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Web 2.0 Technologies in Remote Community Schools in Western Australia

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Abstract: This paper explores the extent to which educators are adopting Web 2.0 technologies, particularly in remote and regional schooling. A survey was undertaken of teachers in remote community schools in Western Australia focussing upon their use of Web 2.0 technologies in their teaching and learning programs. The results present a number of scenarios that differ from the main stream of belief with regard to both Generation Y and Generation X use of Web 2.0 Technologies suggesting that contexts of learning have a major impact on the integration of such technologies in the classroom and questioning the salience of generational differences in their use.

Introduction

Like many hyped technologies, the concept of Web 2.0 is prone to a rhetoric that may not be matched by the reality of its use. One commonly accepted belief is that Generation Y are using Web 2.0 technologies with great vigour and this may be the case on a social level but is not the case when considering such technology use in classrooms. This is also the case for educational institutions (Crook 2008).

Web 2.0 is defined by a range of characteristics such as continually updated content, aggregated data and a move from publishing to participation (O'Reilly, 2005). The social orientation of a participatory web has particular relevance to a broad range of 'real world' communities such as those found in remote areas of Western Australia and in particular remote area schools. In a context defined by its isolation, it could be argued that if educators are not engaging in Web 2.0 technologies they are potentially disenfranchising learners from rich and diverse communities of learning. With a lack of existing empirical data, particularly in relation to Web 2.0 Technology use by teachers in remote community schools in Western Australia, there is a need to explore how Web 2.0 can best be used to support the needs of remote schooling.

The purpose of this research was to question the extent to which Web 2.0 technologies, if any, were actually being used in remote schools in Western Australia. If such technologies were being used then it was also important to gain an understanding of the pedagogical standpoint taken by teachers incorporating Web 2.0 technologies. Conversely, if such technologies were not being used in classrooms, then it was also vital to gain an understanding of the pedagogical beliefs of those teachers not engaged in their use.

Research into this area needed to give consideration to the physical nature of delivering e-learning experiences to students in remote learning communities for such constraints could greatly impact on the implementation of Web 2.0 technologies within classrooms. It would be very difficult to implement a Wiki experience for students for example, if Internet access was unavailable.

This paper focuses upon four main areas. The first relates to information about educators' knowledge of what is meant by the term Web 2.0. The second focus is on the extent that teachers in remote learning communities are aware of Web 2.0 technologies such as Blogs, Wikis etc. The third identifies the constraints placed upon teachers in remote communities when using information technology tools and the fourth to discuss how Web 2.0 technologies can be promoted as a tool for teaching and learning in remote learning communities.

Literature Review

The term Web 2.0 has been widely used by many and at this point in time there appears to be multiple interpretations as to what it really means. This premise is supported by McLoughlin (2007, p. 665) and Alexander; the latter stating that the term Web 2.0 is 'audacious' and that it 'assumes a certain interpretation of Web history, including enough progress in certain directions to trigger succession' (Alexander, 2006, p. 9). Alexander (2006, p.9) goes on to claim that few can agree on even the general outlines of Web 2.0, but what is agreed upon is that Web 2.0, is manifested by technological tools such as Blogs, Wikis, podcasts, RSS feeds etc. and facilitates greater social participation on the web. Shirky (cited in McLoughlin 2007, p. 667) refers to such tools under the banner of Web 2.0 as social software or 'software that supports group interaction'. Individuals can interact in a web space by adding and editing information.

Perhaps, therefore, it is less important to focus on what is meant by the term Web 2.0 (Crook, 2008; Rogers, 2007) than what it can offer. Alexander (2006, p. 8) agrees and states that 'Ultimately, the label Web 2.0 is far less important than the concepts, projects and practices included in its scope'. Rogers (2008) emphasises the potential of such technologies in promoting collective intelligence through collaborative creation and reconfiguration of rich content. This collaborative approach to content creation and use allows the promotion of digital literacy and identity development through informal learning (McLoughon 2007).

