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## **The Ultranet as a Future Social Network: An Actor-Network Analysis**

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### **Abstract**

*Community development is seen as an increasingly important role for government and the potential of Web 2.0 tools to aid in community development seems obvious. An experimental technology relating to e-government is being introduced by the State Government of Victoria, Australia. This involves a closed social network called the Ultranet which is intended to support communities of parents, teachers and students in State schools. As the Ultranet has only recently come into operation, this paper cannot present an analysis of its operation, only a theoretical investigation of its possibilities. In the paper the Ultranet is seen as an innovation, and handled accordingly. An Actor-Network approach is proposed as a potential analytical lens for researching the Ultranet, its application and its social impact. The paper also proposed use of actor-network theory to identify how the Ultranet might be shaped by future use, and how it could be used to identify problematisations of this new network and the actors that it seeks to involve and hence to identify potential translations of the innovation. Analysis of these potential translations allows the creation of a theoretical framework that permits a sensible review of the introduction of the Ultranet. The framework allows for the possible production of communities of practice amongst teachers, a 'door' for parental involvement as opposed to the 'windows' currently common in education, with an ideal that involves a Web 2.0 supported community where all parties (students, teachers, resources provided by the Departments of Education, parents and the local*

community) contribute. The paper suggests that perhaps this is the future of safe, secure social networking for schools.

**Keywords:** Research paper, Web 2.0 technologies, Ultranet, future social networking, social interactions, Internet security, eLearning 2.0, eEducation, schools, innovations, actor-network theory.

## **1 Introduction – Web 2.0 Technologies in Education**

In recent years Web 2.0 technologies have become a popular avenue for social interaction, and applications such as Myspace, Facebook, Skype and Twitter are becoming major channels of communicating for many people, particularly the young. Many students now communicate with friends and family using these technologies that act beyond the traditional boundaries of space and time. While many students spend much of their spare time posting information on Facebook and Twitter about every possible aspect of their lives, often their parents and teachers look on without a full understanding of the social consequences of these technologies. Many are concerned that children and youth are vulnerable to undesirable social influences, such as misinformation, inappropriate content and relationship when exploring the loosely regulated virtual world, and banning these social networking sites is standard practice in Victorian primary and secondary schools. Some schools, however, have started using wikis and blogs as well as YouTube to enhance student learning through new technologies. Blogs have been successfully used for diarising and journal writing while wikis are being utilized by teachers to facilitate collaboration and cooperative knowledge construction. However there are several significant issues that have, to date, not been resolved when using Web 2.0 technologies and are hindering widespread adoption of these online resources. Several questions are currently being debated in education circles around the world:

1. How do we protect privacy and confidentiality of personal information and educational content that has been individually or collaboratively created using these new avenues of communication and social interaction?
2. How do we manage issues related to copyright and intellectual property when sharing digital content in schools?
3. How do we protect children and youth from possible psychological, social and legal risks?

Several years ago, partly in response to these questions, the Victorian Government conceived an online social networking system, the Ultranet, for connecting school communities using web-based technology. The Ultranet, which was launched in September 2010, will support knowledge sharing across Victorian government schools and also provide facilities for building social networks of parents, teachers and students as well as for curriculum delivery and online learning and teaching (Department of Education and Early Childhood Development, 2010e). The Ultranet aims to address some of these problems by providing a safe and protected environment for interaction,

exploration and collaboration among students, teachers, parents and the wider community.

## **2 The Victorian Education Ultranet**

The Ultranet is the result of work by the Victorian Department of Education and Early Childhood Development (DEECD), beginning with a report (Griffin & Woods, 2006) of a “proof of concept student-centric ICT system, called Students@Centre, to support online teaching and learning, curriculum delivery and knowledge management in Victorian government schools.” (Department of Education and Early Childhood Development, 2010a). This resulted in design and construction of the Ultranet, which DEECD describes as “a student centred electronic learning environment that supports high quality learning and teaching, connects students, teachers and parents and enables efficient knowledge transfer.” (Department of Education and Early Childhood Development, 2010c). The \$60 million Ultranet, which is essentially an extended intranet/extranet was rolled out to all Government schools in September 2010 when the Victorian Minister for Education noted that: “The Victorian Government is committed to giving every child every opportunity to experience the full potential of online learning, collaboration and information sharing” and described the Ultranet as the “Victorian Government’s biggest investments in information and communication technology in our public education system” (Pike, 2010).

