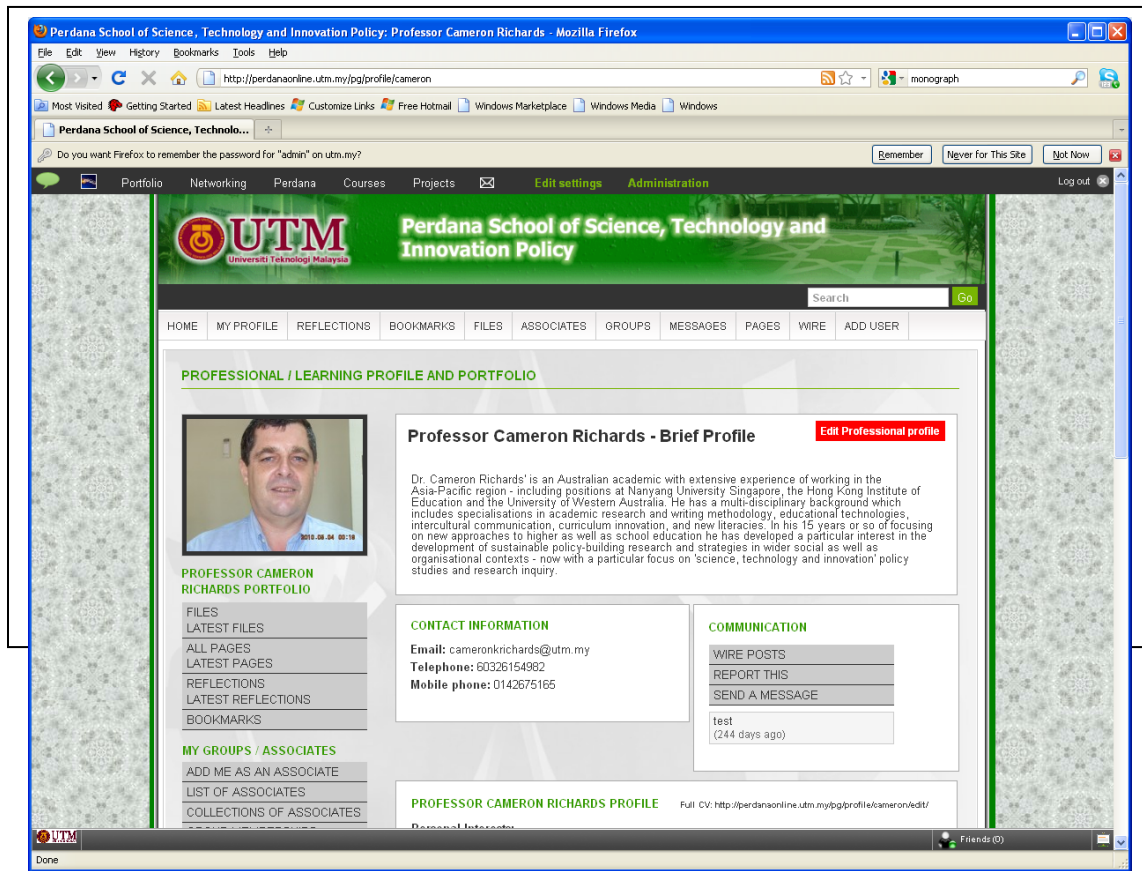


The Use of Social Networking Software and Web 2.0 functions in Higher Education for E-Learning and Online Research Communities



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ABSTRACT (120 words)

Online social networking and related Web 2.0 technologies have taken the world of internet users by storm in recent years. However beyond the use of blogs for reflective learning journals and University alumni pages on Facebook, there has generally been little integrated use of social networking tools in higher education. This report will explore how a *design research* approach may assist in not only recognizing but also developing the knowledge-building implications of a convergence between such tools and technologies on one hand, and also on the other constructivist approaches to related domains of learning, research and professional reflective practice in academic communities and contexts. The process of designing and developing an applied research problem and related central question or inquiry focus is approached in terms of two 'design research' proposals. One, it considers the idea that if a critical mass of both basic skills and actual usage could only be achieved by teachers, administrators and researchers then social networking has the potential to significantly and productively transform higher education. Two, it considers the idea that the key to achieving such a 'critical mass' in education contexts perhaps lies in designing meaningful contexts or purposes of interaction – that is, in linking the function of social networking to an appropriate design paradigm for using associated Web 2.0 tools. In this way the paper will explore the

requirements for a more effective harnessing of the exemplary possibilities of online social networking in higher education contexts.

1. INTRODUCTION

Web 2.0 will affect how universities go about the business of education, from learning, teaching and assessment, through contact with school communities, widening participation, interfacing with industry, and maintaining contact with alumni ... - Franklin & van Harmelan (2007), Commissioned report for the UK Joint Information Systems Committee.

Universities have long been interested in harnessing the educational possibilities of new Information and Communication Technologies (ICTs) (e.g. Daniel, 1996; Corford & Pollock, 2003; Laurillard, 2004, 2006). However, university students around the world have generally been uninspired by the typical model of university e-learning using online *learning management systems* as mainly a repository of learning content posted by lecturers (Paloff & Pratt, 1999; O'Neill, Singh & O'Dooghue, 2004; Herrington & Herrington, 2005). On the other hand, many of these same students now regularly use at home online communications and profiling which extend from messaging programs like *Skype* and *Twitter* through to social networking programs like *Facebook*. Some workplaces outside education have started to use some related Web 2.0 functions for such purposes as business communication and project development (Tapscott & Williams, 2006; Shirky, 2008; Zittrain, 2008; Li & Bernoff, 2008). However, apart from the use of blogs as a kind of reflective journal and some educational wikis (e.g. Anderson, 2007; Churchill, 2007), there is presently little applied use of a wider Web 2.0 concept of 'online social networking' in education. In other words, a new generation of young learners are increasingly embracing a Web 2.0 paradigm of interaction which has yet to find wide or general currency inside schools and universities. In light of the prediction above made by Franklin & Harmelan (2007) this paper will explore the possibilities and requirements of a more effective harnessing of social networking tools and other Web 2.0 technologies across a range of purposes in higher education including e-learning (Cf. also Rheingold, 2002; O'Hear, 2007; Simoes & Gouveia, 2008).

The paper also reports on the design and development of a project to especially investigate the promise of social networking tools for supporting online research and learning communities or environments (Jonassen & Land, 2000; Miller, 2000). The exemplary focus of this case study project was a large cohort of postgraduate researchers – the particular group in higher education who are well-known to commonly experience feelings of both academic and social isolation (Tapscott, & Williams, 2006). The study focused on the design requirements for not only encouraging widespread use of this program, but an effective harnessing of its related functions linked to a range of useful purposes. Ongoing further project development will extend this study to include more directed and integrated use by academic and also non-academic staff in terms of using the same social networking program to be fully integrated into the teaching, research and administrative activities of an academic faculty. In this way, the two stages of the project will particularly focus on the exemplary possibilities of using a social networking platform to develop more effective academic research cultures, to encourage collaboration, and to increase the quality as well as quantity of publication outputs.

The discussion below will thus be developed around the structure of how - from the outset - the project provided a basis for addressing three key and related challenges. The first and most important challenge lay in providing designs for giving participants – university students, postgraduate researchers and academic staff – a meaningful rationale and context for using online communication and networking programs in higher education contexts. A second challenge was implied by how part of the answer to the first challenge clearly lay in the question of how to more productively link the social networking aspects and purposes of such programs to a range of possible educational applications. Thus a related third challenge was the question of what are the wider and transferable *educational design* requirements for most effectively using social networking software (and related Web 2.0 functions) for developing and supporting online communities of academic researchers and learners? Implicit in the third question is also a related issue of what might be the most appropriate and effective research design methodology for developing a project inquiry as a basis for evaluating transferable principles and implications.