Numerous studies have been undertaken relating to how students interact with Web 2.0 technologies (Harris et al, 2009; Parker et al, 2007; Law, 2009). One survey, undertaken by the PR Agency ZPR (Germany) in Safran (2007) found that only 6% of Germans aged between 16 and 65 know the term *Web 2.0*, 16% are members of an online community, 14% use podcasts and only 9% read web logs. The results were higher for users aged 16 -20 year olds, in which case 42% are members of an online community and 35% interact with Blogs regularly. These statistics present a picture that suggests that Web.2.0 technologies are not embraced by the majority of individuals in at least one country but could this also be the case for others? Safran et al (2007) also undertook research into the use of Web 2.0 technologies by students and teachers in India and the UK, finding that several aspects of Web 2.0 technologies were used only by a minority of students and teachers. Wikis for example were used primarily for gathering information (Wikipedia) rather than for social interaction, running counter to the community-based notion of Web 2.0. Safran concluded that teachers may have a long way to go before integration of Web 2.0 technologies become a part of the everyday. Similarly De Boer (cited in Collis, 2009) summarised an international survey literature of Web 2.0 technology use in education, noting that such technologies were primarily being used for logistical rather than learning processes.

Sanchez (cited in Collis 2009) pointed to resistance to change by teachers as one of the primary impediments to the uptake of Web 2.0 in learning, identifying the lack pedagogical models and insecurity as being two possible reasons. The teachers' own sense of identity as purveyors of knowledge suggests Donald (2009, p. 181) may become destabilised as a result.

Such issues may be endemic to the profession and a result of ingrained beliefs and knowledge (Donald, 2009). Ultimately if teachers do not have belief in the potential of technology in the classroom then it simply will not be used. Research of science student teachers in the UK has found that while they can see the potential of the Internet to motivate learners, the use of it was limited. The teachers felt that technical issues remained a concern and perceived a need for support for both teachers and students in understanding the pedagogy of the Internet as well as technical operational skills (Twidle, 2009).

While this study took place in the UK, it poses the question about whether these issues are similar or even exacerbated in a remote Australian setting. Collis (2009) supports Sanchez stating that teachers are not using Web 2.0 Technologies to their fullest potential in the classroom. Kirshner and Selinger in Twidle (2006, p.209) suggest that 'If the Internet is an information superhighway, then teachers just might be the road-kill on the asphalt of the information superhighway'. Although, at first recognised as a tongue-in-cheek statement, the resonance of such a statement warrants investigation.

Methodology

The exploration of knowledge of Web 2.0, its technologies, the constraints on their use in remote and regional settings and how best to promote them involved collecting data from educators. Surveys were undertaken by a volunteer group of educators in the Pilbara and Kimberley Regions of Western Australia. The educators teach in schools within these regions known as 'Remote Community Schools'. A Remote Community

School, according to the Department of Education and Training (2009), Western Australia is defined as a school that is located in isolated communities with a predominantly Aboriginal population. For a school to be classed as remote it must meet certain criteria that relate to distance from major centres and degree of difficulty in accessibility. At the time of the research there were 42 remote schools in Western Australia with a combined staff of 200 teachers.

To ensure a broad range of responses, educators were sequestered from schools across both the Pilbara and Kimberley Regions, from Onslow in the west to Oombulgarri in the east. School Principals were contacted by either telephone or email and asked to participate in the research. They were also asked to have their staff participate on a voluntary basis. It is important to note that there was no defined age range or experience level of participants in the study. It was important to gain responses to research questions from teachers in their first year of teaching to those in their 30th year of teaching. This could also be said for teachers who were for example, mature in age but in their first year of teaching. It was envisaged then, to gain an informed view from the research questions, that there would be a diverse age and experience range of participants. With reference to the degree of technological background that participants have, this again was not essential for individuals to participate in the research. Again, to procure useful responses to the research questions it was not imperative that participating teachers have any knowledge of information technology at all.

