

## **Connecting isolated Senior Citizens: Illustrating the Complexity of Social Information Systems Development.**

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In Australia, complex issues relating to an ageing population are confronting governments, communities and individuals (APC 2011). This is a common concern in most developed countries and one where IS can play a significant role. Some studies have suggested that social well-being could be enhanced by participation in online activities (ADHA 2011). Reports in aged care research literature indicate that loneliness and isolation are among the main problems encountered by people living well into their 80s and 90s (Coughlan 2011). Those still in their home receive basic medical and support services, sometimes via the Internet, but their lack of mobility restricts their ability to interact socially. Those who move into independent self-managed units or full-residential institutions are often dislocated from family and friends.

Social technology offers a flexible mechanism for addressing the isolation experienced by many senior citizens. As the needs and capabilities of this group may vary considerably, developing social information systems in this area represents a complex challenge. Meeting this challenge fits well with the theoretical approach to the development of social information systems discussed and illustrated in this paper.

### ***Information Systems Development***

Information Systems Development (ISD) is a central activity of the computer age. ISD becomes complex when there are changing user requirements, changing organisational needs, changing external competitive conditions, increased interdependencies among the involved individuals, organisations and technologies, and rapidly evolving technologies (Benbya & McKelvey 2006). However, most ISD projects undertaken by IS practitioners in organisations have a responsibility to deliver an Organisational Information System (OIS) on time and within budget, and ensure that the information system fits the organisation's purpose and management-defined objectives. These requirements establish a boundary for ISD complexity that constrains unbridled experimentation within ISD and to some extent dampens the emergence of unpredicted, but potentially valuable outcomes. The social information systems development to meet the diverse needs of senior citizens as considered in this paper avoids some of these constraints.

### ***Complexity and Complexity Theory***

In common parlance the word 'complex' is often applied loosely to a situation or problem. For our research, it is necessary to make a clear distinction between what is really complex, and must be treated as such, and what is merely complicated, in the language of Snowden (2002) and Kim and Kaplan (2006). Although composed of many intricate parts, *complicated* systems can be understood by careful examination so that their future behaviour can be predicted. *Complex* situations, problems and systems are fundamentally different as they are 'comprised of populations of interacting entities where the overall system behaviour is not predefined but rather emerges through the interactions of its entities' (Kim & Kaplan 2006, p. 37). Dealing with *complex* problems and situations, such as those with societal purposes, as if they were merely

*complicated* is inappropriate. 'If you make the complicated simple you make it better but if you make the complex simple you make it wrong' (Gray 2009). Complex systems have incomplete, contradictory, and changing requirements and large numbers of diverse components whose interactions are dynamic, rich and non-linear.

### **Social Information Systems Development**

We argue that most mainstream ISD research deals with *complicated* systems for which researchers develop and apply theoretical frameworks that simplify how the system is perceived and understood. This reflects the historical context of ISD in organisational settings where there is an imperative to produce clearly specified outcomes.

In contrast, IS projects with a societal purposes can be understood as Complex Adaptive Systems (CAS) where fluidly changing collections of distributed interacting components react to both their environments and to one another (Madsen et al. 2006). Online communities exemplify an innovative instance of the ad hoc diffusion and adoption of emerging social technologies, which have the potential to address critical social problems. Due to their essentially emergent nature, the formation of online communities is more likely to be successful when developed and nurtured as evolving collaborations between IS developers and participating community members. However, the situation is *complex*, so the full potential of these online communities is often not realised when IS experts or other institutional stakeholders attempt to impose such solutions. The aim of systems that have predominantly a societal purpose with ill-defined objectives and multiple interacting social and technical components lie outside organisational constraints. Such systems are more social than technical and may never reach a stable finished state, but continue to be self-directed and follow an independent evolutionary development process.

Broadbent (2003) suggests that a new generation of evolutionary systems design methodologies is now emerging as a socio-cultural phenomenon where social IS take a more central role in human affairs. Agile and iterative development methods provide ISD projects with some ability to adopt CAS appropriate attributes such as emergence, self-organisation and flexible work patterns. However, existing ISD theory and practice still struggles with the behaviour of such systems as their developmental pathway is difficult to predict as solutions, processes, work patterns and team configurations are all allowed to emerge naturally rather than from heavy planning and design (Meso & Jain 2006).

We suggest that empirical investigation into the ISD of social IS, such as those exemplified in our research setting, may provide deeper understanding of this phenomenon and lead us towards more usable CAS-oriented ISD theory.

### **Research context**

Illustrative of the *complexity* of social IS is the contradiction that, just as social media are creating an unprecedented interconnected world, an increasing number of senior citizens are becoming more socially isolated. Such isolation stems from policies that encourage seniors to remain living at home longer, but as they are less mobile, they are less likely to be involved in a full range of social engagements. Conversely, a senior's physical and social condition may require them to move to an aged care facility away from family, friends other social connections. Problems associated with resulting isolation may be alleviated by connecting them to suitable online communities, which allow meaningful social interaction regardless of location.