2. RESEARCH METHODOLOGY

A general design research paradigm has a particular resonance for not only educational research and technology research but especially educational technology research (e.g. Barab & Kirshner, 2001, Reeves, Herrington, & Oliver, 2005, Kelly, Lesh & Baek, 2008). As suggested at the outset of this paper the application of educational technologies clearly require an actively experimental (Design-Based Research Collective, 2003) as well as ‘formative (Reiguluth & Frick, 1999) or ‘developmental’ (Van Den Akker et al, 2006) framework of inquiry in order to explore sustainable as well as transferable implications. The pedagogical challenge of redesigning the curriculum as well as teaching practices to better integrate new ideas and tools is one which naturally converges with the active learning paradigm associated with constructivist theory and associated concepts such as lifelong learning or ‘learning to learn’ (e.g. Jonassen & Land, 2000; Botha, van der Westhuizen & Swardt, 2005). Thus a Web 2.0 model and particular related social networking functions represent an exemplary focus for reflecting on some of the wider implications of a design research paradigm as well as a constructivist paradigm shift in education.

In exploring the related issue of how an effective Web 2.0 paradigm of learning might be conceived and developed, this paper and the associated project have focused on the key *design challenge* of sufficiently linking social and personal contexts of online interaction on one hand, and educational possibilities and applications on the other. The reason new social networking software (and particular Web 2.0 functions) represents a specific challenge but also opportunity for revisiting and transforming e-learning in higher education lies in the question of how to more productively make this connection. In other words, we needed to reflect on what kind of design strategy might result in the most effective connection between the use of a Web 2.0 architecture and related tools on one hand, and both informal and formal uses of this by students and also academic staff on the other. Insofar as the term ‘Web 2.0’ is suggestive of not only new technologies but changing practices of human knowledge-building, then we believe that the associated design requirements for effective integration in education (and perhaps more widely in other domains) lie in a paradigm which in many ways ‘turns upside down’ existing paradigms of e-learning. People will struggle to practice as well as to see the possibilities of not only emerging technologies but associated new modes as well as technological mediations of human interacting and knowing if they continue to use out-of-date frameworks or perspectives. Our project and inquiry has thus been conceived to both investigate some new possibilities and associated design requirements on one hand, and also to develop some more effective models, strategies, and examples of implementation on the other. Thus, as earlier suggested, such concepts as ‘e-Learning 2.0’ may be useful if conceived also in terms of appropriate educational (and also ‘community of practice’) design approaches and not just social networking software per se and associated Web 2.0 tools and functions.

As Reeves and most of the design research theorists and commentators point out, *action research* – which is also a form of professional action learning – is an important precursor to *design research*. This is exemplified by the general model of Kolb’s (1984) learning cycle which aims to better connect concrete experience and abstract conceptualization (also clearly at the heart of the universal human research enterprise). Kolb’s cycle posits an integrating fourth stage of ‘active experimentation’. In research terms this is normally associated in the natural sciences especially with the predictive testing of a hypothesis in terms of a controlled experiment distinguishing between dependent and independent variables. Those who take a positivistic stance or recognize only the legitimacy of the hypothetico-deductive method (i.e. dismiss or downplay the ‘other’, especially more qualitative methods of evaluation and theory-building) often underestimate or ignore the extent to which the most effective scientific experimentation is often preceded by a sometimes unacknowledged inductive framework of prior knowledge linked to an active problem-solving or discovery design. This prejudice is at the heart of criticism of what some have referred to as ‘the awful reputation of educational research’ (e.g. Kaestle, 1993; Cf. also Levin & O’Donnell). In short, its approach tend to be descriptive and formalistic and removed from the stakeholders in the field who would prefer that theory building research (and also policy building research) be grounded in more practical, sustainable and authentic contexts of interdisciplinary relevance as well as ‘change and improvement’ in knowledge.

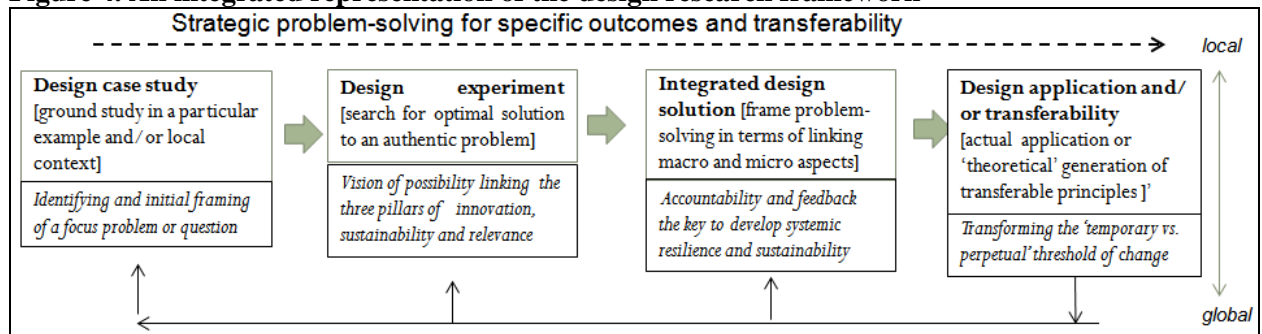
Whereas many of the design research theorists and commentators remain content to apply this methodology to areas such as education, technology and educational technology, others such as Reeves (2005) take a wider view that the design research paradigm stands in an integrative relation to the hypothetico-deductive method as a constructivist learning paradigm does in relation to traditional transmission methods of learning. This is especially so in terms of how at the heart of more refined and advanced versions of the constructivist revolution is the notion that knowledge building design is one of the more important if not most important generic skill or rather ‘new literacies’ in the emerging global knowledge society (e.g. Lankshear & Knobel, 2006). Just as interesting and significant is the adaptation of a design research paradigm for the applied purposes of ‘engineering research’ (e.g. Burkhardt, 2006).

In going beyond and integrating the key principles of design research articulated by the design research collective (2003) as well as others, Reeves’ paper recognizes the timely need for the research process and other formal approaches to human knowledge-building to become more relevant in terms of engaging with and trying to develop sustainable future strategies as well as present solutions to authentic real-world problems in larger collaborative and emergent principles of ongoing knowledge-building. In other words, the more closed, controlled, and specifically narrow focus of experimentation as hypothesis testing might be seen as part of a more open, wider and ultimately global paradigm of human knowledge building which also supports and focus on the inquiry into innovative and sustainable solutions to both practical and theoretical problems or challenges. This is especially the case in terms of the more complex research problems and challenges which involve a range of interdependent factors or variables which unfold and interact in time. Likewise the associated notion of the progressive and interdependent refinement of both theory and practice is based on the concept that if an idea, method or tool is so good that it should work or has already worked somewhere else, then the operative research question seeking to ‘change and improve’ knowledge becomes one of ‘what is needed to make it work’ (i.e. in this situation, with these agents, and with what kind of appropriate support).

This is reflected in Reeves’ (2006) exemplary depiction of the design experiment model as the seeking of a ‘refinement of problems, solutions, methods and design principles’ in relation to the four key stages of a renewable cycle: 1. The analysis of practical problems; 2. Development of solutions; 3. Iterative cycles of testing; and 4. Reflection to produce ‘design principles’ or enhanced solutions. Those familiar with the *action research spiral* will recognize its adaptation into a much more sophisticated model which might also be used to distinguish between low-level action research and more advanced, effective and innovative theory-building consistent with the rigorous and problem-solving orientation characteristic of the best scientific practice. To similarly adapt a well known definition of the design experiment model: ‘design experiments were developed as a way to carry out formative research to test and refine [knowledge-building] design based on principles derived from prior research’ (Collins, Joseph & Bielaczyc, 2004) [our parenthesis]. But equally the design research paradigm represents an antidote to top-down or de-contextualised theorizing in terms of not just accounting for but actually building knowledge out of the concrete, grounded and interdependent nature of various factors and variables which influence events and situations.

