25/06/2009

		credibility of web team	4	25	9:56 AM 23/10/2008
		following business change	3	11	4:10 PM 25/06/2009
		good IA	2	4	10:04 AM 25/06/2009
		invisible			10:05 AM
		influencing business units	3	18	23/10/2008
		meeting	3	8	4:09 PM 30/10/2008
		business needs			1:57 PM
		opportunism	2	9	23/10/2008
					4:03 PM
		organisational change	4	18	25/06/2009
		working across units	4	38	10:12 AM 23/10/2008
Owning IA	0	0	30/10/2008	30/10/2008	1:48 PM 1:48 PM
		Name	Sources	References	Created
		governance	4	27	30/10/2008 1:50 PM
		Name	Sources	References	Created
		authority for IA	4	54	9/04/2009 1:25 PM
		responsibility	4	27	2/11/2008 6:05 PM
		senior management	4	34	2/11/2008 6:15 PM
	importance of the web to org	0	0	30/10/2008	30/10/2008
					1:57 PM 2:03 PM
		Name	Sources	References	Created
		history	4	12	25/06/2009 10:13 AM
		ignorance web management	1	1	25/06/2009 10:07 AM
		importance of web	2	7	25/06/2009 10:08 AM
		motivation to improve IA	2	2	25/06/2009 10:11 AM
	web management	0	0	23/10/2008	23/10/2008
					2:52 PM 2:52 PM
		Name	Sources	References	Created
		centralisation of web management	2	5	23/10/2008 2:53 PM
		leadership	4	10	25/06/2009 10:11 AM
		Managing IA	1	2	23/10/2008 3:44 PM
		managment of website	3	7	23/10/2008 2:54 PM
		reporting	3	6	25/06/2009 10:12 AM
		resourcing	4	31	25/06/2009 10:13 AM
		strategy and planning	1	3	30/10/2008 2:15 PM
		web management	3	18	23/10/2008 3:48 PM
		web team	3	4	23/10/2008 3:45 PM