Our research looks at social information systems development in the Australian aged care context. While social IS presents many challenges, it also offers potential benefits that enable isolated seniors to explore the world - contributing, connecting and interacting. The imperative to continue to contribute as useful members of society drives seniors to connect to the wider community (thus reducing isolation) while improving their wellbeing.

The focus of our research is the ISD of social IS that seeks to address critical wicked problems (Rittel & Webber 1973) concerned with concentrated social disadvantage, inequalities and exclusion (Gardener 2011). These systems are participant driven, perhaps with support and facilitation from people with IS expertise, who often participate in these projects on a voluntary basis. They predominantly use existing free IS infrastructure and tools, such as social media, and so have minimal budget or time restrictions. The success of such a project is not in terms of the production of the system itself, but the benefits accrued to society and those involved in the development process.

As our focus is on the development of social IS, our aim is to work with participants, senior citizens in aged care facilities, to set up online communities to enrich their social interactions. Consistent with the reviewed literature, we accept that this is a complex issue that requires close attention to the perspective that is adopted. As IS researchers we envisage successful outcomes as vibrant online communities. However, from the perspective of the participants, the social IS should enhance their well-being: the societal purpose. Moreover, this societal purpose is shared by other stakeholders in the aged-care sector. Thus we need to clearly distinguish our perspective as IS researchers from the perspectives and practices of the participants as well as other stakeholders. Our ability to deal with these multiple perspectives is supported by concepts from complexity theory and CAS in designing and conducting the research.

### **Preliminary findings**

The findings of the preliminary stage of this research indicate that the situation under study is indeed *complex* as predicted (Burgess et al. 2012). While seniors are not digital natives; they vary in their use, attitude and understanding of Information and Communication Technology (ICT) and the Web. They also have many particular challenges in using ICT. These can be physical (eyesight, dexterity), cognitive (identity, security) or cultural (the attitude towards social media may often be suspicious or negative). There are many programs advertised on seniors' websites, which offer to teach basic computing skills to the elderly and these are well attended. Among the seniors in the computer club included in preliminary research, most participants used email accounts and online searching, although computer use for social interaction was limited. While most members did appreciate the potential for using online services to connect with family and friends, to access information and to conduct online transactions, little was done in practice.

In our engagement to date, our reflections, combined with feedback from other stakeholders, has seen the following issues emerge:

- For social IS, it is essential to establish the social purpose, keep it prominent, and use it as the prime element for evaluating outcomes;
- there are social benefits for participants from their engagement in the ISD process;
- the technical aspect of a social IS may not be very prominent in respect of the whole socio-technical system that evolves or emerges from the ISD process;
- too much involvement by stakeholders other than the key participants, in our case, the senior citizens, may be obstacles for the development of social IS;
- it is a challenge to choose suitable attractors; and,

- when there is a genuine desire to help it is difficult not to intervene, but to allow emergence.

These issues specifically relate to complex aspects of social IS. They complement and extend the principles already identified with respect to CAS-oriented ISD in organisations.

In the preliminary stage of our research, we recognised that only few online senior citizens communities thrive and that even computer literate seniors looked negatively to social media to interact socially (Burgess et al 2012). Thus, we concluded that some level of stimulus and facilitation without too much intervention is required to initiate the ISD process for social IS. The second stage results confirmed this. The engagement with the two representative individuals in an aged-care facility suggest that social IS may need little structure and order to be beneficial or sustainable. So, unlike the development of OIS, the development of social IS may not encourage the emergence of order and structure, but allow the system to remain continually on the edge of chaos or even in a chaotic state as long as the purpose of social wellbeing is being served. The new theory of CAS-oriented ISD for social IS will therefore differ from that of OIS in the light of our research and implications for our theory building.

## **Conclusion**

The issues identified in the evaluation phase of our study provide preliminary evidence of the direction that should be taken when theorising the ISD of social IS through the lens of complexity theory. The key aspect of a social IS that distinguishes it from an OIS is the predominance of its societal purpose. Moreover, a successful outcome of the development of a social IS is the fulfilment of that societal purpose and not necessarily a viable social IS as originally envisaged. The social benefit for participants may stem from their engagement in the ISD process or their membership in the social IS artefact that emerges from the ISD process, or both. Following CAS principles that allow and encourage self-direction, co-creation and emergence are necessary, but not sufficient for a theory of ISD for social IS. Determining an appropriate level of assistance and intervention is something that our research must also consider.

Our research is also directed towards the building of an empirical tested theory for the design and co-creation of social IS and that class of IS artefacts. Our emerging empirical work (Burgess et al. 2012) provides important implications for this theory building. We will build on existing principles and frameworks that view ISD, predominantly of OIS, as co-evolving, self-organising activities (Vidgen & Wang 2009; Meso & Jain 2006). However, these have two shortcomings from our perspective. Firstly, although this body of work is based on complexity theory as instantiated in CAS, it does not propose new theory beyond descriptive frameworks and lists of recommendations on how to conduct ISD in complex contexts. Secondly, there appear to be critical complex aspects of social IS that do not need to be considered even in complex organisational settings.

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