Our own re-framing of a design research paradigm in Figure 4 corresponds to but goes beyond the four stages indicated by Reeves. Such a model is equally applicable to applied or experimental and theory-generating inquiry. However to the extent that any research should somehow be a strategy or design of meaningful problem-solving for specific outcomes and applied transferability then the design research framework represents a generically relevant model of active or constructive knowledge-building. Such an approach might apply just as much to the generating of either applied theory and principles in relation to specific examples/samples and local contexts as it does to authentic problem-solving or action research. On this basis an outcomes focus or ‘vision of possibility’ might also be generated whereby ‘design experiments’ are framed around the three pillars of innovation, sustainability and social relevance. To be both transferable and effective design experiments should aim to achieve what might be referred to as ‘integral design solutions’. In other words, both applied and conceptual or theoretical problems inevitably involve both macro and micro dimensions which need to be addressed and connected to achieve the most effective solutions and transferable implications or principles.

Figure 4. An integrated representation of the design research framework



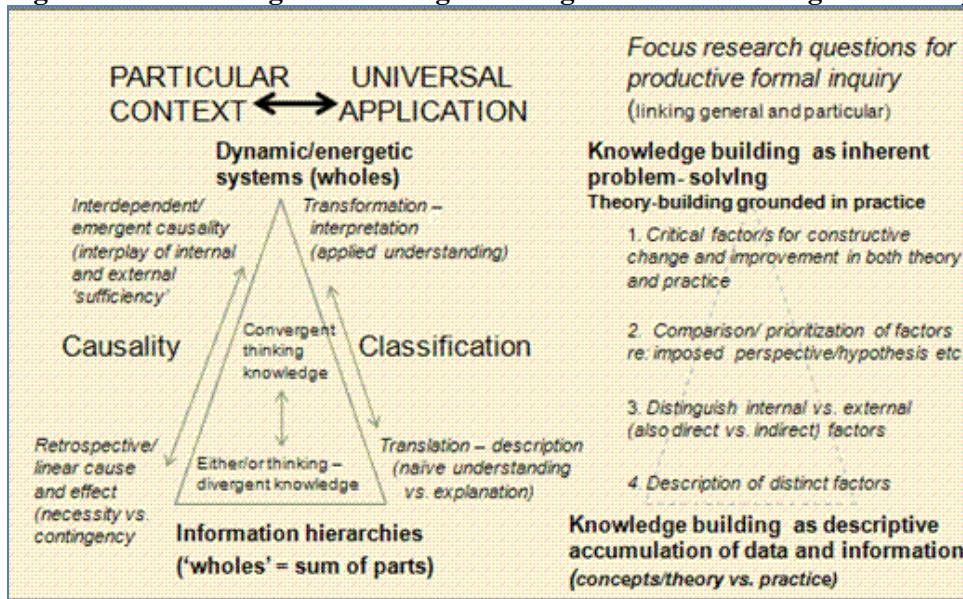
It is perhaps simple common sense that more considered, strategic and relevant designs for any mode or process of human knowledge building – ranging from formal research to more non-formal or ‘educational’ kinds of inquiry – will lead to more productive or transferable outcomes than vague, ad hoc and segmented notions of research observation or data collection. The key to how a design research paradigm might become more inclusive and part of a wider experimental or applied knowledge building lies in the link between a specific research design (especially when this is formulated as a specific research problem or question) and the formative or developmental inquiry process over time. In other words, this paradigm recognizes and begins to clarify a notion of universality as not just a convention of ‘objectivity’ but as inherent to a particular research design, problem and/or question in terms of its transferable relevance as some exemplary link between the particular and general in both human experience and formal hierarchy of concepts.

This suggests also a more sustainable and enduring notions of triangulation in time rather than just as a matter of spatial measurement or diversity of methods of data collection. As Karl Popper pointed out in terms of his well-known theory of the inherent ‘falsificationism’ of all human theory-building, the universality of the predictive method is ever open to change as human knowledge is ultimately context-dependent or open to new and different perspectives. Given that design research is ultimately about designed human interventions and not just observations, it might equally be relevant to point out how a cornerstone of modern physics is the notion inherent in Heisenberg’s famous ‘uncertainty principle’ that even the most distant or removed observation of nature still represents to some degree an intervention or dialogue of contexts and frames of interpretation. However, the timeless and transferable relevance of design theory rather lies in the exemplary and emergent implications of how an ongoing process of any kind of knowledge-building (including different forms of active experimentation) is ever referenced by how its implied research problem or questions is able to generate transferable findings and principles in terms of an open-ended link between the particular and general in human knowledge- for instance, a particular issue or problem framed within a recognized field or domain. To put this another way, *academic universality* is a function of the process of analysis, testing and measurement (i.e. the methodology of evaluation) in the predictive model but rather of the *methodology of design* in formative or developmental research. But although it may be common sense that any *methodology of evaluation* should be appropriate to the direct or indirect methodology of research design, many researchers in the human sciences are still encouraged to simply choose a quantitative or qualitative evaluation strategy (i.e. a descriptive rather than interpretive or transformative paradigm) independently of or prior to the refining of a relevant research problem or question with transferable significance. In other words, the methods of acquiring and analyzing any data collection should be relevant to the particular research design, not the other way around as is sometimes the case.

The design research paradigm thus stands in contrast to various top-down or de-contextualized approaches to theory-building as a process imposed rather than grounded in the concrete contexts of human experience and understanding and filtered through the transformative lens of human language-use and preconceptions. To the extent we might refer to this as a new and better paradigm of human knowledge building, design research reflects a view that formal research as well as other forms of human knowledge-building might be more productively viewed in terms of both: (a) a *systems* perspective of the link in time and not just in space between various parts and changing wholes, and (b) human inquiry as correspondingly an *emergent* process referenced by the particular problem or

question at hand. Sandoval & Bell (2004) have usefully described the formative or developmental foundation of a wider design research paradigm in terms of the concept of ‘conjecture maps’ which organize and reflect the trajectory of an inquiry in an open-ended but also problem-solving or question-answering orientation. In similar fashion to how inquiry-based learning, problem-based learning and project-based learning are arguably the three central as well as related pillars of constructivist learning, so too in the most effective applications of the research process. The ‘project development’ dimensions of research inquiry are part of the convergent notions of formative and developmental foundations of a design research paradigm. Thus the formative or development framework for conducting, refining and evaluating design research (or simply any good research problem or question) represents an open-ended inquiry scaffold by which to consider, understand and distinguish a range of ‘internal’ and ‘external’ factors or – in predictive experimental terms – the interplay or ecology of dependent and independent variables.

Figure 5. The convergent knowledge building functions of a design research paradigm



Adapted from Richards 2010a

Figure 5 maps out our view of how a design research paradigm thus reflects an overall knowledge-building framework which also ultimately converges the initially distinct but ultimately convergent functions notions of *causality* and *classification* in various kinds of formal and non-formal human knowledge accumulation and transformation across time. The right hand column outlines a generic design framework of knowledge building as effective problem-solving and project development linked to the posing of a central and supporting set of research questions which together represent a relevant as well as strategic research inquiry focus and structure. Corresponding to this on the left column is a model of how such an applied framework reflects a trajectory or *thread of inquiry* which both proceeds from a fixed and descriptive to a more transformational and interpretive paradigm of classification on one hand, and likewise from retrospective linear views of causality in a vacuum to more emergent, interdependent and also ‘re-finable’ view of practical and conceptual problems. Thus the convergent design key to more effective knowledge building thus lies both formally and non-formally in establishing links or transferability between particular contexts of inquiry and more ‘universal’ aspects or principles of application on the other. A related distinction might be made between either deterministic or ad hoc notions of formal knowledge building on one hand, and emergent design research paradigm on the other which recognizes that the linking of the general and particular in a specific inquiry focus or research focus question provides the sustainable inquiry foundation for generating innovative relevance, reliability and ‘transferability’ in any specific processes of knowledge building.