The research questions were answered through the use of two data gathering instruments - interview and questionnaire. An online questionnaire was used to gather a great deal of responses from a broad range of participants in a short period of time and within budget. It also implied anonymity and the participants could complete the questionnaire at a time that best suited them. The interview approach was used as it could elicit responses, such as emotional responses, offer immediate clarification of questions and hopefully secure greater in-depth answering.

The online questionnaire was also used as the basis for interview questions and was pilot tested by five teachers to reduce the risk of potential misunderstandings. Following this, inconsistencies or errors were corrected. Within the questionnaire, Likert Scales, open ended and closed questioning approaches were used to gather information. The data collection tools addressed each of the four research concepts of the extent of teacher awareness of Web 2.0 technologies, the use of technology in the classroom, the issues and constraints placed on their use, and their value to remote learning communities. Seventy five surveys were sent to volunteer teachers and 56 responses were received. A further fifteen teachers from a variety of remote communities were contacted by telephone and asked to undertake a telephone interview and 12 responded.

Findings

Of the 68 participants (interview and survey) 32% were male and 68% female, with the majority of teachers in remote communities having 1-10 years of teaching experience (Figure 1)

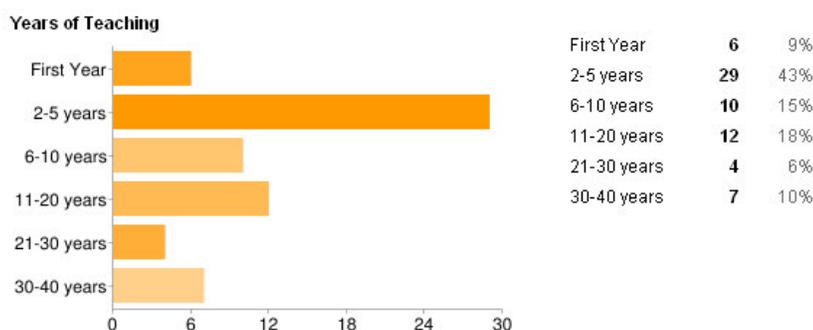


Figure 1: Years of Teaching Service

When comparing male and female teaching experience to that of remote teaching service generally, of all males 77% were in their first five years of remote teaching compared to 71 % of females. In the remote service group 6-10 yrs only 8% were female and 13% male. In the 11 plus years of experience in remote schools females amounted to 11% compared to 4% of males. Of the 46 females surveyed 7 teachers had been in remote

schools for 11 plus years compared to one male out of the 22 surveyed. The male representative had been teaching for 30-40 years and had spent 22 years in remote communities.

Awareness of Web 2.0

84% of participants did not know what the term ‘Web 2.0’ represented although they were aware of many of its tools. Email was used significant by the majority of participants and teachers were aware of Blogs and Forums but this was not the case with Wikis. Wikis were being used by very few participants whereas more were using Forums and Blogs with the latter being the most popular and mainly for communicating with family and friends. When comparing teacher experience to the use of Blogs, Wikis and Forums, similar numbers can be found using and not using these tools across the groups. This was not the case for Instant Messaging. Instant Messaging was used significantly more by participants but in relationship to teaching years of experience it was mainly used by participants who were in their early years of teaching.

27% of respondents used Social Networking Sites frequently, with the majority of teachers using it to keep in touch with family and friends. One interesting finding was that 24% of participants had never used a Social Networking Sites. Some teachers did not use Social Networking Sites at all either due to access or because they have no need of them. All Participants in the 30-40 years of teaching experience range and 38% of the 11-20 years are found in the 24% group strongly suggesting that teachers in their early years of teaching were more inclined to use Social Networking Sites then those who are more experienced.