The Ultranet has many of the features of a business extranet in that it is closed to people outside the Victorian government school community and requires a username and password to gain access. One major difference to a business extranet, however, is the Ultranet’s large size: its users will include over 540,000 students (and their parents) in 1,555 government schools, along with their 40,000 teachers (Australian Bureau of Statistics, 2010; Department of Education and Early Childhood Development, 2010b).

The Ultranet’s underlying technology is based mainly on Oracle and it incorporates various Web 2.0 technologies. The Ultranet is thus a closed, secure place on the Internet, accessible by students, teachers and parents/guardians from the school community. It offers a space that students, parents and teachers can connect to anywhere, anytime they have access to a computer. The Ultranet has been designed to allow students to access personalised learning activities and to keep an ongoing record of these activities. It will allow students to collaborate and communicate with students from their own school and with students from other Victorian government schools. They will be able to create learning portfolios and use online communication tools such as wikis, blogs and discussion boards. Teachers will be able to create curriculum plans, collaborate with other teachers, monitor student progress and provide student assessment. Following on the success of the nationwide Learning Federation Project, (Ministerial Council for Education, Early Childhood Development and Youth Affairs, 2001) the aim of which was to create intellectual capital by introducing an innovative digital curriculum and content management system, the Ultranet has been designed to support new paradigms of learning of teaching, enabling knowledge construction, personalised learning and collaboration at a local and global level. The Ultranet will also provide support for teachers to collaborate and to share professional practices and

interests with colleagues from around Victoria by enabling more effective approaches to teacher professional learning and development. Teachers will be provided with just-in-time learning opportunities, via innovative online learning resources as well as with instant access to professional networks which will facilitate the sharing and dissemination of novel ideas and leading pedagogical practices. The Ultranet will also assist parents in harnessing the benefits of flexible access to student information and school resources that will help them keep up-to-date with their child's learning. This dynamic profile of their child will include attendance records, timetables, test results and learning progress, homework activities and tasks and teacher feedback, so providing another way for parents to support their child at school. It is expected that these features of the Ultranet will strengthen and extend parental involvement in schools and will result in richer more holistic and better negotiated approaches to student learning.

Clearly security and privacy will be very important issues here. The Ultranet website (Department of Education and Early Childhood Development, 2010c) notes that this is a 'closed community' with controlled access and that it has a very specific educational purpose as everything that students can do on the Ultranet is intended to support their learning. It lists the following measures to ensure security and privacy protection:

- *“to access the Ultranet, authorised users must log in with a secure, complex password*
- *there are rules around who can access what information, and the types of users that can access each type of ‘space’ within the Ultranet*
- *no anonymous postings are possible in the Ultranet – all postings are logged and audited*
- *all learning communities on the Ultranet must be moderated by a teacher*
- *all users can report inappropriate content*
- *in addition to the filtered internet service available in each school, the Ultranet also contains filters for bad language.”*

(Department of Education and Early Childhood Development, 2010c)

The Ultranet has many of the features found in learning management systems, such as Blackboard, but also has other features intended to involve parents by informing them of their child's education and about the school they attend. The documentation provided to students, teachers and parents for the Ultranet speaks of three different types of entity that they will need to understand to use it. The Ultranet makes use of **Spaces**, which are really mini-websites, **Icons** that help you to get to the appropriate Space, and **Applications** that “bring the Space to life”. Each of the different types of specially designed ‘Space’ is intended to allow different information to be accessed and different learning activities to be performed. Each Space is classified by its accessibility into one of the following categories:

- **Me Spaces** are private spaces accessible only by the owner
- **We Spaces** are shared spaces that can be seen by those with permission to be in that space
- **See Spaces** are public, open access spaces that can be seen by the whole world.

