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Educational scenarios for digital futures.

This article frames and theorises the nature of adolescents' informal experiences in Web 2.0 environments to articulate their fit or misfit with current conceptions of school education and educational practices. Adolescents are increasingly active Web 2.0 users. However, the traditional research and education communities have been slow to respond to the rapid emergence of the digital generational culture. Adolescents' new ways of interacting and producing could possibly render current configurations of schooling obsolete and hence require new conceptualisations of schooling. While scenarios for schooling in the future have been broadly discussed by educators, little analysis exists of the possible impact on these scenarios of adolescents' engagement with Web 2.0 spaces. This paper discusses how these new visions might influence, disrupt and interact with future schooling scenarios and educational practices.

Keywords: Adolescents; schooling; future schooling, educational scenarios; Web 2.0 participation; digital media; read/write spaces.

Introduction

This paper considers the possible implications for schooling of adolescent activity in Web 2.0 read/write spaces. It presents arguments for considering such activity when thinking about future scenarios for schooling, and discusses whether adolescent Web 2.0 activity is pertinent to current and future ideas about schooling, learning and teaching. The aim of the paper is to stimulate debate and provoke thinking about learning and future schooling and educational practices.

There is an urgent need to find out where new boundaries have emerged and to identify strategies for exploiting the fluid nature of adolescent Web 2.0 usage. Boundaries between private and public entities and between offline and online identities are blurring (Geftter 2006) and implications of these shifts need investigation to inform school change. From a broader educational perspective, the use of social networking technologies provides an alternative to the dominant culture of schools (Heppell 2000) and by implication a critique of current policy and practice.

The paper examines the use of Web 2.0 by adolescents to assess its importance to young people. It then investigates current and speculative discussions in the literature about the nature of future schooling. In particular, it explores future schooling scenarios put forward by the OECD (2006). An analysis of the possible impact of Web 2.0 usage on these conceptions provides the central argument of the paper.

Adolescent engagement with Web 2.0

Technology plays a significant role in the life of twenty-first century adolescents. Increasing numbers of young people use Web 2.0 technologies to interact socially, to construct their identities and to create artefacts. The term ‘Web 2.0’ describes the range of user-controlled publishing and networking websites that have emerged over the past 5 years, effectively providing a vehicle for creative expression and social networking and allowing people opportunities to share their thoughts and creations. In contrast, ‘Web 1.0’ sites were far less interactive and their usage was characterised by passive viewing and information retrieval. The content on Web 1.0 sites could be modified only by the sites’ owners (O’Reilly 2005). Web 2.0 spaces have been described as a “blurring of the boundaries between Web users and producers, consumption and participation, authority and amateurism, play and work, data and the network, reality and virtuality” (Zimmer 2008, 1). Web 2.0 sites provide opportunities for social networking, media sharing and creation, data/web mashups, participation in virtual worlds, social bookmarking, creation of blogs, wikis and other collaborative editing and writing (Crook 2008; Schuck, Aubusson and Kearney 2010).

Web 2.0 participation amongst adolescents is rising rapidly with the provision of increased digital access. This phenomenon is particularly noticeable in Australia, the UK, US and European countries. As of June 30, 2008, 52% of all Australian households had Broadband connections, an increase of 22% from the previous year. At the same date, 67% of Australian households had home Internet access and this figure rises to over 80% for households with children under 15 years of age (Australian Bureau of Statistics 2008). A study of 751 Australian families with children aged 8 – 17 years by the Australian Communications and Media Authority (ACMA 2007) found that young people spend about one and a quarter hours online each day on average. Over 40% of participants in the study had some of their own user-created material on the Internet and from age 14 this figure rose sharply to 70%. Among 16 – 17 year olds, two-thirds had an online profile in a social networking site, one in six had their own blog and one in eight had published their own videos online. Similarly, a UK survey conducted in 2006 of 1,003 13 – 17 year olds and 1003 parents (NCH 2006) found that 33% of the young people regularly use the Internet for blogging and 79% said they use Instant Messaging (IM) regularly. The Pew Internet Project (Lenhart and Madden 2007) reported that over half of US adolescents, aged 12-17 were found to be using online social networking sites in 2006. Of these, 55% have created a personal profile, and 48% visit social networking sites daily or more often. Given the popularity of digital interactions for young people, the question arises as to whether educators should be considering the importance of these new technologies and their affordances for contributing to formal schooling. If so, what might schooling that exploits these technologies look like?