As Reeves (2005) suggests, a design research framework indicates the possible and indeed natural convergence between *basic research* and *applied research* – that is, the ultimately complementary and inter-dependent relation between those who undertake formal research to achieve fundamental understandings and those who are more concerned with the practical

uses of research findings. Indeed this also a complementary convergence in principle if not in projected outcome and audience between formal research itself and professional reflective practice, lifelong learning, community capacity-building and various modes of non-formal research and knowledge-building. In the context that his elenchus method of rigorous inquiry (perhaps the original prototype of the scientific method) was based on the exemplary function of an open-ended question, we might thus recognize an additional convergence between a research design paradigm and Socrates' dictum that formal inquiry and explicit human knowledge-building should proceed in relation to how a focus question or problem is an exemplary means for undertaking or pursuing an inquiry design and strategy. That is, authentically, productively, and with the prerequisite humility of any good scientist, a design research should seek to open up and explore the gap between 'what we know' and 'what we don't know'. In other words, to the extent that Socrates' elenchus method has been identified as the original prototype of the scientific methods, such a convergence might also be interpreted as a recovery by those research design proponents interested in the universality of human knowledge-building.

3. LITERATURE REVIEW

Challenge #1: How to effectively 'situate' the use of social networking programs and Web 2.0 functions in a general higher education context?

The central challenge of harnessing the power and possibilities of both social networking programs (and a Web 2.0 paradigm of human interaction and knowledge-building more widely) is to give people a 'reason' to use it. The contagious attraction to and use of programs such as *Facebook* and functions such as *Blogs*, *Wikis* and *RSS feeds* in countries and cultural contexts around the world make the initial stage of this challenge a relatively easy one. As anthropologists have long known it is a generally universal aspect of the human condition to want to show oneself off, to want to interact or network with others, and sometimes perhaps even to want to freely share useful information or gift personally meaningful 'items' (e.g. Hawkes & Bird, 2002). In other words, *individualistic* propensities for profiling identity or personal customization and innovation of cultural styles and fashions are just as much the motivation or incentive for social networking online or in 'real life' as informing principles of *collective* solidarity or inter-personal reciprocity. In retrospect, an accessible technological means of doing all this online can be seen as an epidemic or 'tipping point' (Gladwell, 2000) waiting to happen also representing a fundamental 'paradigm shift' in human interaction and knowledge-building (Richards, 2006, 2007).

As much as insightful investigators such as Franklin & van Harmelan recognize and understand the many and significant implications and applications of Web 2.0 for higher education, there are many attitudinal and cultural obstacles which will need to be addressed to start to harness the possibilities more effectively. What they do not seem to appreciate is that such a 'missing link' was perhaps also the reason that the optimistic promises and visionary rhetoric of e-learning have rarely been translated into sustained and widespread practice in the last decade or so. In other words, as many of the influential conceptualisers of *Web 2.0* point out (e.g. the man credited with coining the term, O'Reilly, 2005), such a paradigm is ultimately perhaps more a function of a required attitudinal and cultural shift than the range of new internet and related technologies which are associated with the term. Indeed, these are some of the same key obstacles which have beset all the expensive and elaborate efforts to promote and integrate a 'Web 1.0' paradigm of e-learning in many higher education institutions around the world. As Bartolome (2008, p.6) has pointed out, 'e-learning courses have not yet adopted aspects related to collective intelligence, horizontal relations, dynamic knowledge conceptions and to new information management tools such as tags and bookmarking.... [and] they seem to have little or no impact on the structure and conception of old learning paradigms on which today's curricular are built'.

Perhaps the central problem has been the failure to extend all the effort and expense on setting up learning management software on internal computer networks into not only adequate staff training and professional development support but also in exploring and researching practical and relevant 'educational design' requirements (Cornford & Pollock, 2003). One exception to this has been the

extensive constructivist theoretical literature on developing ‘online learning environments’ (e.g. Jonassen & Land, 2000). But this also has too often remained just theory and rhetoric rather than sustainable and transferable principles or concrete examples of innovative actual practice (Richards, 2002, 2004, 2006).

So why will connections made by some between a so-called *Web 2.0* paradigm of internet usage and general knowledge building and e-learning (i.e. *e-Learning 2.0*) not necessarily suffer the same general fate as the dominant ‘learning management systems’ (LMS) model of e-learning in higher education as primarily an information repository with a generally *add-on* rather than *integrated* use of some additional functions such as webforums, multimedia learning objects, and online quizzes? We believe there are two main and related reasons. The first is that we think any effort to use social networking programs and related Web 2.0 functions in a similar way to learning management systems or programs will generally be much less effective than conventional e-learning - with the partial exception of reflective blogs and information sharing wikis. A second reason, conversely, is that a more sustainable approach will require a new educational design approach – one which ‘turns upside down’ some conventional assumptions and practices in order to better harness the possibilities. We think this is the key to harnessing the power and promise of any or all of the various notions of e-learning.

For those interesting in harnessing the power of new communication and knowledge technologies in education as well as wider social contexts, it is possible to build a foundation of inquiry upon a policy revolution in higher education which has aimed to challenge ‘industrial age’ and related ‘transmission’ notions of the passive learner. Habits and assumptions of rote learning, transmission teaching and mere reproduction of information or acquisition of skills in a vacuum are very much linked to the general failures to adequately support staff professional development and to research or develop the most effective new educational design principles and practices. Such habits and assumptions also inform the learning management (or related Web 1.0) model of e-learning. But this has been now overturned in theory if not in practice by a new policy shift in higher education around the world to promote more active, innovative and critical learning, to aspire to achieving generic skills and competencies in young graduates, and to replace a *transmission paradigm of education* in terms of a more applied, more relevant and even interesting *outcomes-based learning paradigm*. Many of these generic skills and learning outcomes (such as *effective problem-solving, communication, collaboration, information literacy, critical thinking, independent or lifelong learning, and creative innovation*) are particularly relevant to the use of ‘e-learning’ to enhance higher education generally.

Therefore, possibly the most important implication of a *Web 2.0 paradigm of e-learning* is that it offers the promise of better connections in practical ways with the constructivist and life-long learning aspirations of much recent international educational rhetoric, theory and policy for more active, critical and innovative learners. This is in contrast to how some similar promises of a ‘Web 1.0’ model of e-learning were mainly focused on the technological capacity for ‘anytime, anywhere learning’ (e.g. Bates, 1985). Partly as a result of this, many educators saw e-learning as somehow an extension or even replacement (i.e. a *substitute* not *supplement*) for not only face-to-face education but some of the key educational design principles for the most effective learning. Likewise some of the enthusiasts for an e-Learning 2.0 model (e.g. Downes, 2006; O’Hear, 2007) tend to set up and reinforce a simplistic model of contrast between not only a Web 1.0 and Web 2.0 paradigm of web-based technologies but also associated principles of learning and knowledge building. In short, a key challenge is to rescue a Web 2.0 paradigm of learning and knowledge building from an ‘opposite error’ to that informing the obstacles to a better integration of learning management programs and an associated e-learning model in universities around the world.

There is indeed a superficially useful link between comparing old transmission models and new constructivist models of learning on one hand, and Web 1.0 and Web 2.0 technologies on the other. Typical models of contrast emphasize a distinction between digital media software and functions where data/information/knowledge (and also multimedia elements) are still quite ‘fixed’ when accessed or used by individuals (a *read paradigm* of the Web) and a more *interactive paradigm* where both content and media are ‘mashed up’ (or ‘remixed’) in a *‘read-write’ paradigm* of transformative reproduction and socially networked dissemination by ‘end-users’ (Berners-Lee, Hendler & Lassila, 2007). Thus influential commentators such O’Reilly (2007) describe key characteristics of Web 2.0 as a *knowledge process* rather than *technological process* in such terms as an architecture of participation, social networking, and even a harnessing of collective intelligence. To this extent Tim

Berners-Lee, the ‘inventor’ of the World Wide Web, was right to deny that the concept of Web 2.0 is a new version of the Web itself. Unlike many others, Berners-Lee never saw the original Web as merely an information repository but as an evolving new interactive media as well as new paradigm of human communication. Indeed, Berners-Lee’s collaborative concept of a new ‘semantic web’ paradigm is perhaps more significant and transformative with its implicit recognition of how natural human languages, which embrace *horizontal* (associative networks) as well as *vertical* (linear and hierarchical classifications) relations, are the key to all the new or emergent interactive functions of the internet including most of those labeled ‘Web 2.0’ (Berners-Lee, Hendler, & Lassila, 2001).