The Ultranet will be released in two stages and consists of the following Spaces, all of which (except Learning Tasks and Learner Profile) will be available in Release 1:

1. **Home** is a personalised page for students, parents and teachers where they can see school or community notices and where students and teachers can add their favourite applications. (This is a *Me Space*.)
2. **eXpress Space** is a personal *We Space* for students and teachers to capture, share and reflect on their learning. The student eXpress Space includes spaces for their Learning Portfolio and Learning Goals.
3. **Design** is a *We Space* where teachers can plan, create and collaborate with colleagues within and across schools and design curriculum and student learning activities. This space is not available to students.
4. **Community** is a *We Space* where students, parents and teachers will find information about school news and events and where they can be involved in school-based groups, clubs or activities.
5. **Collaborative Learning**. In this *We Space* students can take part in online learning activities set up by their teachers using a range of Web 2.0 tools including blogs, wikis, message boards and polls.
6. **Learner Profile** is a *We Space* where students, their parents and teachers can view a detailed profile of their individual learning progress. Information about each child will build up over time, creating an ongoing record. (Only available in Release 2.)
7. **Learning Tasks**. Here teachers can plan, deliver and assess learning activities, and students can view and submit learning tasks. (This is a *We Space*, only available in Release 2.)
8. **My Content** is a space where teachers and students can store and search for personal, school and quality-assured digital learning resources. (This is a *We Space*.)
9. **Connect** is a *See Space* that allows students to find reviewed websites and online activities.

(Department of Education and Early Childhood Development, 2010d)

The Ultranet aims to provide a safe and protected environment for interaction, exploration and collaboration among members of this community. *Spaces* provides personalized pages for students, parents and teachers through which they can securely access and store digital content and can interact with each other without compromising the privacy or confidentiality of information. Spaces uses Web 2.0 technologies by incorporating wikis, blogs, instant messaging and conferencing to allow for both synchronous and asynchronous information exchange and collaboration between the various stakeholders. Drawing on the power of Web 2.0 technologies, parents can use a number of Spaces such as Home, Learner Profile and Community to stay informed about their children's school performance as well as to be involved in various groups and activities. It is hoped that these new ways of informing and engaging parents will strengthen parental involvement in schools resulting in improved student outcomes and stronger partnerships between schools and communities.

### 3 Actor-Network Theory

Any study of the Ultranet will, of necessity, involve investigating the contributions and interactions of human actors but also of those of many non-human actors including the technology itself. It is thus important to think of the Ultranet as an actor and not just an artefact. Actor-Network Theory (ANT) was designed as an approach to socio-technical research that would treat the contributions of both human and non-human actors fairly and in the same way (Callon, 1986b). ANT investigates the construction and maintenance of networks made up of both human and non-human actors and attempts impartiality towards all actors in consideration, whether human or non-human, and makes no distinction in approach between the social, the natural and the technological (Callon, 1997; Latour, 1993; Tatnall, 2009; Tatnall & Gilding, 1999). ANT considers the world to be full of hybrid entities containing both human and non-human elements and allows neither technological nor social determinism to hold sway. In this socio-technical order nothing is purely social and nothing is purely technical.

The first step normally undertaken in an ANT research investigation is to identify the actors involved, but first we should consider what entities we need to think of as actors. Law (1987) describes an actor as any human or non-human entity that is able to make its presence *individually felt* by other actors, and so this term is applied to any entity that has an effect on the situation being examined. An actor is made up *only* of its interactions with these other actors (de Vries, 1995) and Law (1992) notes that an actor thus consists of an association of heterogeneous elements constituting a network (Tatnall, 2010). Callon (1986a) also argues that an actor can also, at times, be considered as a *black box* as we do not always need to see the details and operation of the network of interactions that is inside it. The Ultranet can thus be seen as an actor or perhaps as a network of actors.