The use of computers and Web 2.0 in the classroom

In a classroom setting, the actual use of technologies was much more limited. While 83% (56) of teachers either agreed or strongly agreed that computers and the Internet should be an integral part of everyday school life, the fact that 4% disagreed is intriguing (Figure 2). It can be noted that the teachers who belong to the Disagree group were from the 2-5, 11-20 and 30-40 teaching year experience group. The teacher who strongly disagreed was in the 11-20 teaching experience group.

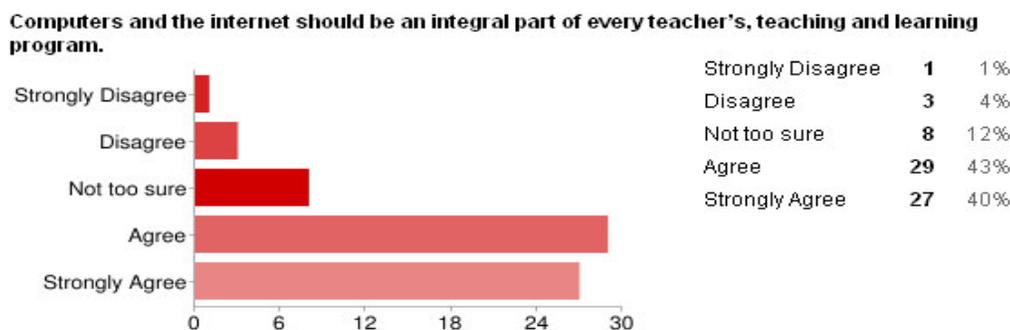


Figure 2: Teachers views on the place for computers and the Internet in teaching and learning.

In terms of their actual use in the classroom, 93% (63/68) of participants used computers either ‘frequently’ or ‘sometimes’ with 72% using them frequently. When explored in light of teacher experience, the ‘Rarely’ group consisted of five teachers, two in the 30-40 years teaching bracket and three in their first year of teaching. Of the ‘sometimes’ and the ‘frequently’ groups, teacher experience was equally shared again suggesting that ‘age’ did not play a part in deciding if computers were to be used in teaching and learning programs.

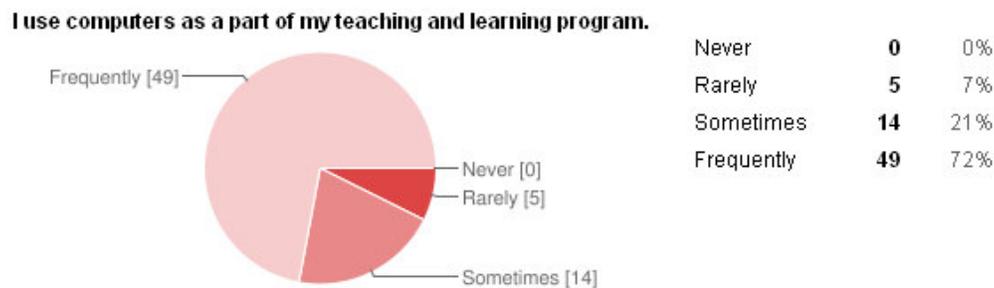


Figure 3: Use of Computers in Teaching and Learning Programs

The findings suggested strongly that the Internet was used by the vast majority of participants in teaching and learning programs. The 7% (5 participants) who indicated that they rarely used the Internet in their teaching and learning programs when compared to teaching experience were found to be in the 30-40 year group. These participants demonstrated frequent personal use of Computers, particularly for e-mail. However, although they did have access to the Internet, they did not use any of the Web 2.0 communication tools.

The percentage of participants who used the Internet on a personal level 'frequently' (82%) compared favourably with the percentage of those who used the Internet to gather information for teaching and learning programs (84%). When participants were asked if they used the Internet in lessons, however, 35% (24) indicated that they used it 'frequently'. This represented reduction of 50% of users from using the Internet for just the gathering of information to that of using it in classroom lessons - a finding that was consistent across all experience groups. 77% of teachers (52 in total) incorporated hands on activities for students in the use of the Internet in Teaching and Learning Activities. 23% of teachers did it rarely or not at all.

