Chapter XVII
On the Social Shaping of the Semantic Web

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ABSTRACT

Addressed in this chapter is the Social Shaping of the Semantic Web in the context of moving beyond the workplace application domain that has so dominated the development of both Information and Communications Technologies (ICTs), and the Social Shaping of Technology perspective. The importance of paradigms and the values that shape technology are considered along with the utility value of ICT, this latter issue being somewhat central in the development of these technologies. The new circumstances of ubiquity and of uses of ICT beyond mere utility, as a means of having fun for example, are considered leading to a notion of the Semantic Web, not just as a tool for more effective Web searches, but also as a means of having fun. Given this possibility of the Semantic Web serving two very different audiences and purposes, the matter of how to achieve this is considered, but without resorting to the obvious and rather simple conceptual formulation of the Semantic Web as either A or B. The relevance of existing Social Shaping of Technology perspectives is addressed. New thoughts are presented on what needs to be central to the development of a Semantic Web that is both A and B. Key here is an intelligent relationship between the Semantic Web and those that use it. Central to achieving this are the notions of the value of people, control over technology, and non-utility as a dominant design principle (the idea of things that do not necessarily serve a specific purpose).

INTRODUCTION

When computing and communications technologies merged and moved from the industrial, commercial, academic and government settings in which the technologies initially developed, into society at large, something fundamental and quite profound happened. On achieving ubiquity, Information and Communications Technologies (ICTs) ceased to be the primary preserve of the
professional developer and the work-based user, and became, in effect, public property. No more can the use of ICT be perceived as the domain of a select few. And the World Wide Web is the quintessential embodiment of this new circumstance. But it is not just the user community that has changed, for it is also the case that professional software developers also now operate in a world where anyone, potentially, can become a software or applications developer.

However, with the movement of ICT out from, and beyond, the workplace, into society at large, there is a need to look beyond traditional concerns with problem-solving, efficiency, utility, and usability. These are the criteria of the business world, of government departments, and the like, who are single-mindedly focused on delivering against targets set from high above. To these types of organization, computers, software, the Internet, and the World Wide Web are but functional utilitarian tools deployed in the service of profit, in the case of business, or policy as the embodiment of high political principles, in the case of governments.

Step beyond this well ordered world, into the life of an everyday citizen in modern society—the information society—and all these conventional concerns with problem-solving, efficiency, utility and the like, sit side-by-side, often uncomfortably, or are often substituted by, a second dimension representing a whole spectrum of other interests. The defining characteristics of this second dimension to the Web are typically: fun, enjoyment, happiness, fulfillment, excitement, creativity, experimentation, risk, etc. These in turn raise a much wider range of values and motivations than those of business, and embody notions such as freedom, individuality, equality, the human right to express oneself, and so forth. Moreover, these lead to a World Wide Web as a place, not of order, but of chaos, anarchy, subversion, and sometimes, even the criminal. And into this world moves the notion of semantic technolo-

gies, potentially transforming this chaotic and unpredictable environment into a place of order and meaning, taming this wild frontier, making it more effective and useful. But order, meaning, effectiveness, and usefulness for whom?

This paper addresses this rather simple, yet profound question. It is argued that the Semantic Web, as originally conceived, is not, as has been claimed, an improvement upon the first generation of the World Wide Web, but potentially a destructive force. What the Semantic Web may end up destroying is the unpredictability of interactions with the Web. This unpredictability, it is argued, is one of the Web’s most appealing characteristics, at least to those who are not seeking to be more efficiency, or effective, and the like. And with the loss of unpredictability goes serendipity, which is something that has a value beyond quantification, for both the workplace user and the non-workplace user.

However, this outcome is not inevitable: there is no immutable law which states that the Semantic Web has to be such that all unpredictability in encounters with the Web has to be eliminated. The Semantic Web, like all technologies, can be shaped to produce outcomes (MacKenzie & Wajcman, 1985), and these do not have to be dominated by the need for efficiency and utility. In other words, insights form the social sciences can be used to design a technology that is different from one where purely technical and business considerations dominate.

To understand this perspective it is first necessary to understand how design paradigms influence the development of technology, and how these paradigms have failed to adapt to the age of computers and the information society (Kidd, 2007a). These paradigms, it is argued, are still predominately locked into a world dominated by inflexible electro-mechanical systems, these being technologies which severely limit design freedom and which do not allow designers to accommodate individualism. This, it is further
argued, has implications, not just for social users of the Web, but also for business users.