Chaos or participatory democracy in society and education?

The increase in usage of new technologies by adolescents has led educational reformers to suggest that these technologies will impact strongly on ways of

learning, content of learning and location of learning (Warshauer 2007). Warshauer notes that we are in a transitional period, between a period in which print media were dominant and one that will be characterised in different, "post-print" ways. Writing a decade earlier at the brink of this period of change, Weston (1997, 196) hypothesised that it was likely "that the existing social order is about to be challenged". He based this suggestion on the contrast between the ways in which we used the mass media of the day and the ways in which the Internet might be used. He noted that the Internet was used mainly for individuals to express themselves. In contrast other mass media presented content in a "nontransactional" way. It is for this reason that Weston believed that social change was likely on an unprecedented scale. As Weston so eloquently argued, "While expressions like 'public involvement' and 'participative democracy' are embedded in our rhetorical traditions, their unquestionable acceptability has always been conditional upon their equally unquestionable nonattainability." (Weston 1997, 197).

Somekh (2007) agrees that students' interactions through the Internet are vastly different from the sort of interactions that occurred prior to its advent. She highlights its anarchic and highly individualistic nature. She argues that the characteristics of Internet usage by young people are the antitheses of the traditional activities, norms and customs operating in schools.

Adolescents participating in Web 2.0 spaces can be seen as sharing a culture because they exhibit "shared patterns of behavior, beliefs and language that develop over time" (Creswell 2005). A robust adolescent online culture has emerged; robust because it contains features of being self-sustaining; adapting; enduring and rich in content. However, at this point little attention has been given by formal education authorities to the opportunities that these technologies give students for sharing ideas, exchanging and debating views and making global connections (Lamb and Johnson 2006). Adolescents are accessing and contributing to new media in new ways, but they are mostly doing this outside of formal schooling and do not view this participation as learning (Sheehy and Bucknall 2008). There is a growing incongruence between students' informal and formal learning environments (Griffin and Aubusson 2007) and a subsequent need to examine this shifting landscape. Further, the increased access to public networks and the growing opportunities for adolescents to produce, share and re-use artefacts with a global audience suggests a re-examination of the very nature of schooling, as indicated in Weston's prescient paper (1997). Yet, this need to re-examine and perhaps reconceptualise the nature of schooling and educational practices has had little impact on societal and systemic views of education, teaching and learning, which appear largely to be entrenched in industrial-age thinking (Nagy and Bigum 2007). Sheehy and Bucknall (2008) suggest that if we are to reconceptualise schooling and educational practices using innovations in ICT, we need to provide learners with the necessary metacognitive tools to better understand their own learning.

Like others, Nagy and Bigum suggest that the biggest impact that new technologies have and will continue to have, is on interactions rather than content. This impact thus raises the question of what role schools might have in the

production and consumption of knowledge, given the change in the valuing of various concepts and skills.

Regardless of this impact, it is questionable, in fact, whether schools are able to change. Ovsiannikov and Monakhov (2007) note that it is possible to understand and judge a society by its educational system. They suggest that "a system of education produces the ideas, socially significant ideals, worldview positions, and hopes that go together to make up the future society as a whole and the destiny of individuals." (61). Conversely, Somekh (2007) suggests that the institution of schooling is "formed, maintained and sustained as much by the assumptions and routine behaviours of those who work within it as by the larger system which gives it legitimacy." (169). Somekh goes further to claim that "teachers, parents and the community - students even - can be said to be complicit in the unreformed institution of the school." (169). Sheehy and Bucknall's research (2008) supports this claim as they found that students' models of future learning were based on their current models. Given this reflexive relationship of educational systems and their societies, some understanding can be gained of the difficulties of implementing radical systemic educational change. These authors appear to suggest that, as the models that societies hold for their educational institutions are formed through historical and cultural understandings, new visions are not likely to differ markedly from the old.