Findings for the use of specific Web 2.0 technologies in teaching are shown in Table 1 across the four key technologies of Wikis, Blogs, Forums and Instant Messaging (IM). Reasons given for their lack of use focused primarily tended to be similar for both personal use, in particular participants' not having heard of them or having the skills to use them.

Table 1: Percentage Comparison of Use by Teachers of Web 2.0 Tools in Classrooms

WEB 2.0 TOOL	YES	NO
Wikis	4	96
Blogs	12	88
Instant Messaging	7	93
Forums	0	100

This lack of awareness or a perceived deficit of skills was particularly true for Wikis, where the 4% of participants suggested that they used them as a reference or to get information. The use of Blogs was more popular, with 12% of teachers using them. One teacher commented that they were mainly used for students to sometimes engage in online Blogs such as 60 minutes depending on the class topic. Some participants stated that they had found no use for Blogs and that most of the Blogs they would like to use are blocked by the schools server. Most teachers though, declared they did not know how to use them on a personal as well as at a classroom level.

Instant Messaging was only used by 7% of participants and this was when they were engaged in online e- learning experiences organised through the distant education program such as 'School of the Air'. While 91% of participants knew how to use them for 'personal use', the vast majority were unable to articulate their value in the classroom, while some mentioned barriers to their use such as cyber-bullying.

As displayed in Table 1, Forums were not used for teaching and learning programs by any of the participants many suggesting that they could not find a need for them. When viewing participants' personal use

of Online Forums, parallels could be found. Only 4% of participants used Forums frequently and 18% used them sometimes, suggesting the vast majority of participants rarely or never used them.

The survey indicated that 73% of participants used Social Networking sites for ‘personal reasons’. When viewing classroom use of such sites 90% of participants had not used them in their teaching and learning programs. Participants suggested that this was due to the lack of security surrounding such sites, their lack of knowledge on how to incorporate them into learning programs and the restrictions set at the administration level.

Constraints on teachers in the use of Information Technology tools in remote teaching

The above findings raise obvious questions about the issues that teachers face in trying to use Web 2.0 and ICT generally for teaching and learning. The comments presented by the participants were categorised into five main categories as displayed in Table 2. The Response column refers to the percentage of participants who regarded the Focus Area as a major constraint to the enhancement of Web 2.0 Technologies in the classroom. Each was a single response that is each responding teacher only chose one are for a response.

Table 2: Percentages of Responses identifying specific constraints in incorporating IT in the classroom

FOCUS AREA	RESPONSE
Administrative Policy relating to IT within the school.	2.27%
System Reliability within the school.	38.64%
Access To Computers	15.91%
Professional Development	20.45%
Literacy Constraints – degree literacy skills impact on student engagement.	15.91%

As shown in Table 2, System Reliability was a major concern, particularly if considering that most schools operate via satellite, and this was followed by Professional Development concerns. When asked about the adequacy of the technical infrastructure within the school, over 50% of participants either agreed or strongly agreed that their school system was effective for their use, though a large number of participants (38%) were concerned about the speed of connection and unreliability of their system and saw this as an inhibitor to enhancing teaching and learning at their school.

Professional Development amongst teachers was seen to be an area of some concern as show in Figure 3. 71% (48) of participants saw their Professional Development in the area of computer use as being inadequate whilst 28% (19) viewed it as being adequate or very adequate.