Consideration is also given to values underlying science and technology, which still seem to embody Newton’s Clockwork universe, with its belief in predictability and absoluteness, a perspective which sits in sharp contrast to the modern world view of a chaotic and relative universe. The journey will also consider notions of happiness and how this is connected to the concept of meaning. Meaning here does not refer to that which is commonly understood in the context of the Semantic Web. What meaning implies in this context is something that is strongly linked to the subjective, and key among this is emotions, which are a human trait that surpasses the domains of usability and conventional human factors. Emotions and meaning however are not well understood by software developers, but it has been argued that these are the very things that underlie the success of many of the modern world’s most successful products (mobile phones being the classic example). Finally, the discourse will consider the concept of Ludic Systems, Ludic (Huizinga, 1970) being an obscure word meaning playful, but in a very wide sense, including learning, exploration, etc. This perspective does not just characterized people by thinking or achievements, but also by their ludic engagement with the world: their curiosity, their love of diversion, their explorations, inventions and wonder. Play is therefore not just perceived as mindless entertainment, but an essential way of engaging with and learning about the world and the people in it.

Bringing these perspectives together, the contribution will then consider the Social Shaping of the Semantic Web, namely the conscious design of the Web such that it accommodates the two very different, but important dimensions of the Web discussed in the chapter. It will be argued that the appropriate perspective is not to view these as competing and opposing views, a case of the Web as A or B, but rather the Web as A and B, in effect, order co-existing with chaos. And the key to achieving this lies in the development of a different sort of Semantic Web, one with different aims, and this in turn involves adopting a new design paradigm. This new perspective needs to explicitly acknowledge that usefulness, as defined in the classic sense, is not the beginning and end of matters, and that, it is legitimate to design the Web taking into account that not everything has to have a particular purpose. Put another way, as Gaver (2008a) has noted, some artifacts can just simply be curious things for curious people. The elements of such an approach will be described, including links to another Web development that goes under the label of Web 2.0; specifically context awareness.

BACKGROUND

The Semantic Web can be viewed as a business engendered ICT, that is to say, driven by and shaped by the needs of business. The promise is of a structured information resource from which information and knowledge can be more easily discovered than is the case with the first generation of the World Wide Web. A key requirement for creating the Semantic Web is the organization and classification of web content. In support of this requirement, knowledge-based technologies are needed that will provide a means of structuring this content, adding meaning to it, and automating the collection and extraction of information and knowledge.

Ultimately the goal appears to be transforming the World Wide Web from a chaotic and disorganized place, into an efficient information and knowledge source, providing a basis for the development of value added services based on this Semantic Web. One of the key elements in achieving this goal is the creation of ontologies (Benjamins et.al., 2003), which are in effect agreed and shared vocabularies and definitions,
that provide a basis for adding meaning to web content. These ontologies should provide a common understanding of the meaning of words used in different circumstances. One of the essential tasks in the development of the Semantic Web, is to research and define ontologies for specific applications. Another key research topic is that of content quality assurance, for without this there can be no trust that the data, information and knowledge derived are of any value.

There are of course other challenges of a technical nature, including scalability, multilingualism, visualization to reduce information overload, and stability of Semantic Web languages (Benjamins et al., 2003).

All these issues are recognized as being central to the successful development of the Semantic Web. However there is one more element, perhaps less well appreciated, that is also central to the success of the Semantic Web. This additional factor is the human and social dimension. It can be argued that the handling of this particular area could significantly affect, for better or worse, both the usefulness and the acceptability of the Semantic Web. To understand why this is so, it is necessary to understand something of the bigger picture that provides a contextual background to the development of the Semantic Web. This reflection begins with consideration of the future development of ICTs in general.

Future visions for ICTs are characterized by a belief in the ubiquity of these technologies (e.g. see Wiser (1991), Ductal et al. (2001), Aarts & Marzano (2003)). Phrases such as ubiquitous computing, pervasive computing, and Ambient Intelligence represent visions of computing devices embedded into everyday things, thus transforming these items into intelligent and informative devices, capable of communicating with other intelligent objects. These intelligent and networked artefacts will assist people in their daily activities, whether these are associated with work, travel, shopping, leisure, entertainment, etc.

The prospect of embedded intelligence transforming the nature of everyday objects builds upon the already widespread use of ICTs in society at large. Personal computers, mobile telephones, laptop computers, personal digital assistants, MP3 players, games’ consoles, and such forth are ubiquitous in society. And applications such as the Internet and the World Wide Web have provided a new access channel to existing services, and also opened up new activities, like social networking, blogs, instant messaging, personal web sites, and so forth, that were previously unforeseen and infeasible. Moreover, the ubiquity of computing and communication devices along with cheap (some times free) software downloadable from the Internet, has transformed the non-workplace user environment, for those with the inclination, into a do-it-yourself development environment. Many of the these developments in ICT can be described as socially engendered ICTs and applications, that is to say, driven by and shaped by social interests.