Attwell (2007) approaches this argument from a different perspective. He suggests that 'industrial revolutions' do lead to change, but that this change takes time to take effect. He suggests that we understand education both in terms of the way society is portrayed in it and in terms of its assumptions about how we learn. He notes that while industrial revolutions lead to far-reaching societal change, there is a substantial lag in such change. Indeed, Attwell argues that our current form of schooling, and development of curriculum and pedagogy has its roots in the Industrial Revolution and that this paradigm is being challenged by the advent of the Web 2.0 read/write revolution. One of the major critiques that Attwell provides is that education systems have failed to recognise as valuable, any form of learning that occurs outside of the institution or its narrowly defined systems. Thus, "Education systems have failed to extend opportunities for learning outside the institutions and into wider layers of society at a widespread level" (Attwell 2007, 5). As Web 2.0 engagement and learning occur mainly outside the educational institutional setting, its affordances are not sufficiently recognised nor exploited.

It seems clear, therefore, that changing the mindsets, aims and approaches of educational institutions and systems is difficult and takes time to achieve. Nevertheless, Web 2.0 participation is challenging the way schooling is currently enacted, as this participation changes interactions and knowledge production. This argument is supported by evidence that adolescents' learning is being influenced by their engagement in Web 2.0 spaces. A US study (Ito et al. 2008) investigated youth and young adults' (ages ten to thirty) media use through large scale ethnographic studies. Their major findings are that the main usage of these new digital media is to extend friendships and interests, and that young people engage in peer-based, self-directed learning online. The researchers suggest that these

activities have altered how adolescents learn and interact and suggest that there are major implications for educators and policy makers.

Meanwhile, Somekh (2007) extends Atwell's argument regarding the limitations of educational systems which neglect learning outside of institutions. Somekh has drawn attention to the vast difference in impact on young people's lives of new technologies in and out of school. She notes that while usage out of school is high, and having a great impact on students' lives, the opposite is true in schools. While Somekh cites studies and data that pertain to the turn of this century, the contrast between home use and school use is likely to be similar today. This indicates that different scenarios for schooling are needed, that include home activities. Some of the scenarios discussed later in this paper encompass this aspect as a feature of the scenario.

As argued above, the potential relationship between Web 2.0 informal engagement and formal schooling remains an open question. Griffin and Aubusson (2007, 218) argue that in school there has been "a lost opportunity ... to embrace the different learning experiences (that occur) ... in authentic settings beyond the classroom". In a similar vein, Hull and Schultz (2001) urge researchers to help bridge the vast gulfs that separate and continue to widen between children and youth who succeed in school and those who do not, by seeking a collaborative understanding of the relationship between formal classroom learning and the informal learning that flourishes in a range of settings outside school. Heppell (2000) in his development of the Notschool initiative (notschool.com) has developed a different approach to learning material traditionally covered at school, for marginalised teenagers. In this approach, students have access to computers at home, use mobile technologies for their learning and work in ways that are fundamentally different from the autocratic and hierarchical structures of schools. These students have succeeded in learning, which has also resulted in high self-esteem (Somekh 2007). Somekh suggests that this practical exemplar of learning with new technologies, underpinned by activity theory (Wertsch 1998), McLuhan's "the medium is the message" (1964) and Turkle's (1995) work on identity and information and communication technologies (ICT), indicates that a radical revisioning of schooling is not only possible, it is necessary. Our paper discusses the alternatives for such revisioning by analyzing the OECD scenarios below (OECD 2006).