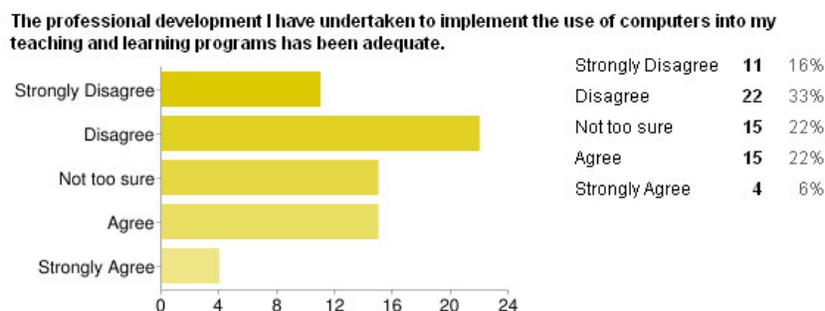


Figure 3: Professional Development

Issues identified by the 16% that strongly disagreed with the level of Professional Development being ‘adequate’ pointed to a lack of opportunity, particularly for online learning and for very remote teachers, with some classifying themselves as hesitant computer users who lacked basic training computers. One IT coordinator complained about the lack of basic training for students in the use of computers as well.

Approximately 16% of participants had difficulty in gaining access to computers for student use. Participants suggested lack of computers disadvantaged students in accessing online and offline computer activities. Some participants stated that computers, although in the classroom, were not working and access to those who could fix them was limited. The small number of negative responses towards administrative policy was encouraging. The responses within this area related to the need for the development of a school Information Technology Policy to guide teachers. Of greater concern was that approximately 16% of teachers viewed student's poor literacy skills as a constraint when viewing information technology at their school. Many students, according to participants were unable to read instructions, read online text or make any use of the Internet except to play games.

Promoting Web 2.0 as a tool for teaching and learning in remote learning communities

Key findings of the previous sections identified a range of issues in awareness, use and external constraints upon not only Web 2.0 technologies but ICT generally in the classroom. The vast majority of teachers were unaware of what the term Web 2.0 meant nor the technologies that constituted it. While there was a small number of teachers using such tools in teaching and learning, these were in the minority and the use of Social Networking and Instant Messaging in particular were rarely used. Even those teachers who demonstrated so called 'digital nativity' did not make great use of individual tools such as Blogs, Wikis and Forums in their personal or professional lives. This was exacerbated by technologies such as satellite communications, which were prone to a range of speed and stability issues resulting from phenomena as random as cloud cover.

To investigate this further, teachers were asked how they felt Web 2.0 could best be promoted for teaching and learning in remote communities. Of the 68 participants, 49 teachers responded. Three main areas of focus emerged:

- (1) Professional Development
- (2) Planning for ICT
- (3) Abstainers

Professional Development stood out as the main focus of attention with a 66% response. 23% stated that school planning for IT within schools was necessary if Web 2.0 Technologies were to be incorporated to a great degree. The Third area were the 'Abstainers' who constituted the very small percentage of teachers who were not convinced of the usefulness of Web 2.0 tools and did not think that anything would change their minds.

Recommendations and Conclusions

This survey indicated that the term Web 2.0 was unknown to the majority of teachers. This was the case also for many of the associated technologies such as Blogs, Wikis and Forums with Wikis being the least known. Such Web 2.0 technologies were also not embraced by the vast majority of teachers on a personal or a professional level in remote community schools. There is evidence to show that some teachers use tools such as Blogs, Wikis, and Forums as a means to collaborate with others on line but these teachers are in the minority.

The most tools used across all teacher groups in order of popularity was found to be email, Social Networking Sites and Instant Messenger and these gained precedence over the other forms of Web 2.0 tools due to their ease of use and the need to communicate with family and friends. Social Networking Sites and Instant Messaging were also not used in schools as teaching tools by the vast majority, being discouraged by the Department of Education, whereas the prevalence of email (and particularly the Department of Education email) was possibly due to the need for internal communication.

To increase the use of Web 2.0 technologies and enhance the understandings of their effectiveness as part of a teaching and learning approach it is evident that a range of strategies need to be employed that foster the technological, infrastructural, training, and social needs of teachers and the school-based system in remote learning communities. The following recommendations in particular are suggested as the key focus for such strategies:

1. **Provide appropriate Professional Development programs.** This proved to be the strongest need identified by participants of the study. Such professional development needs not only to expose teachers on how to become familiar with the technologies but also how to use them successfully with students in class.