This is a very new circumstance and not surprisingly this has raised some concerns about the social effects of all this new and networked technology.

These concerns are wide ranging (Kidd, 2007b). They include worries over security, loss of privacy, and the rise of a surveillance society where the state, as well as some rich and powerful corporations, take on the features of the all seeing and all knowing Big Brother central to George Orwell’s novel Nineteen Eighty Four. Other concerns include the fear that society is becoming too dependent upon computers, to the point where the computer becomes the defining feature of reality, and, if the computer says something is so, or not so, then this must be true, even if it is not. There are also worries about peoples’ behavior. These range from increased detachment from the real world as people are increasingly drawn into the artificial world of cyberspace, through to concerns about lack of consideration for others, for example,
by those using mobile telephones in public spaces without any regard for the affect on those around them (referred to as increasing civil inattention (Khattab & Love, 2008)).

In Europe there is also a worry that citizens will not accept the offered vision of ubiquitous computing. As a result of these concerns a different vision has been formulated for ubiquitous computing, one that goes by the name of Ambient Intelligence. Specifically, the concept of Ambient Intelligence offers a vision of the information society where the emphasis is on greater user-friendliness, more efficient services support, user-empowerment, and support for human interactions (Ductal et al., 2001). People will be surrounded by intelligent intuitive interfaces that are embedded in all kinds of objects, and their environment will be capable of recognizing and responding to the presence of different individuals in a seamless, unobtrusive and often invisible way. This particular perspective is founded, at least in principle, on the notion of humans at the centre of all this technology, of the technologies serving people, of a human-centered information society.

But even the acceptance of this more human-centered vision by society at large is perceived to be a problem. This has led some senior representatives of the European ICT industry to propose that ordinary citizens become involved in the research, development and design processes that lead to the creation of so called intelligent everyday objects (ISTAG, 2004). This approach, as presented by ISTAG, is quite radical as it advocates design by, with, and for users, seeing these people not just as subjects for experiments, but also as a source of ideas for the development of new technologies and products.

In the USA there is also an appreciation of the importance of the human dimension with respect to ubiquitous computing (Abowd & Sterbenz, 2000). Key among the topics raised with respect to what are called human-centered research issues, is that of control. Control in this case means considering circumstances when an intelligent environment should initiate an interaction with a human, and vice versa, or when sharing of control is necessary between users and the system, and also flexibility in the level of control. Other issues raised are deciding which activities should be supported by these intelligent environments, what new capabilities they enable which go beyond current capabilities and activities, and support for task resumption following an interruption.

There is a danger however, that such matters might be seen as either usability issues or those relating to traditional human factors or ergonomics. And Abowd and Sterbenz (2000) do in fact raise matters that are very much in the sphere of traditional human factors. However there is more to human-centred research issues than these more traditional concerns. To understand why this is so, it is necessary to consider technologists’ and engineers’ perceptions of human-centredness.

Isomäki (2007) reports on a study of information systems designers’ conceptions of human users. Of note is the observation that these designers occupy a continuum of perceptions. At one end there are those with very limited conceptions, right through to the other end where designers have more holistic and comprehensive perspectives. This tends to support the conclusion that different forms of responses are possible when taking into account people, ranging from ergonomics of human-computer interfaces, right through to designing technologies so that users have full control over the way that the technologies work and the way that they are used.

With different conceptions of human issues, it follows that designers will have different perceptions of the problems that need to be addressed. To those with limited conceptions, traditional ergonomics and human factors is all that is needed to address the human dimension. However, for those with more developed perceptions of the human dimension, of what human centeredness might imply, the scope of designing for the human, has, potentially, much greater scope.
These designer conception issues therefore raise matters of values and design paradigms concerning technologies and the relationships with people, and more broadly with society.

This then leads to the familiar ground of technological determinism (MacKenzie & Wajcman, 1985, page 4), where technology is perceived to lie outside of society, having effects upon society, but being neutral in the sense that the technology is not influenced by subjective elements within society (e.g. such as values). If there is a choice in relation to technology, then it is one of choice between competing inventions, and by virtue of rational assessment and judgments, the best technology can be selected. This chosen technology then has some effect upon society, and matters of human issues just reduce to finding the most appropriate way to interact with the technology.