Future schooling scenarios

This paper debates the potential of such revisioning with reference to OECD schooling scenarios. An OECD Future Schooling Scenarios paper (OECD 2006) proposes a set of six possible scenarios for schools. We discuss these below and consider how the read/write characteristics of Web 2.0 fit or disrupt these scenarios. OECD emphasises that the scenarios are not proposed as realities but are thinking devices that aim to sharpen distinctions, imagine possible alternatives and inform policy that may shape the future. There are three main categories each with contrasting alternative scenarios:

1. Status Quo
 - Bureaucratic school systems maintained

- Meltdown and exodus
- 2. Re-schooling
 - Schools as core social centres
 - Schools as focused learning organisations;
- 3. De-schooling
 - Learning networks in network society
 - Extended market model

In a *Status quo* future, schools attempt to maintain existing structures, procedures and practices by resisting change, resulting in mild perturbations and gradual evolution. In this future two extreme possibilities are identified. One scenario describes Bureaucratic School Systems, characterised by a centralised curriculum, management and governance dominated by accountability measures, predictable learning indicators readily and regularly assessed to promote efficiency of delivery and distribution of modest resources. An alternative prediction of the attempt to maintain status quo is the Meltdown Scenario. This is characterised by teacher shortages and crisis management with increased centralisation to solve problems, and imbalances in resourcing.

The status quo model seems inconsistent with our analysis of Web 2.0 participation, access to information and social networking. Many of the arguments for the lack of alignment of this model and Web 2.0 participation are provided above. Points raised include the need to consider learning occurring out of school and the characteristics of learning in Web 2.0 spaces. Consequently we argue that the attempt to maintain status quo in schooling is likely to make schools less relevant as sites of learning. Humans are social creatures and learning is a social endeavour. Web 2.0 is changing the ways people access information, exchange ideas, communicate and socialise. In the competition for the attention and engagement of young people, if schooling seeks to remain static and unbending in the winds of change, then its dominant position as a site of socially mediated learning is fundamentally threatened. The risk is that the privileged position of the school in education may become dependent on its role as sanctioned credentialing agent rather than because it is a space where a culture distributes knowledge from one generation to the next. In short, the status quo scenarios are unattractive and unsustainable as learning futures for a modern society. The inflexible, centralised, hierarchical nature of the status quo seems sharply at odds with the anarchy and unpredictable nature of Web 2.0 environments and the nimble thinking required for a knowledge-based society.

A recent report on Web 2.0 technologies (Crook 2008), suggests that take-up of Web 2.0 tools for learning in schools depends on educational dispositions located within "systems of educational delivery, management and assessment that have been fashioned in harmony with such attitudes" (6). If the influence of a growing adolescent digital culture is limited to the adoption of those aspects of Web 2.0 that are consistent with the prevailing policies and practices of current schooling then its impact is likely to be marginal and provide experiences very dissimilar to those that many adolescents enjoy in their Web 2.0 spaces. Furthermore, merely transplanting features of virtual adolescent cultures into

formal school settings remains vexed and a formidable challenge (Schuck, Aubusson and Kearney 2010).

Consequently, such an emaciated Web 2.0 - subservient to existing school mores, laws and rituals - cannot exploit its apparent potential for learning. Thus we question whether we should consider the adaptation of these technologies to serve the purposes of a status quo scenario and argue that adolescent Web 2.0 practices demand different scenarios for future schooling as indicated by the OECD (2006).