An Actor-network analysis involves the following steps:

1. Identify as many (human and non-human) actors as possible
  - i. Various humans, organisations and technologies can be considered as actors
  - ii. When ANT speaks of the technology acting in some way, this action can be traced back to an origin in the actions and interactions of the components of its network (often human)
2. Proceed to interview the human actors and to investigate the non-human actors
3. Investigate networks of associations and interactions
4. Build up a general picture of the relationship between the various actors.

## 4 An ANT Framework for Investigating the Ultranet

### 4.1 Innovation: Actors, Networks, Interactions, Translations

Just because some a new technology has become available does not mean that it can be assumed that organisations or individuals will immediately want to adopt or use it. Even

if an organisation does adopt a new innovation, it cannot be assumed that it will be used in the way that its proponents intended – ANT suggests that usage is emergent and works to make visible the unintended consequences of this use. As the old saying goes: ‘*You can lead a horse to water but you can’t make it drink*’.

Actor-network theory sees the process of innovation in terms of *translation* from one state to another and Callon (1986b) suggests that the process of translation has four aspects or “moments”: Problematisation, Interessement, Enrolment and Mobilisation. These can be described as follows:

1. In **problematisation**, one or more key actors attempts to define the nature of the problem and the roles of other actors so that these key actors are seen as having the answer, and being indispensable to the solution of the problem (Tatnall, 2010). In other words, the problem is re-defined, or *translated*, in terms of solutions offered by these actors who then attempt to establish themselves as an “obligatory point of passage” (Callon, 1986b) which must be negotiated as part of its solution.
2. In the case of the Ultranet it is unlikely that all the actors will see its use in the same way, and some actors will want to try to persuade others that their view of its operation (- their problematisation) and use is the one that should be adopted. These key actors will then attempt **Interessement**, which is a series of processes that attempts to impose the identities and roles defined in the problematisation on the other actors. They will attempt to convince students, parents and teachers to make what they consider to be ‘good use’ of it. How successful they will be only time will tell.
3. **Enrolment** will then follow, leading to the establishment of a stable network of alliances. For enrolment to be successful however, it requires more than just one set of actors imposing their will on others; it also requires these others to yield (Singleton & Michael, 1993).
4. **Mobilisation** finally occurs as the proposed solution gains wider acceptance (McMaster, Vidgen, & Wastell, 1997) and an even larger network of absent entities is created (Grint & Woolgar, 1997) through some actors acting as spokespersons for others.

Although somewhat at odds with the original ANT as proposed by Latour, Callon and Law, we suggest that it is now possible to devise a research framework based around the use of ANT in prognostication of innovation adoption. Such a framework would include the following steps:

1. A theoretical actor-network analysis of an innovation: identify potential actors and postulate potential relationships from the known characteristics of these actors.
2. The outcome space of this analysis is a set of potential translations of the innovation for the purpose of understanding the ways in which the assemblages of actors and their interrelations with the Ultranet are interpreted.
3. This outcome space then forms the basis of review of the adoption.
4. The adoption is monitored for evidence of the emergence of translations.



5. Simultaneously the identified relationships are monitored for evidence of strength (strong positive or negative reports from sampled actors).
6. The innovator (the Victorian Government and DEECD) is appraised of the tendency of any given translation to emerge and informed of the relevant relationships that might be encouraged or discouraged so as to guide the eventual outcome.

## **4.2 Actors**

At this stage of the development of the Ultranet project it is possible to identify the human actors: State Government policy makers, Students (over 500,000), Teachers (about 40, 000), Parents (about one million), Principals of Government Schools (about 1,500), School Councils, Teacher Educators, Pre-Service Teachers and the Ultranet Developers. There are non-human actors as well: Broadband Connections, Web 2.0 technologies, Schools, School Computers, Home Computers, the Victorian Institute of Teaching and Learning (VIT), the emerging National Curriculum, policies, privacy laws, DEECD, the Victorian Government and the technology of the Ultranet itself.