An alternative view is to consider technology as the product of society, a result of the prevailing economic, political, social and value systems. Technology therefore is not neutral and independent of society, but is shaped by society and its dominant values. And if this is so, then it is possible to shape technology in different ways, depending upon the values that are dominant, which opens up the possibility for the Social Shaping of Technology, using insights from the social and psychological sciences to produce different technologies to those that would normally be produced when technologists are left to themselves.

This discussion about the factors that shape technology leads to considerations of design paradigms. Paradigms are comprised of core beliefs, shared values, assumptions, and accepted ways of working and behaving (Johnson, 1988). Technological determinism is part of the framework of beliefs that are held by technologists, and is therefore part of the paradigm of technology development.

It has been argued (Kidd, 2007a) that the shift to the knowledge age, to a world where Ambient Intelligent systems predominate, involves a paradigm shift, not just in technology, but also in terms of the values that technologists bring to the process of designing these technologies. The knowledge era is heralded as a new age for humankind, implying some sort of transition from the past, to a new and different future, one based on the value of information and knowledge. The old age that is being left behind, the industrial era, was, to a large extent, based on subjugation of human skills, knowledge, expertise, and purpose to the demands of a resource-intensive economic system based on mass production. This led to a relationship between people and machines, where the needs of machines were predominant, and technology was designed to, as far as possible, eliminate the need for human intelligence, or to move this need to a select group of people within organizations, such as engineers and managers.

In other ways also, technology design practices have been shaped by the limitations of past technologies. The age in which technology development and design practices emerged and were refined, was primarily characterized by rather inflexible electrical, mechanical, or (a combination) electro-mechanical systems, which severely limited what was possible. In many respects the advent of relative cheap and highly flexible computers, which are in effect universal machines, has done very little to change these established practices, especially when it comes to considering the human dimension. This is the power that paradigms hold over people, trapping them into avenues of thought and practice that no longer have relevance.

But the industrial age view of technology and machine, also reflected the dominant world view of the time, where the universe was seen as a machine, a majestic clockwork (Bronowski, 1973, pages 221-256) and where its workings are defined by causal laws (Newton’s), and where, by using reductionist scientific methods, all in time could be understood and be known. Of course,
the universe turned out to be a much stranger place than Newton imagined, a place of relativity, chaotic behavior within what were once perceived as predictable systems, and of the quirky behavior of matter at the quantum level.

But in many respects this clockwork view of the world still prevails in the world of technology, for it is far easier to conceive of people as being components of machines, since the alternative is to consider humans in their true light, with all their quirkiness, likes and dislikes, interests, emotions, wants, and so forth. Yet the advent of the information society, the knowledge era, the age of Ambient Intelligence, demands just such a shift, for no more can ICT be perceived primarily as technologies for the workplace, where the employees can be subjugated to the needs of employers and the purposes of the employing organization.

And the primary reason for this is the change, is that of a different context for the use of ICT, which is now just as much focused on the world outside of the familiar workplace environment, as it is on the workplace. But this not only has implications for technology and technology design practices, it also has implications for the social sciences. Traditionally, those concerned with the Social Shaping of Technology have developed their theories and concepts based on the use of ICTs, as well as early generations of automation technologies, in the context of workplace environments. In other words they have been motivated by business engendered ICTs. This is no longer the prevailing circumstance. ICTs now need to be designed for both the workplace user and the non-workplace user. Business engendered ICTs and socially engendered ICTs have to be accommodated, with an ill-defined boundary between the two, and this provides the Social Shaping of Technology perspective with new challenges.

**MAIN FOCUS OF THE CHAPTER**

**Relevance of Existing Social Shaping of Technology Theories and Concepts**

To begin to address the Social Shaping of the Semantic Web, it is first necessary to make a detour to consider some key theories and concepts of the Social Shaping of Technology, and then to address their potential relevance to the Social Shaping of the Semantic Web.

The Social Shaping of Technology has it roots in the understanding that technology is not neutral, and that technology is shaped by the values and beliefs of those that influence its development, these being mostly engineers, technologists, and scientists. Change these values and a different technology will result.

While the scientific and technical community tend (and like) to believe that technology is neutral and is not determined by values, many social scientists think differently. As a result there is a body of thought and knowledge in the social sciences, that provides a theoretical and conceptual basis for the Social Shaping of Technology. Key among the existing body of knowledge is sociotechnical design. Another important perspective is interfacing in depth.

For completeness, some of the key features of both will first be described. Then, the relevance of these to the Social Shaping of the Semantic Web will be addressed.

The Sociotechnical School developed in the United Kingdom shortly after World War II, in response to the introduction of new technology into the British coal mining industry. Its central tenant is that surrounding technology, which can be regarded as a sub-system, there is also a social sub-system. These two sub-systems can
be designed to be compatible, either by changing the technology to match the social sub-system, or modifying the social sub-system to match the technology, or a mixture of both.