Although many commentators emphasize the connection between Web 2.0 and the open source movement, peer-to-peer communications and file-sharing (especially of music, image and video files), it is also highly significant that the person who coined the term referred to it as primarily a ‘business revolution in the computer industry’ (O’Reilly, 2007). On the other hand, when comparing Web 1.0 and Web 2.0 other enthusiastic e-learning 2.0 proponents tend to describe associated principles such as *mashups*, *rich media* and *multi-devices* in terms of postmodernist principles of *bricolage* (e.g. Downes, 2008) – thus accentuating this as more an accidental or ad hoc process than a designed one. Likewise the importance of ‘tagging’ or ‘folksonomies’ (or associative key-word descriptors for content or functions) is often contrasted with more linear and hierarchical categorizations or constructions of information and knowledge. This is in similar terms to the distinction often made between how the human brain has both horizontal or associative tendencies for thought and language-use (e.g. key-word synonyms in a search engine) and vertical or logical aspects (generic versus specific terms or concepts). Whilst many of the interactive functions of Web 2.0 (person profiling, text mining, etc.) are increasingly linked to the associative aspects of human thought and language-use, this does not mean that logical relationships and planned structures are unimportant or disappearing.

Those such as O’Hear (2007) who would also compare ‘e-Learning 1.0’ *sermons* with ‘e-Learning 2.0’ *conversations* should realize that a further distinction can be made between merely ad hoc and accidental interactions or conversations on one hand, and those that reflect a more *dialogical* relationship in such terms as how stories or narratives can provide the integrating threads of design in multimedia presentation and internet communications as well as digital organizations (i.e. web-based designs) of information and knowledge. In the manner of Laurillard’s *dialogical* re-conception of higher education pedagogy to also integrate educational technology, pedagogical designs for better connecting *top-down* and *bottom-up* principles of learning and educational management implicitly as well as explicitly involve various forms of interaction – not just the one-way transmission of content from teacher to passive learner, but interactive convergences between distinct *teacher-learner*, *learner-other learners*, and *learner-content* relationships (Laurillard, 2006).

Present connections between the Web 2.0 concept and education in general, and e-learning in particular, are often made in such *either/or* terms of *ubiquitous computing = ubiquitous learning* (O’Hear, 2007). On one hand this is often expressed in terms of a ‘social’ paradigm which implies that all *future learning* (and not just that using such tools as blogs, wikis, and other functions of social networking) should be grounded in a collective process of *social construction* rather than *individual cognition* - the two alternate aspects of constructivism either often in conflict or tending to be confused. On the other hand, there is the postmodern view of the link between individual agency and social networking contexts as a somewhat ad hoc and even superficial process based on the principle of the ‘short attention span’ of users which runs the risk of remaining fairly ad hoc and superficial in education contexts. One view tends to focus on the collective intelligence at work in such examples as Wikipedia, and the other on the multimedia requirements of an interactive visual interface. In short, the purposes of formal education much different to those of directly social or commercial purposes. Even if the Web 2.0 concept provides powerful support to a larger and more ‘long-term’ concept such as ‘lifelong learning, a poor educational design model of e-Learning 2.0 runs the risk of being both ‘poor’ education and ‘poor’ social networking.

So how to develop a foundation for proceeding on the basis of a sound and appropriate Web 2.0 *educational design* principles for using social networking programs and functions in schools and universities? There are perhaps two fundamental implications of the discussion above which perhaps accords with international efforts so far to integrate Web 2.0 in higher education. Firstly, there would appear to be a quite lot of widespread usage of such functions as Blogs or Wikis and programs such as *Flickr* and *Facebook* on a fairly ad hoc and superficial basis. This may even be ‘socially’ and creatively quite useful and interesting. But it does not necessarily reflect a substantial connection to

integrating constructivist theory and outcomes based learning policy in higher education. Such practices often attract a lot of initial attention but are generally not sustainable (without more integrated design strategies of learning and especially assessment) in relation to either traditional transmission education or the current global shift in higher education towards prioritizing generic skill outcomes.

Secondly, if social networking and related Web 2.0 are going to productively transform and not just aimlessly subvert formal education around the world then any efforts to generate appropriate educational design principles and practices needs to understand and frame more effectively the connections between socially constructive aspects of learning and education and the new Web 2.0 functions and technologies on one hand, and the enduringly individual or cognitive aspects of substantial and sustainable knowledge-building on the other (Richards, 2006). In short, the socially constructive and cognitively constructive implications of Web 2.0 need to be better understood and reconciled within the particular purposes of education (as distinct from mere socializing or commerce) as a foundation for required educational design approaches. Many educators and universities struggle to integrate constructivist learning theory and, by extension, also outcomes-based learning policy in practice (e.g. Laurillard, 2006). Perhaps a key reason this is so is that the connection between *social constructivism* and *cognitive constructivism* is often confused or inadequately reconciled when linked to educational theory.

In concrete terms of further inquiry, there are two particular important implications which might be identified. Firstly, distinct social networking functions such as blogs, wikis, and RSS feeds might be better introduced in a more comprehensive platform or engine which facilitates a larger, regular social networking foundation for grounding social networking in educational contexts linked to enduring (not transitory and ephemeral) institutions such as universities and schools. Secondly, before teachers and lectures attempt to turn to Web 2.0 tools or programs to replace learning management technologies of e-learning (and the industrial age model of transmission education which has typically informed the institutional use of e-learning), universities should develop more systematic and supported strategies for harnessing the many powerful, meaningful and even exciting uses that could be and would likely be enthusiastically received by a new generation of ICT-savvy students.

Challenge #2: How to most productively link Web 2.0 technologies, online social networking and educational purposes?

The worries of many educators that computers might somehow replace teachers, and that online education and ‘virtual learning’ might somehow even replace schools and universities ignores the enduring human needs of and desires for face-to-face interaction, for socializing, and also for direct teacher-student interactions of some kind (Hannon, 2008). In other words, in the ‘big picture’ of things e-learning (whether Web 1.0 or Web 2.0 paradigms) can usefully *supplement* but never fully *substitute* for fundamental aspects of effective human interaction and learning (Weigl, 2003; Garrett, 2004; Laurillard, 2004). What can be taken from this are some useful principles to achieve better educational designs which can better harness the use of new educational technologies. Clearly designs for encouraging *social structures* of collaboration and interaction can be a powerful basis for also enhancing functions of *individual cognition* (e.g. undertaking an individual research project or dissertation). Likewise the function of teacher ‘dialogue’ and meaningful engagement with learners can be built in to the design of any kind of distance education resources (with much more potential for this in online formats as distinct from the traditional use of written documents) as well as in specific learning tasks or activities with interesting as well as useful contexts and purposes (Richards, 2005a).

As new media commentators like to point out (e.g. Jenkins, 2006; Jander, 2009), the internet and related digital media have become quite ubiquitous in many societies around the world and with a younger generation globally in particular. This development has provided a powerful basis for the growing interest in and opportunities for *life-long learning* (also *informal learning*) - as much a requirement of future work-places as a desired goal of personal knowledge and development. In that context, individuals and societies are increasingly unable to avoid the responsibilities as well as opportunities for taking more ‘active’ interests and roles in developing personal and community contexts of human knowledge-building which might include but go beyond the organizational concept of ‘knowledge management’ (Firestone & McElroy, 2003). Such a foundation needs to be recognized and harnessed in terms of strategic, meaningful, and productive possibilities rather than merely ad hoc and superficial uses of new digital media. Such development ultimately represents not a threat but

wonderful opportunities to enhance human learning. This is as long as effective, interesting and/or useful design principles are harnessed.