2. **Bridge generational differences as well as acknowledge the fluidity of such differences.** There is no doubt that there are generational differences in attitudes and beliefs about the use of technologies and these were evident in this study. A large number of participants (67%) have been teaching for less than 10 years and 52% of this group were in their first five years of teaching. Nevertheless, even those teachers who could be classified as ‘digital natives’ were not strong in their use of Web 2.0 technologies for teaching and learning. The key barrier identified by that group was their lack of knowledge of how to use such tools to generate content and communicate. Since this group did not know how to use these Web 2.0 tools on a personal level they therefore did not use them in the classroom as teaching tools. This highlights the importance of the Professional Development noted in the previous recommendation but also emphasises that such programs need to be inclusive as it is not just the ‘older generation’ that lacks such skills.
3. **Enhance IT infrastructure in remote schools.** Even with effective Professional Development programs in place, a significant element that frustrates, bewilders and ‘turns off’ teachers in the use of any online technology at home and at their school, was identified in the survey as the speed and reliability at which they can be accessed. The speed of any download is directly associated with the infrastructure and the type of connection available. Some teachers will not use the Internet in the classroom because they cannot be assured that the Internet or the connection to the Internet will work when required. Most teachers will try to connect and hope for the best. Satellite connections proved particularly vulnerable but some participants also reported issues with infrastructure where broadband connections were available.
4. **Close the gap between remote and metropolitan schools.** One of the greatest challenges for remote communities is not the money available to build infrastructure but the human capital to implement it and use it effectively. It was apparent in the comments that a number of teachers were frustrated by the fact that they could not find computer technicians to ‘fix’ their computers and therefore they became the ‘techo’ for the school. In some cases the computers sat at the back of the room and were not used and thus students were disadvantaged. Teachers in Metropolitan and Regional schools are possibly less frustrated as they do have greater opportunity to gain support from a local technician. The inflexibility of the WA Education Department in terms of making social networking available was also a major hindrance to remote schools that suffered from a strong sense of isolation from the broader learning community. Having a willingness to provide a communications infrastructure is only one part of the solution. Acknowledging the value of social learning despite the risks involved is another.

It has been many years since the term Web 2.0 entered the collective consciousness of the Internet, yet this study has shown that the term is still one that has yet to filter down to remote schools. This can be attributed not just to a lack of awareness of the term but also a lack of familiarity with the underpinning technologies. The findings strongly suggest that Professional Development programs are needed for teachers in remote communities and this should be accompanied with improved access to the Internet and greater technical support if Web 2.0 technology use is to increase in schools. The findings also support the research of others such as Kennedy et al (2007) whose studies in the use of Web 2.0 Technologies by first year students warned against overgeneralising about the Digital Natives since they did not form a homogeneous group. It would be similarly wise to avoid over generalising about other generations and their involvement in Web 2.0 technologies; in particular the ‘older generations’ such as Gen X.

Remote schooling will always present challenges to providing a quality learning experience for students and Web 2.0 technologies have the potential to close the divide between remote and metropolitan/regional contexts. Infrastructural support is one approach to doing this but in many cases the problem is not money or hardware. Some schools cannot actually find technicians even if they could afford to employ them. There may be a range of solutions to this. Simply providing the same approach to curriculum technology as is provided to enterprise technology could level the technological gap. Grass roots strategies, finding teachers who can embrace technologies and act as change-agents in their communities may also help.

Whatever the solution, one thing is vividly apparent – that the Web 2.0 dream is one that is still under-realised in remote education. It will only be through a combination of Professional Development, appropriate technical resourcing and an unwavering commitment to embrace and resolve the unique challenges provided

within a remote rural context that Web 2.0 will become mainstream. Then students will have access to rich participatory learning experiences that will equip them not just for success in schooling but with the networking and technology skills that are required to adapt to the constantly evolving world of work.

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