The Sociotechnical School of thought has been articulated in the form of principles, (Cherns, 1976, 1987) that embody the values and key features of sociotechnical design. These principles, of which there are 11, are: Compatibility; Minimum Critical Specification; Variance Control; The Multifunctional Principle—Organism vs. Mechanism; Boundary Location; Information Flow; Support Congruence; Design and Human Values; Incompletion; Power and Authority; and Transitional Organization.

Among the above there is a sub-set of principles that are primarily organizational in nature. These are: The Multifunctional Principle—Organism vs. Mechanism; Boundary Location; Information Flow; Support Congruence; and Power and Authority.

The Multifunctional Principle—Organism vs. Mechanism refers to traditional organizations which are often based on a high level of specialization and fragmentation of work, which reduces flexibility. When a complex array of responses is required, it becomes easier to achieve this variety if the system elements are capable of undertaking or performing several functions. Boundary Location is a principle that relates to a tendency in traditional hierarchical organizations to organize work around fragmented functions. This often leads to barriers that impede the sharing of data, information, knowledge and experience. Boundaries therefore should be designed around a complete flow of information, or knowledge, or materials, to enable the sharing of all relevant data, information, knowledge and experience. The Information Flow principle addresses the provision of information at the place where decisions and actions will be taken based on the information. Support Congruence relates to the design of reward systems, performance measurement systems, etc., and their alignment with the behaviors that are sought from people. For example, individual reward for individual effort, is not appropriate if team behavior is required. Power and Authority is concerned with responsibilities for tasks, and making available the resources that are needed to fulfill these responsibilities, which involves giving people the power and authority to secure these resources.

There is also another sub-set of principles that largely relate to the process by which technology is designed. These are: The Compatibility Principle; The Incompletion Principle; and The Transitional Organization Principle.

The Compatibility Principle states that the process by which technology is designed needs to be compatible with the objectives being pursued, implying that technologies designed without the involvement of users, would not be compatible with the aim of developing a participatory form of work organization where employees are involved in internal decision making. Incompletion addresses the fact that when workplace systems are designed, the design is in fact never finished. As soon implementation is completed, its consequences become more evident, possibly indicating the need for a redesign. The Transitional Organization principle addresses two quite distinct problems when creating new organizations: one is the design and start-up of new (greenfield) workplaces, the other relates to existing (brownfield) workplaces. The second is much more difficult than the first. In both situations the design team, and the processes it uses, are potentially a tool to support the start-up and any required transitions.

What remain from Cherns’ set of 11 sociotechnical design principles, is a sub-set that is significantly technology oriented, although the principles also have organizational implications. The principles in question are: Minimum Critical Specification; Variance Control; Design and Human Values.
The principle of **Minimum Critical Specification** states that only what is absolutely necessary should be specified, and no more than this, and that this applies to all aspects of the system: tasks, jobs, roles, etc. Whilst this is organizational in nature, it impacts technology as well. It implies that what has to be done needs to be defined, but how it should be done should be left open. In terms of features and functions of technology, the technology should not be over determined, but should leave room for different approaches. It implies a degree of flexibility and openness in the technologies. Turning now to **Variance Control**, this is a principle that, as its name suggests, is focused on handling variances, these being events that are unexpected or unprogrammed. Variances that cannot be eliminated should be controlled as near to the point of origin of the variance as possible. Some of these variances may be critical, in that they have an important affect on results. It is important to control variances at source, because not to do so often introduces time delays. Next on the list of principles is that of **Design and Human Values**. This is concerned with quality of working life. In the context of the working environment it manifests itself in issues such as stress, motivation, personal development, etc. This principle has both a social sub-system dimension and a technology sub-system dimension, in that both can be designed to reduce stress, and to enhance motivation and personal development.

The second approach mentioned as being of relevance to the Social Shaping of the Semantic Web, known as **interfacing in depth**, has its roots in technology design, specifically the design of computer-aided manufacturing systems.

This perspective on the **Social Shaping of Technology** rests on the observation (Kidd, 1992) of the importance of technology in influencing organizational choice and job design. There is a perspective (e.g. see Clegg, 1984) that suggests that technology is of secondary importance with respect to job design and organizational choice. However, as noted by Kidd (1992), technology is clearly not neutral and can close off options and choice in the design of organizations and jobs. Technology for example can be used to closely circumscribe working methods, to limit freedom of action and autonomy, and to determine the degree of control that users have over the work process.