Figure 2. A potential ‘e-learning’ convergence between a Web 2.0 paradigm of internet usage and a constructivist paradigm of (more) interactive learning

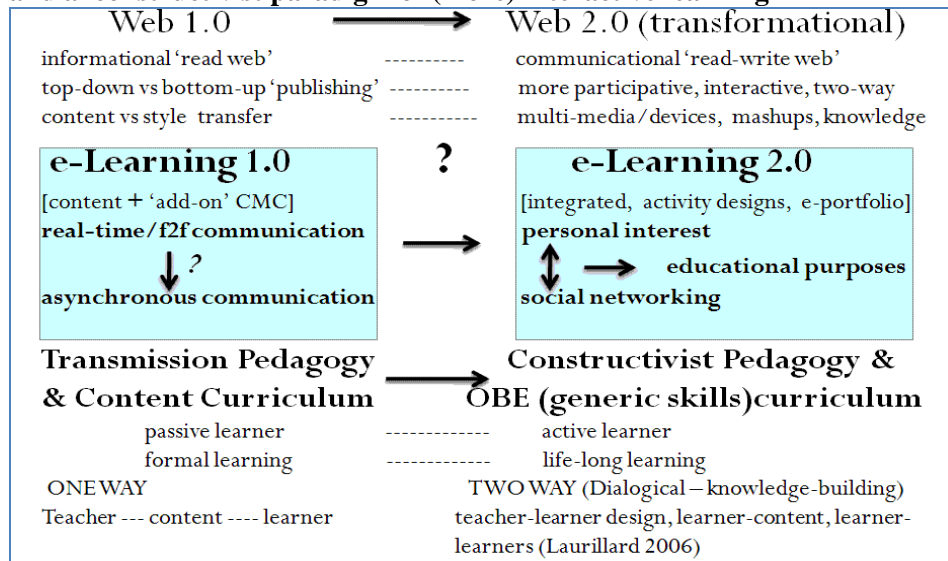


Figure 2 above attempts to map out a projected view of the connection between the *constructivist* approach to education and a projected Web 2.0 paradigm of both internet use and 21st Century knowledge-building. These convergent paradigms stand in contrast to the corresponding *transmission* views and assumptions about learning and communication which commonly assume a one-way orientation and ‘passive’ tendency towards either learning content or the process of technologically mediated information. Just as a Web 2.0 paradigm represents a more dialogical and interactive view of users actively involved in constructing meanings and even media itself, so too the kind of *constructivist* model of higher education articulated by Laurillard (2006) recognizes the convergent as well as distinct interactive and educational design aspects of learners actively engaging with other learners as well as with teachers and even meaningfully constructed or designed ‘content’. Convergent *transmission* assumptions perhaps inform many typical conceptions of e-learning in terms of ‘anytime, anywhere’ online access to information or content as somehow a means of extending or substituting for face to face learner interactions with teachers and other learners. Conversely, a new model of e-learning design is clearly needed to use social networking tools and purposes for effective and integrated educational purposes (Clark & Mayer, 2007). In sum, we believe that an effective *educational design approach* to use social networking tools and programs for e-learning purposes would also transform and recuperate the entire project and promise of all ‘e-learning’. That is, such an approach would also lead to a much better and more interactive use of the learning management system (LMS) model in place at present as much more than a repository for information and some add-on or substitute communication.

The revolution in new digital media perhaps involves educational design implications which lie in a better understanding and harnessing of a distinction between the three convergent pillars of both (transmission vs. constructivist) *pedagogy* and (Web 1.0 vs. Web 2.0 paradigms of) *technology* which inform e-learning generally as well as any face-to-face learning context – *information, communication* and *interactivity* (Richards, 2006). As discussed above, the emergence of digital technologies has also been a social and indeed knowledge revolution in terms of not only the access to information and means of extending human communications, but even in related notions of personal and shared identities in terms of principles of ‘interactivity’ where social and digital media converge (e.g. O’Hear, 2008). An interesting and interactive interface design can transform the menus and layers of an information architecture and related technological ‘infrastructure’. So too effective learning activity designs provide a reference for a principle of *interactivity* (learner-teacher, learner-content, and learner-other learners) similarly able to transform any teacher transmission of content.

Li and Bernoff (2008) have cautioned against the tendency of many organizations to use Web 2.0 tools and functions of social computing in ad hoc ways with little regard for the need for a more strategic plan of interaction. Advocating the importance of a ‘coherent approach’ to particular purposes and

audiences, they have developed a model of typical behaviours they call *social technographics* in order to assist organisations to strategically profile and plan for social computing. In this way they distinguish between key social roles and how these link to key Web 2.0 functions: creators (blogs, wikis, video archives), critics (comments, ratings functions), collectors (RSS feeds, bookmarks), etc. Whilst this model only has very limited application to educational contexts of either e-community or e-learning, it provides a useful reminder that any sustained failure to apply both a relevant strategy and design paradigm will obstruct the design and development of a sustainable model of practice.

Thus a primary aim of our project was to investigate the *direct* teaching and learning uses of new educational software or even of Web 2.0 tools or functions. This was an intentional aspect of the design strategy deployed. In part, this was because we were actually also interested in some of the direct educational uses of such tools and functions. We think that a key cause of the general failure of a Web 1.0 paradigm of e-learning was the tendency to view ‘online learning’ as merely an add-on or substitute for the face-to-face classroom (or conversely that learning is simply a matter of accessing ‘content’ or skills in a de-contextualized vacuum). Likewise we believe some people replicate this fundamental design error in terms of too directly imposing ‘social networking’ tools and functions upon the contexts and practices of formal education. A typical mistake of e-Learning 1.0 was to think that after using learning management programs as mainly repositories of content to replace or substitute for some degree of face-to-face engagement, the situation might be somehow redeemed by a similarly token or ‘add-on’ use of web forums or quiz functions in such programs. Likewise a ‘Web 1.0’-cum-‘transmission’ mindset can easily be applied to the use of new Web 2.0 tools for e-learning purposes (e.g. wikis as mere information repositories and blogs as an ‘add-on’ use of internet communications). To avoid this also requires educational design principles which are applied to encourage interactive learning in such terms as social networking, multimodal literacy, and active knowledge-building. An e-Learning 1.0 mindset might be able to initially deploy either an ad hoc or transmission approach to some of these tools in isolation. However, it will be difficult to achieve a sustainable and integrated use of social networking programs because, to put it simply, unlike learning management programs they are generally incompatible with a mere ‘transmission’ approach to learning. Conversely, those who are successful in achieving an effective e-Learning 2.0 design will also be able to use even learning management systems (LMS) in much more effective ways.

In short, we think many conventional approaches to using both e-Learning 1.0 and e-Learning 2.0 models make the mistake of being ‘upside-down or round the wrong way’ when it comes to effectively harnessing the educational possibilities of new technologies on one hand, and to encouraging more active, more interested, and generally more effective learning on the other. In any case, we think that it would be difficult and not sustainable to use ‘social networking’ tools and functions for directly educational purposes without first integrating this in terms of the important social aspects and also related personal interests. Conversely, we think that if we can just harness some of the interest and existing knowledge in such tools as Facebook and functions such as wikis then we can better link this to educational purposes, and better establish models and practices which might then support wider dissemination and more specific design principles. Thus in our project we recognized the importance of applying both a research and educational design trajectory which proceeded from the social and community-based foundations of human knowledge-building to both the more formal aspects of education and the more individualized elements of how information or skill *explanation* needs to be ever grounded in *understanding*.

Challenge #3: What are the educational design (and research design) requirements for appropriately investigating the educational and social implications of social networking programs (and related Web 2.0 functions) in higher education?