Many of these actors can probably, in fact, be broken into finer groupings. For example Teachers may devolve into such actors as: Teachers who want to use the Ultranet to promote their own agenda, Teachers who make limited the use of the Ultranet, Teachers who work to belittle the value of the Ultranet or Teachers who are overenthusiastic about the Ultranet to the extent that they neglect other aspects of teaching. Such sub-groupings are hypothetical at this stage, but something like this is likely to emerge as the Ultranet develops.

Actor-Network Theory usually determines the nature of these actors and their views of an innovation by interview or examination of documents. We should be able to identify possible views as hypothetical responses to a new innovation and use these to attempt to identify potential translations through likely problematisations. For example a parent may be a person who wants to control the education of their children by direct intervention. Parents in Australia often do this by choosing a school, by volunteering for committees and by active approaches to the children's teachers. For this type of parent the Ultranet could be seen as a new avenue to control the experiences of the child. Other parents could see the school and its many professionals as those most qualified to provide the educational service. These are the parents who only volunteer for working bees or are completely absent from most school contact. They would see the Ultranet as a way in which the teachers could keep them informed of what is happening in the school: the opposite direction of information flow from the former group.

Non-human actors often have the most sway over the eventual translation through their agency. Many educational systems experience periodical forces towards a uniform curriculum, sometimes right down to daily activities. A National Curriculum Statement that allows no local changes would constrain the Ultranet to only those translations in which no input to the system could result in a change in the curriculum.

### 4.3 Networks

It is, however, not the actors themselves that are important, but their interactions with each other. In ANT terms a network is an interconnection of actors (both human and non-human) that shows these interactions. To determine the interactions that do lead to dominant translations requires data gathering. Even before the innovation has been fully implemented we can still identify potential interactions and the translations implied by those interactions should they become actual.

It would be possible for a National Curriculum to reinforce teacher's belief in the right of professionals to set curriculum detail. This interaction could again be reinforced by the software being designed to make it difficult for conversations between parents regarding curriculum to be unedited.

Alternatively a possible network could be formed at the school level where teachers, parents and students are encouraged by the software to make the curriculum local and living. This type of interaction has been seen in indigenous communities where traditional education informs schooling.

### 4.4 Possible Translations

Using an ANT analysis we can see that the Ultranet could undergo a number of intended and unintended translations. For example, it could hypothetically be translated into any of the following or other, perhaps more subversive, forms:

1. **A platform for monitoring student progress** (within schools or between home and school). Teachers will be able to learn more about individual students through systemic information collected by other teachers. This will allow for more effective personalisation of the learning process and catering for student diversity. A downside is that teachers may be influenced by cognitive bias, described by the Halo Effect. This may have serious ramifications related to personal privacy and privacy of information. (Actors: Ultranet, students, parents, teachers.)
2. **A vehicle for teacher collaboration and professional development/learning.** The Ultranet may provide an online platform for sustainable teacher professional learning, allowing teachers to collaborate, share leading practices and access professional development programs without traditional space-to-time mappings. It could also provide teachers with opportunities for just-in-time professional learning, trouble-shooting and technical support. The problem here is that teacher education institutions are not considered to be part of the password-protected networks which limits the agency of these actors to successfully prepare for their future workplace by not having access to the Ultranet. This has been the case with other Victorian Government initiatives and this anomaly should be addressed. (Actors: Ultranet, teachers, schools, school leadership(s), teacher education institutions, VIT, pre-service teachers, teacher educators.)
3. **More active involvement of parents in the lives of schools.** Parents, students and teachers could see themselves supported by the Ultranet to create a community wide education institution. Students would come to see their education as part of their whole life and family rather than a disjoint time during semesters. This can be problematic as it can result a reduced face-to-face interaction between parents and schools, at the same time it offers new avenues for flexible partnerships between

teachers and parents, providing opportunities for real-time monitoring of student progress, instantaneous feedback, better alignment of goals and aims between families and teachers, which has been one of the major obstacles to effective collaboration between schools and parents. Varied levels of digital literacy could also cause concerns as parents with lack of digital skills may find it difficult to engage with the innovation. This is likely to have a number of adverse effects on the adoption of the Ultranet and could result in widening the gap between those who have and those who have not, initiating further inequalities in the acquisition of social capital and access to digital citizenship.(Actors: Ultranet, parents, teachers, communities.)