This viewpoint, of technology shaping organizations, roles, and working methods, led to the notion of **interfacing in depth**. So, rather than just applying ergonomic and usability considerations to the design of human-computer interfaces, it was proposed that there is also a need to apply psychological and organizational science insights to the design of the technology behind the interface.

Kidd (1988) for example, describes a decision support system that was designed using this broader perspective. A key point about this decision support system is that the system characteristics were not achieved through the application of ergonomics or usability considerations to the design of the human-computer interface. Rather the characteristics arose from the technology behind the human-computer interface, where the technology refers to the algorithms, data models, architectures, and the dependency upon human judgment and skills that were built into the operational details of the software.

Kidd (1988) also points out that it is necessary to make a distinction between the surface characteristics of a system, as determined by the human-computer interface, and the deeper characteristics of a system, as determined by the actual technology. The surface characteristics are strongly related to ergonomics and usability, while the deeper characteristics relate more to the view of the user held by the designer, in that if values are driven by a desire to reduce user autonomy, this will be reflected in the details of the underlying technology. Likewise if values are such that autonomy is valued, then this will lead to a different type of underlying technology.
Consequently, good human-computer interface (surface) characteristics are necessary, but not sufficient. Attention must also be paid to the deep system characteristics, that is, the technology behind the human-computer interface. This is called interfacing in depth.

The relevance of both sociotechnical design and interfacing in depth to the Social Shaping of the Semantic Web has been addressed by Kidd (2008a). A key point in this consideration is the relevance of both approaches to non-workplace environments, for socially engendered ICTs, given that both the sociotechnical approach and interfacing in depth were developed in the context of workplace environments.

Kidd (2008a) specifically addresses the relevance of sociotechnical principles and interfacing in depth for the case of the Semantic Web, not just as a technology for the workplace, but in the context of the non-workplace user environment, for example in the home.

A key feature of any web technologies is that the outcome of the use of this type of technology is not known in advance. Consequently, to over determine how the technology is used, to over limit results based on semantics, could be incompatible with the purpose of the technology, as perceived by some people, and its value to users.

This implies that the sociotechnical variance control principle could potentially be very important in the design and development of the Semantic Web. One of the potential downsides of the Semantic Web is that it eliminates variances in web search results, thus destroying some of the value of the Web (the experience of discovering the unexpected). Consequently, enabling the user to decide how much variance to tolerate, in other words to place control of variances in the hands of users, could be an important attribute that needs to be designed into the Semantic Web, and for this reason therefore, variance control is potentially an important principle for the non-workplace environment. But it could also be an important principle in the workplace environment as well. The reason for this primarily lies in the competitive imperative for innovation, and in the need to be adaptive and responsive, especially in the face of structural changes in the business environment; changes that require agility, and corresponding organizational designs and operating principles that are open to bottom-up adaptation (Kidd, 2008b).

Control therefore is potentially important because not to have control over technology such as the Semantic Web, for users not to be able to decide which features of the technology should be employed, reduces the role of the Semantic Web to that of a vending machine for search results. This could be highly de-motivating to users of the Semantic Web.

This observation also arises from the interfacing in depth perspective. The whole philosophy of interfacing in depth is based on design of technologies where there is uncertainty and unpredictability in terms of outcomes. This approach provides a framework to counter the tendency to reduce human-computer encounters to circumstances where there is no uncertainty and unpredictability in outcomes. This theory is highly relevant to the Semantic Web, for this approach would seek to allow user autonomy and control to flourish, thus maintaining the potentially chaotic and serendipitous nature of the World Wide Web, but at the choice of the user.

Moving Towards the Social Shaping of the Semantic Web

Summarizing the central argument, the key issue is to shape the Semantic Web so that it does not reduce interactions with the Web to the circumstance where the Web becomes like a vending machine. But there is more involved here than a simple on-off switch that disables or enables, at will, the semantic features of the Web, although such as approach could be used. Ideally a circum-
stance should be created where the technology provides a more sophisticated approach. But the question remains how to do this? A key issue here relates to avoiding a circumstance where the Web is viewed in polar terms. The appropriate perspective therefore is not to see two competing possibility, two extremes, a case of the Web as semantic or the Web as non-semantic, but as a combination of both, as a continuum of infinite possibilities.