A *De-schooling* future predicts a dismantling of current school systems with a rise in dissatisfaction among key stakeholders and the middle classes. This provides for a continuum of potential alternatives ranging from cooperative learning networks to a competitive, consumer driven market system. A Learning Networks scenario is characterised by a learning organisation driven by individual and community interests, unpredictable patterns of knowledge acquisition and reduced measures of accountability. Resourcing of public institutions would diminish and teachers would be replaced by relatively informal networks where ICT would play a central role and attract major investments; small groups, the home and individual arrangements dominate. Alternatively, market led entrepreneurial providers emerge providing diverse means of accreditation, for consumers to purchase with a degree of public oversight and regulation. The dismantling of schools as sites of education to be replaced by informal networks with universal access might seem attractive to some but there remain fundamental flaws in such anarchical dispersed mechanisms for education and learning. The absence of schools as institutions and their replacement with informal networks and ad hoc patterns of learning arising at need seems broadly consistent with the preceding analysis of Web 2.0 patterns of engagement among adolescents. A mere consistency, however, does not of itself imply it is an ideal state or recommended scenario. The existence of a 'second digital divide' (Somekh 2007) illustrates that members of society have unequal access to technology and varied forms of participation in Web 2.0 activity in particular, "according to the cultural capital available to them" (Somekh 2007, 173). Warschauer's (2007) argument that the contribution of at-home computer use to education is highly variable with high socio-economic status learners benefiting more than those from low socio-economic status background underlines this point. For educators, such a gap is morally intolerable. We are all the worse off if some of us are denied the tools they need to succeed in life; it is also economically intolerable if the benefits extend only to individuals with privileged access (Ogilvy 2006). It has long been argued that schools have a moral and ethical responsibility in society ((Phenix 1958). Schools have a responsibility to enhance the weave of the social fabric, which entails, at least, the attempt to curtail disadvantage (Beare 2001). If this is to be achieved then school education has a public responsibility to address disparity in access to educational tools that significantly impact on learning outcomes. Education is already becoming increasingly dependent on digital technologies and this dependence runs the risk of ignoring the needs of and disempowering the disadvantaged (Remtulla 2007). This point is underlined by Dodds and Mason (2005):

We seem to be at a pivotal point in addressing inequities. Failure to provide

adequate technological resources for all translates into failure to provide quality education, creating an even greater divide between affluent and poor ... (Dodds and Mason 2005, 26)

A schooling scenario with no place for schools, per se, removes one (albeit flawed) mechanism with capacity to provide educational access across socio-economic, racial and gender barriers. Consequently, any future learning scenario that aims to be broadly inclusive, providing universal education across all levels of society, requires schooling to ensure significant opportunities for digital learning and Web 2.0 engagement. Similarly a market-driven schooling system is likely to favour those with consumer power, inevitably high socio-economic status groups and the middle classes.

The collaborative ideals and universal access embedded in de-schooling scenarios are well matched to Web 2.0 possibilities. The consequences of de-schooling for the disadvantaged, however, raise critical concerns about its attractiveness as a schooling future.

Re-schooling predicts schools as either core social centres or as highly focused learning organisations. In both, schools are high status, highly valued organisations with teachers as respected professionals. However the school as core social centre emphasises values and citizenship rather than cognitive outcomes which are more readily addressed through informal systems. ICT is used extensively particularly for communication and in enhancing a sense of community. Leadership is distributed with local decision making.

As learning organisations, schools are driven by a knowledge management rather than a social agenda. Here extensive use of new media and ICT supports knowledge access and exchange in an environment that values small, relatively independent teams engaged in educational innovation.

Re-schooling scenarios retain a place for schools but address key problems of relevance and shift the role either towards social community roles and/or towards that of a learning organisation with a focus on knowledge production and exchange. In the context of re-schooling it is useful to consider the 'how' and 'where' paradoxes outlined by Warschauer (2007, 44-43). The 'how paradox' is that learning autonomously will be critical in a digital future but, paradoxically, strong teacher mentoring is required for students to achieve this autonomy. Similarly, the 'where paradox' suggests that at a time when informal and out-of-school learning has become more powerful and ubiquitous so too formal education is having a greater impact on people's lives and on workforce preparation. Therefore it seems that schools as institutions with professional teachers capable of facilitating student learning and capacity building will have a critical role in future learning, digital learning and learning in Web 2.0 spaces.

A consistent theme emerging from studies of Web 2.0 participation indicates that the types of activities are variable ranging from expansive creative use to descriptions of proposed and past social interactions; from extensive access among high SES adolescents to negligible access by those on the other side of the digital divide; from genuinely powerful learning tools to influential tools of social interaction and friendship groups. If there is to be a scenario where Web 2.0 features in providing a richer learning experience for all then it is likely to be within the broad parameters of a re-schooling scenario. Here, the school as

institution: sustains social networks; facilitates the capability of learners for autonomy and independence, with an open unpredictable curriculum that addresses issues about access and equity; and promotes thinking that draws on transdisciplinary knowledge.