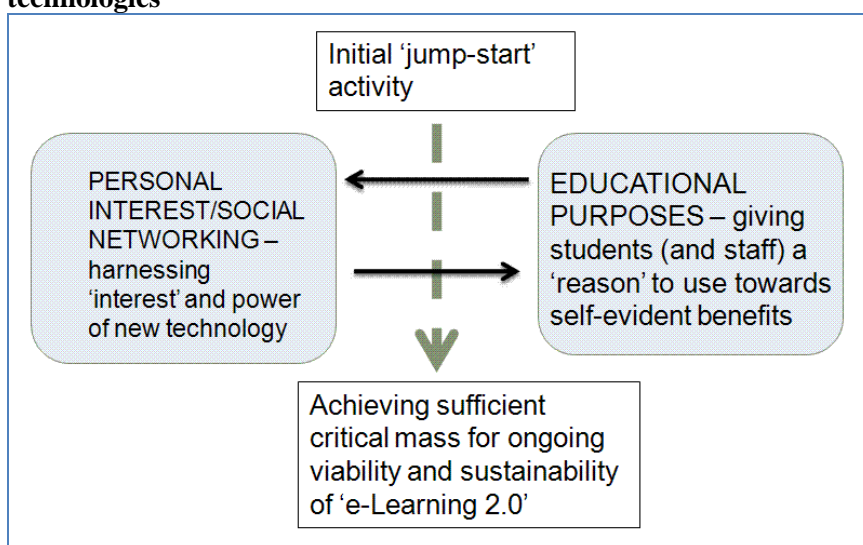
A faculty cohort of postgraduate research students perhaps represents a particularly useful context to explore the use of ‘online social networking’ (and related Web 2.0 tools and functions) in a higher education context for a number of reasons. In universities around the world, postgraduate research students often feel socially and academically isolated in their typical pursuit of individual research projects and theses or dissertations (e.g. Laurillard, 2006; Gough, 2008). This is even where their programs may involve elements of coursework or classes. Just as postgraduate research students represent an ideal focus for exploring the social role of ‘online communities’ to enhance ‘e-learning’ policies and technologies in higher education especially, likewise for seeking to introduce such tools and functions with academic staff (Courant, 2008). This is particularly so in relation to teaching staff who generally-speaking are often notorious for resisting and distrusting new educational technologies

in such terms being ‘digital immigrants’ in contrast to their ‘digital native’ students (Prensky, 2001). If effective contexts of student usage were already established then academics would be more likely to both introduce and provisionally explore some further educational possibilities for teaching and learning. In the area of postgraduate research student support, there are some particular additional opportunities and requirements for supervisors to interact with, provide feedback and even specific editing suggestions using the various general functions of a platform such as ELGG, or specific ones such as the wiki and messaging functions of this program.

The organizing methodology of the project applied a version of the ‘design case study’ approach to do ICT-focused educational (and other human centered) research for improved quality and innovation (Reigeluth & Frick, 1999; Reeves, 2008). As indicated earlier, such an approach is particularly useful for focusing on the ‘design requirements’ for better or more successful implementation of any general or particular educational innovation - and for also further refinement and development. This especially applies to educational innovations involving new ICTs (Reeves, Herrington, & Oliver, 2005). We will specifically link such an approach to the question of how to achieve and support a particular ‘community of practice’ in an online context especially, but more generally in terms of online tools to support better peer in universities in terms of how many postgraduate students feel isolated. Thus a key element of the design case study challenge in this case was to use online educational technologies to try and build a particular learning community (also, more generally a *community of practice*) in terms of both formal and informal aspects of human knowledge-building (Wenger, McDermott & Snyder, 2002).

If we had simply announced that we had set up an online community or made a social networking program available to our students then there was some likelihood that the ELGG platform would not have been used widely enough to achieve a needed *critical mass* of both initial interest and actual usage with our particular group of postgraduate research cohort. No doubt there would have been some students interested enough in developing their own online groups or even community, or to explore some new Web 2.0 tools. It is even conceivable that in time that this would become so fashionable that nearly all students would voluntarily participate and be proficient in specific aspects. Yet to ensure both widespread ‘ELGG literacy’ and also a useful foundation for successful implementation in a short space of time, some additional incentive or reason to use this in the initial stages was required. We therefore aimed to give our students some concrete ‘reasons’ to migrate to this new social and learning environment in terms of a range of supporting initiatives. The idea was that if we could get enough of the students to initially use the program then its intrinsic powers for social interaction and personal profiling would hopefully ‘kick in’ and then others would want to use it. In this way and as outlined in Figure 3, we strategized to more quickly and effectively achieve the needed critical mass to extend and refine constructive social and educational uses of this Web 2.0 program and associated tools.

Figure 3. A design strategy for also harnessing the education possibilities of Web 2.0 technologies



A number of the Masters students were also struggling to develop focused research designs, so we aimed to link a specific purpose for using the online functions and interactions to a related initiative.

This was the start-up of a regular fortnightly informal seminar series of ‘academic ideas-sharing’ we called the Chautauqua model (borrowing the concept from a 19th Century American movement of informal education). Our Chautauqua model involved students developing an applied research design based around a strategic set of focus questions in consultation with a mentor, and then exploring the potential of using this as an ‘emergent structure’ for further research inquiry or academic writing in a supportive and non-threatening context of additional peer feedback in both face-to-face and online formats. In this way, we hoped to productively assist our postgraduate students in their requirement to come up with a viable research topic and plan for academic inquiry and writing. Whilst we had developed this model earlier with a cohort of academic staff, our plan with the postgraduate research cohort was to use the social networking to allow programmed students to test and refine their ideas in an online ‘social networking’ context of support first. This would also provide an avenue for disseminating awareness about upcoming seminar sessions. The postgraduate cohort consisted of over two hundred postgraduate research Masters and PhD students – many who had never met and who were often not aware of peers doing research in similar areas.

To ‘jumpstart’ things, we simultaneously: (a) linked the initial program of online ideas-sharing to face-to-face seminars to a particular research method subject; and (b) invited the president and committee of a newly created faculty postgraduate research society to a demonstration of the program to be followed by a series of initial workshops for those interested. Quite a lot of interest was generated on both fronts. In the research methods class we used the pretext of an introductory activity and workshop to familiarize students with both the social functions and educational possibilities of the social networking program ELGG. The activity of developing a provisional version of what would become their Chautauqua seminar was conceived as a cooperative activity where they could customize a ‘group of friends’ to assist with this process. This allowed an introduction to and initial use of many of the key functions of ELGG in an applied context and in an authentic “just-in-time” learning mode – its internal messaging and forum functions, its blogging and wiki functions, and the particular social networking functions of both ad hoc groups and fixed groups.

This strategy worked well in an authentic modeling of how the program might be productively used and, at the same, developing a critical mass of interest. It stands in contrast to conventional learning management programs and an associated e-learning 1.0 paradigm which are not so conducive to such purposes. As outlined in Figure 2 above, our general plan was to build on and harness the possibilities of how a customized version of an open source platform like ELGG might more effectively and simultaneously cater for both personal and social interests on one hand, and a range of both informal and formal educational purposes on the other. Users can organize their ‘groups of friends’ and related functions into distinct categories of use, although we will need to further investigate more thoroughly how this distinction might be sustained. In this way we will also try to harness some related functions of the program which, like many popular social networking programs (*Facebook*, etc.), allow personal profiling to attract or invite social interaction and the sharing of items like personal photos as well as various types of files and documents. We are therefore projecting that an optimal strategy might be developed if: (a) some formal use of the program is planned to assist with achieving a critical mass of usage where sufficient numbers of the postgraduate research group start using and continue to use the program because ‘they want to’ (and not because they need to); and (b) that this critical mass of usage then in turn makes it feasible and sustainable to integrate more fully into formal learning in terms of the kind of e-Learning 2.0 paradigm discussed above.