Such a perspective has been advanced before in connection with other technologies (Kidd, 1994, pages 301-303), but also more recently in relation to Ambient Intelligent Systems (Kidd, 2007a). The conceptual basis lies with interfacing in depth and variance control, and has been referred to as user defined human-computer relationships. This word relationship is important here as it implies more than just an interaction between person and machine. There has to be intelligence in this relationship, something that is often overlooked when the word intelligence is used in the context of computers. It is not, for example, very intelligent for a so-called intelligent everyday artifact to enforce a given way of working on users. An intelligent relationship with a semantically based World Wide Web would be built on control and understanding. Control comes from providing the technologies that will allow users to specify in some way, how semantic based searches operate, perhaps for example by including some form of control knob that would tone down the strength of the semantic dimension. But more than this, the Semantic Web needs to understand something of the context of the user.

This then touches upon a sensitive area, that of context awareness (Braun & Schmidt, 2006), which is a matter that arises in another area of World Wide Web development often referred to as Web 2.0. The sensitivity hinted at here relates to privacy, for to understand a user’s context it is necessary to capture information, some of which may be of a personal nature, including patterns of usage and the like, much of which people may not want to have stored within a computer system. The information is also of the sort that commercial organizations, interested in marketing products and services, might be all too keen to lay their hands on.

However, putting aside for the moment these very serious issues, understanding the context under which users come to the Web, knowing something of their likes and dislikes, whether their are interests are broad or narrow, how much they value serendipity and how often they follow-up seemingly random and unrelated search results, could be a key factor in enabling the development of a more adaptive and responsive Semantic Web.

But this only defines the relationship. What about user motivation? Why should technology developers bother with such sophistication? This returns the discussion to the matter of paradigms and technologists’ conceptions of the human dimension of the Semantic Web. Here, looking beyond utility, a factor that is such a dominant feature of the workplace, is critical. This involves addressing the non-utilitarian perspective, something that is perhaps an alien concept to the technologist. Put simply, not everything has to have utility.

Technologists need to understand that what makes people happy is not always something that is useful. Sometimes happiness comes from meaning, from emotional connection. This, it has been argued, is central to understanding why certain technologies are so successful, while others are less so (Lyngsø & Nielsen, 2007). For example, text messaging on mobile phones seems very much to be an example of a very useful tool, and it certainly has a very obvious utility. But text messaging is not just used for utilitarian purposes. Many young people use text messages to communicate with each other. But to adults the messages may seem to be pointless, like “where are you?” or “what are you doing?” or “I’m bored” and so
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forth. This is just chatter, which is meaningful to the younger generation, but not to adults. And the word meaningful is key here. It is the meaningfulness of the text messaging system that makes it so popular. And the same can be said for instant messaging, blogs, and social networking sites. They have very little in the way of utility. They are in fact just an extension of the face to face discussions that take place when people meet. But this point is important, because their motivation is not oriented to fulfilling a task, but to other more human inclinations, like for example, having a good time. These applications and many more, are examples of socially engendered ICT.

Socially engendered ICT points to a different type of driver for the development of the Semantic Web. The Semantic Web is not just a tool to undertake more efficient and effective searches of Web content, but can also be a means for people to have a good time. This is therefore links to the concept of Ludic Systems.

Ludic is something of an obscure word; it means playful (Huizinga, 1970), but in a very wide sense. Included are activities such as learning, exploration, etc. The Ludic perspective does not just characterized people by thinking or achievements, but also by their ludic engagement with the world: their curiosity, their love of diversion, their explorations, inventions and wonder. Play is therefore not just perceived as mindless entertainment, but an essential way of engaging with and learning about the world and the people in it (see Gaver (2008b) for an example).

Consequently, the Social Shaping of the Semantic Web needs to incorporate this perspective, which explicitly acknowledges that usefulness, as defined in the classic sense, is not the beginning and end of matters, and that, it is legitimate to design the Web taking into account that not everything has to have a particular purpose. Put another way, some artifacts can just simply be curious things for curious people (Gaver, 2008a). This could be of key importance in reshaping design paradigms, introducing a different dimension that explicitly recognizes that there is life beyond mere utility.

With this view in mind, Kidd (2008a) has proposed an additional sociotechnical design criteria to add to the 11 proposed by Cherns (1976,1987). This new criteria takes sociotechnical design out beyond the workplace environment, into the world of ubiquitous computing, of Ambient Intelligent systems, a world of the Web as used by a vast network of people seeking to have a good time, of a world of socially engendered ICT. The new principle embodies the mood of the age, as manifested in social networking Web sites, blogs, instant messaging, and so forth. The principle, referred to as the Non-utility Principle, is articulated as:

Non-utility Principle: ICT in non-workplace contexts serve purposes beyond mere utility, and ICTs should therefore be designed to enable users to achieve emotional fulfillment through play, exploration, and several other dimensions, that are not traditionally associated with workplace environments.