- 4. Social networking and new learning platforms for students.** The Ultranet offers a stable powerful technical infrastructure providing opportunities for creating effective local and global networks of learners that can communicate, exchange information and collaborate in augmented realities (real and virtual), allowing for new learning and teaching practices to emerge. The Ultranet could successfully serve this purpose and become a world's leading practice in providing students with an innovative, multidimensional eLearning environment. It could provide students with access to experts and learning platforms worldwide and have the potential to revolutionise the learning space deleting the traditional boundaries of classroom walls. This will also change the traditional classroom dynamics and roles, giving students more autonomy, more opportunities for self-directed learning, peer tutoring, peer and self-assessment. It will also allow students to publish their work worldwide and to establish a track record of excellence. It is unlikely that students will bring in the personal dimension of social networking because of the closely monitored nature of the Ultranet. This translation also carries the possibility that educational direction could be lost. Google has a very large resource for learning, but little in the way of structure and curriculum. (Actors: Ultranet, students from schools in Victoria and all around the world.)
- 5. Community networking for community directed education.** The Ultranet has the capacity to create a social network for all those interested in the local schools. Parents, teachers and students could be enabled to take an active role. Educational decisions, resource allocation, individual student progress and teacher employment could be the subject of community discussion and decision making. The idea of communities deciding what happens in the detail of schooling forms the basis for several independent schools in Victoria. Some of these matters have theoretically been devolved to local communities in State Schools, but the practicalities of democratic decision making normally preclude all but a select group doing the decision making. The Ultranet could provide the platform for community directed schooling. This again raises the issue of digital divide. Communities poor in resources and those with low expectation of schooling could suffer disadvantage over a system with minimum standards.

## **5 Conclusion**

We anticipate that the Ultranet, as a technological innovation, will facilitate the emergence of new social networks that will become self-organised consumers of information as well as constructors of new content through their capacity to access,

nurture, and maintain information and knowledge flow. Parents and community stakeholders will be part of these networks, that will be safe and secure to use and that will enable them to communicate and collaborate with teachers, other parents and community stakeholders in order to gain a better understanding of what schools are trying to achieve.

The Victorian Schools Ultranet has only just commenced operation, but can be seen to offer many possibilities for building social networks of parents, children and teachers and informing parents about what their children are doing at school and about their progress. It also offers possibilities for useful social interactions of many types between all members of school education communities.

What actually happens as a result of these potentials is yet to be realised. We know from studies of innovation that the outcome of any new idea is seldom what was planned for or expected. The actors in any situation will select from the potentials and impose a view between them of what is useful in the innovation.

In this paper we have proposed that actor-network theory can offer a useful framework for investigating the Ultranet, and its related social networks as it develops further. This technique allows us to postulate further on how it will develop. The future will involve interactions between people and technology (human and non-human actors). Which interactions become important and how the innovation is translated can be effectively monitored if we have an idea of the range of translations. We do not suppose that the future is predictable but actor-network theory offers an appropriate framework for its analysis. By proposing actors, their interaction and drawing possible translations we develop a framework around which research into the progress of an innovation can be framed. In this case we have identified five different translations that are possible for the Ultranet. The next stage, as the Ultranet evolves in use, is to gather the data that an ANT analysis normally involves.

It will be interesting to see, whether this development points the way towards the future of safe, secure social networking for schools and education communities. Will it offer the possibility of contributing to future new patterns of learning, collaboration and social interaction?

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