Table 1. Sample online social networking activity: Exploring a potential research idea

<p>This activity represents an introductory stage in the process of developing an outline for an online seminar using the following suggested format: .</p> <p>(a) <i>A refined one paragraph abstract outlining a central ‘thread of inquiry’ in terms which may include a particular purpose, a projected main audience, and a prioritized set of key concepts</i></p> <p>(b) <i>One central research question (linking some particular issue/perspective/problem to somerecognizable ‘general area’ of academic or applied inquiry) and three related ‘supporting questions’</i></p> <p>Preparation: This will be an online activity using the research and learning e-community supported by the social networking program ELGG. You are asked to set up a ‘collection of friends’ for this activity consisting of the allocated members of your group. You will be posting both your initial and summary reflections in the ‘blog’ function, and providing feedback to your group members using the ‘comment’ option..</p> <p>Stages of introductory activity:</p> <ol style="list-style-type: none"> 1. <i>Initial individual reflection:</i> Provide a short outline of your proposed research idea and also describe how this is informed or prioritized by (a) some particular interest/objective/ purpose, and (b) a main intended audience (about 250-300 words)
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2. *Feedback to other group members:* You should use the COMMENT option after you have read the blog of each of your group mates. You can either comment directly to the initial blog or in light of other earlier comments by another group member. Your comments should either (a) seek a clarification or explanation about some aspect of your group mate's research idea, or (b) some other feedback or suggestions about possible ways of developing or refining this. Make your comments 'succinct' – we suggest 1 or 2 short comments to each of your three other group members.
 3. *Summary reflection:* After reading the comments of your group mates, reflect on (a) how you might refine your research idea in light of provided comments, and (b) how your research idea might now be begin to be converted into the format of 'one central focus question and three supporting questions'. Write a new 'blog post' (maximum of 450 words). **Assessment**
- Weighting: 15%**

Main assessment criteria: *Indications of a thoughtful or strategic approach to designing and developing an initial idea for possible research inquiry; relevance and effectiveness of feedback comments to group members, evidence of self-evaluation in follow-up self-reflection.*

Table 1 outlines a sample learning design activity. It was conceived in part to assist with 'jump-starting' a critical mass of using the social networking program set up for the research community. However, it also usefully indicates the kind of design strategy and thought that needs to go into giving students a reason to interact in useful and interesting ways in any kind of online educational format.

Social networking platforms such as ELGG as well as the more popular though limited online site versions such as Facebook were clearly not designed or conceived to be integrated into either higher education or the knowledge management of other kinds of organization. Just as some of the discrete Web 2.0 functions enfolded in ELGG such as Wikis, Blogs and social bookmarking can be integrated into educational settings, so too we believe that the organizational as well as educational implications of social networking platforms lie in the very individual profiling and portfolio functions which also facilitate productive collaborative activities and can especially support what are called authentic learning and assessment tasks in both formal education and continuing professional development. We support the dictum of Barret (2007) and others that digital portfolios are exemplary tools for promoting 'assessment for learning' and not just 'assessment of learning'. On that basis we are planning to extend the project to not only include: (a) a fully integrated use within all the various research, teaching, learning and administration activities of a particular faculty, but also (b) the convergent possibilities of using such programs to house a learning-assessment e-portfolio which can either complement or be converted into a professional digital portfolio (Richards, 2005b, 2010b).

4. FINDINGS

- **Social networking software and Web 2.0 functions have very important role to play in higher education for research and learning purposes but also organizational knowledgement and training in all organization**
- **However the main obstacle is inadequate or inappropriate design strategies and skills**
- **The project has identified key principles and requirements for more effective use.**
- **It has also found the open source software ELGG to be particularly useful for adaptation to Higher Education contexts**
- **This software has been demonstrated to be particularly useful for digital portfolio and e-learning purposes on one hand, and the development of online academic and research communities on the other.**

5. CONCLUSION

This report has discussed the efficacy, implications, and general appropriateness of using a design research approach to investigate the knowledge-building implications of social networking and other Web 2.0 technologies in higher education contexts. The discussion of the paper was initially framed in terms of a series of related challenges which revolve around the central questions of: (a) why the various educational and knowledge management functions of social networking and a general Web 2.0 paradigm have not yet been embraced more widely by higher education (and social organizations in

other formal contexts such as the corporate sphere); and (b) what is needed to pave the way to more productively harness the kind of fundamental and endless possibilities outlined in such reports as Franklin and van Harmelan (2007). The comparison between an emerging design research paradigm and the still dominant predictive or empirical model of research has been contrasted with some similar elements of a comparison or possible paradigm shift also between traditional transmission notions of learning and knowledge building and a new 'active learning' constructivist paradigm. This was extended in such terms as the professional reflective practitioner model and the action research prototypes of an emerging design research paradigm in the human sciences and beyond. In contrast to oppositional (e.g. postmodern) models of 'old vs. new' paradigms of learning and research, the paper argues that the design research paradigm is an inclusive framework which embraces a diversity of methods as well as the very paradigms and practices it is often seen in contrast to. We have suggested that it also provides a more sustainable as well as innovative basis for the human aspiration to universality in knowledge building.

6. RESEARCH OUTPUT

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- Richards C. (2011). Using a Design Research Approach to Investigate the Knowledge-Building Implications of Social Networking and other Web 2.0 technologies in Higher Education contexts, Sulaiman & Nor Aziah (eds.), *Instructional Technology Research, Design and Development: Lessons from the Field*, IGI Global Publishing
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- Richards, C. (2010). The connection between education and research in the future university: Towards a vision of how academic work can be more productive, interesting and 'win-win' all at the same time, Invited keynote address to the *Universiti Tenaga Nasional Teaching and Learning Conference 2010*, 24th June
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- Richards, C. (2009), *Critical Thinking For Increased Academic Publications*, Invited guest lecture, Zhejiang University, Hangzhou, China, 11 November, 2009.
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- Richards, C. (2009). *Using a Web 2.0 Paradigm to Design an Online Academic Research and Learning Community*, E-community Seminar, National E-Community Centre of Excellence, University of Kebangsaan Malaysia 18-19 February

7. HUMAN CAPITAL DEVELOPMENT

7.1 *Training and development of technician Arizan - who has now been employed by other faculties in UTM to provide technical support for ELGG.*

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APPENDIXES

\ Key terms and definitions

online social networking – The online functions and interactions of basic social networks of association and contact – also, what sociologists such as Castells call the emerging and global ‘network society’. The term is popularly associated with web-sites such as Face-book but involve a range of related terms and functions such as online portals, particular programs (such as Elgg), and the specific collaborative and sharing functions of particular Web 2.0 technologies (blogs, wikis, Rss feeds, social bookmarking, file-sharing, etc.).

Web 2.0 - The use of the term here refers to a fundamental paradigm shift in the way the World Wide Web is both used and perceived – a shift from the generally ‘passive’ transmission of information resources to a more interactive paradigm of customization, personification, collaboration, communication and what Berners-Lee calls the ‘Read/Write Web’. It thus includes some different popular uses of the term to refer to a range of particular Web applications, functions, and technologies on one hand, and on the other a dynamic, hybrid and even ‘postmodern’ approach to and convergent view of the information, knowledge and communication functions of the Web (hybrid mashups, associative taxonomies, hyper-mediation, etc.).

e-Learning 2.0 – Links or converges the concepts of ‘Web 2.0’ and ‘e-learning’ in terms of a new more interactive paradigm of e-Learning or learning using digital and online media. Such a paradigm or framework thus includes the technical functions and programs which go beyond a ‘learning management program’ model of online learning in relation to repositories of content and typically ad hoc uses of communication programs.

constructivist learning – Generally refers to a view that both cognitively and socially humans are innately active in their informal learning – and therefore formal learning should be framed to allow learners to organize the learning process as a related process of construction and scaffolding towards the emergence or building of knowledge.

educational design – At the micro level, educational design refers to and also links the pedagogical process of designing lesson content, syllabi and curriculum resources on one hand, and on the other the pedagogical process of framing and directly implementing learning interactions in distance or virtual modes as well as in face-to-face contexts. At the macro level, educational design refers to the integrating and strategic process by which the learning interaction is presented and guided by teachers in indirect as well as direct ways.

design research – The convergent definition of design research refers to a general methodology which makes explicit and structured the process of designing and developing solutions to research problems. Also including related terms such as formative research, action research and design experiments the term design research has particular application to human centred research where the design process is emphasized (education, engineering, information technology and the ‘design sciences’ more generally). Above all else the term implies and infers that the key to all research lies in the overall and strategic planning of the procedures and processes of both practical and theoretical inquiry and problem-solving – in other words, how the methodology of research design precedes and includes any chosen methodology of evaluation and related methods of data collection and analysis.