FUTURE TRENDS

Clearly during the early years of the 21st century there has been an emergence of, as well as a significant growth in, ICTs that are predominately focused on the world outside work. Many of these systems, while they also provide the workplace with useful tools that serve the utility oriented perspective of the working environment, were not conceived with this outcome in mind. It is more the case that they serve a purpose that is related to people as social creatures with a need to find meaning. Often these systems are used in what might be seen, when judged by the rational standards of work, as being nothing more than frivolous time wasting activities. But when
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looked at from a broader perspective, they seem to embody life, for life is made up of many activities such as enjoying oneself, socializing through small talk and casual chat, etc.

Further development and growth in these types of ICTs seems set to continue as social scientists and technologist begin to collaborate on the design and development of technologies that will make the experience of using these socially engendered systems, even better.

This collaboration between the social sciences and technologists is key to creating technologies that are better suited to the new circumstances of ICT and their use. With time, as technologists begin to realize that the value of technology does not just lie with utility, with making things more efficient, and so forth, and that it is quite legitimate to design technologies that will help people to find meaning through whatever activities (within reason) that they want to undertake, there should emerge a very different sort of technology to that which has already been developed.

What new delights lie ahead for the users of these systems is hard to foretell. What needs to be done to bring about these systems is however a little more predictable. Central will be the development of interdisciplinary design, and even the emergence of a new breed of technologist, with knowledge in social sciences as well as in technology subjects. Based upon this, the notion of a new breed of professional can be suggested, involving people who can operate in the spaces between the social sciences on one side, and engineering and technology on the other. Such people would be capable of taking into account both perspectives and would use their knowledge to design technologies more acceptable to society than those that might emerge from a more technology-oriented approach.

This in turn would lead to new research agenda, and in effect the implementation of Social Shaping of Technology in a world where technology is no longer perceived to lie outside of society, but to be an integral part of it. This development will in part be aided by research that is already underway looking at the development of complex systems science (European Commission, 2007) and its relevance and application in areas where ICT and society have already merged (social networking Web sites for example).

CONCLUSION

ICTs are beginning to develop along new paths, socially engendered and shaped to a significant extent by such concepts as instant messaging, chat rooms, social networking, and the like. These developments come from the world outside of work and are not based upon the notion of utility, but more on meaning, of doing things for fun, of explorations, etc. The Semantic Web on the other hand largely comes from business engendered thinking, from a world where the primary concerns are utility, effectiveness, efficiency, and usefulness.

These two worlds in many ways seem to clash, to be polar opposites. But this does not have to be so. The Semantic Web can be shaped in entirely new directions and does not have to become a tool for business, but could also be another means of having fun. To this end the paper has mapped out some preliminary possibilities, provided a conceptual basis for development, and highlighted a key guiding design principle. The challenge for the future is to take what is emerging from the domain of socially engendered ICT, and bring this to the area of business engendered ICT, to the benefit of both domains. For to do so would provide a means of preserving what is good about the Web, that is to say its unpredictability, providing a means by which meaning is found, while also delivering a Web that is also more useful for those with a more serious purpose. This new notion for the Semantic Web would provide a place for both work and play, adapting as required to the needs of users at specific moments in time.
REFERENCES


### KEY TERMS AND DEFINITIONS

**Ambient Intelligence**: A human-centered vision of the information society where the emphasis is on greater user-friendliness, more efficient services support, user-empowerment, and support for human interactions with respect to intelligent everyday objects and other ICT systems.

**Business Engendered ICT**: Information and Communications Technology, the development and use of which is driven and shaped by the needs of business.

**Interfacing in Depth**: Shaping the characteristics of a technology by considering the details of the technologies that lie behind the human-computer interface, where technology refers to the algorithms, data models, architectures, and the dependency upon human judgment and skills that are built into the operational details of the software.

**Ludic Systems**: Ludic refers to the play element of culture. Ludic systems are based on a philosophy of understanding the world through play, of play being primary to and a necessary condition for the generation of culture. Such systems therefore do not necessarily fulfill any particular purpose in the sense that most technological systems usually exist to fulfil a need, or have some useful function, or are a utility.

**Non-Utility Principle**: ICT in non-workplace contexts serve purposes beyond mere utility, and ICTs should therefore be designed to enable users to achieve emotional fulfillment through play, exploration, and several other dimensions, that are not traditionally associated with workplace environments.

**Social Shaping of Technology**: The philosophy that technology is not neutral and is shaped by the dominant social, political and economic values of society. As a result therefore, changes in values lead to different technological outcomes,
and as a result, social science considerations can be used to shape technologies.

**Socially Engendered ICT:** Information and Communications Technology, the development and use of which is driven and shaped by social interests.