Ideally school in this scenario would contribute to an open knowledge-building community where control and choice about what and how learning occurs is vested in the adolescent learner rather than determined by distant bureaucracy. This future would enable Attwell's plea (2007, 5) for a "basic paradigm shift from learners engaging with institutional provision and procedures to the institution engaging with the learner." In such a future, Somekh (2007, 170) suggests, schools might welcome being "fundamentally challenged by the destabilising impact of ICT on concepts like knowledge, teaching, the disciplines and rationality" because schools are revisioned; not as objects of yesterday's industrial revolution reproducing society and a workforce for today, but as sites for strong framing, creation and critique of knowledge for tomorrow. Schooling exists not as a process for stagnation and reproduction but as a social tool for leading learning with innovation driving informed, sensitive social transformation and knowledge production.

Implications and conclusions

Policy discussion about schooling is rarely informed by a serious appreciation of the nature of childhood or youth in today's society, perhaps because this is regarded as a given for all practical purpose. But it is neither given nor unchanging; it would be well for educational policies were more fully informed by a rounded appreciation of the lives of today's young. (Istance 2000, 39)

A serious appreciation of the cultures, contributions, needs and characters of young people requires a deep understanding of adolescents' current and emerging online practices, their benefits and pitfalls; their implications for formal education; and the development of guidelines for the management and uptake of associated social technologies in schools. The potential for digital technologies to contribute to a useful, productive and engaged citizenry seems significant. Social networking and creativity are essential for building an innovation culture and national capacity for smart technology use. Currently, a proportion of our adolescent population possesses expertise in these areas but while these capabilities remain in an alternative culture rather than mainstream, their contribution to national benefit may be untapped. Current growth and use of social technologies is driving innovation in many areas of human endeavour. The smart use of such technologies requires workplaces, industries and education that embrace, exploit and invigorate young people's productive engagement with, and knowledge of, cutting edge technologies. A fundamental way to achieve this is by capitalising on the massive engagement of adolescents with technologies that are intrinsically attractive to them.

The implications for learning, of a phenomenon in which users have unprecedented access to self-expression, global audiences and public spaces, are undeniable. Patterns of behaviour, interaction and access in Web 2.0 contrast with the hierarchical and authoritarian context of current formal schooling. Given the increase in usage of new digital read/write spaces by young people, if nations

wish to have schooling systems that are relevant and responsive to new developments, it is essential to develop policy and debate about the value of such technologies for changing our notions of what schools should look like as institutions of learning. In this context then, it is noteworthy that in a study of education policy leaders' future visions of schooling (Cogan 2004), the schooling scenario that was considered most desirable was that of a (re-schooling) Learning Organisation. However, the scenario that was predicted as most likely was a Bureaucratic System (status quo). If this prediction proves correct then school systems will have increasingly and dramatically failed to capitalise not only on new online technologies but also on the rich learning capacities of the generations participating in social networking and creation with new media.

Meanwhile, adolescents are likely to show ever increased engagement in their use of these ubiquitous technologies to network and express themselves. From a schooling perspective, there is an urgent need to find out where new boundaries have emerged and to develop strategies for exploiting the fluid nature of this second generation of web-based services. From a broader educational perspective, the use of Web 2.0 technologies could provide an alternative to the dominant culture of schools and by implication a critique of current policy and practice. Educational systems need to generate innovative learning opportunities for adolescents who operate in an online world, which is informal and social and which potentially provides them with unlimited voice, access and power. We have a digital generation of adolescents with capability in this area but young people's creativity and expertise, as exhibited in their informal use of Web 2.0 spaces, remains largely untapped and isolated from formal education. Hence, their contributions to national innovative capabilities are dispersed and meandering. Like Somekh (2007), we suggest that it is fruitful for educators to "use their sociological imagination to play a leadership role in scenario building to assist policy makers in the transformation of the education system" (177).

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