Digital or Diligent? Web 2.0's Challenge to Formal Schooling

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Abstract

This paper explores the tensions that arise for young people as both 'digital kids' and 'diligent students'. It does so by drawing on a study conducted in an elite private school, where the tensions between 'going digital' and 'being diligent' are exacerbated by the high value the school places on academic achievement, and on learning through digital innovation. At the school under study, high levels of intellectual and technological resourcing bring with them an equally high level of expectation to excel in traditional academic tasks and high-stakes assessment. The students, under constant pressure to perform well in standardised tests, need to make decisions about the extent to which they take up school-sanctioned digitally enhanced learning opportunities that do not explicitly address academic performance. The paper examines this conundrum by investigating student preparedness to engage with a new learning innovation – a student-led media centre – in the context of the traditional pedagogical culture that is relatively untouched by such digital innovation.

The paper presents an analysis of findings from a survey of 481 students in the school. The survey results were subjected to quantitative regression tree modelling to flesh out how different student learning dispositions, social and technological factors influence the extent to which students engage with a specific digital learning opportunity in the form of the Web 2.0 Student Media Centre (SMC) designed to engage the senior school community in flexible digital-networked learning. What emerges from the study is that *peer support*, *perceived ease of use* and *usefulness*, *learning goals* and *cognitive playfulness* are significant predictors of the choices that students make to negotiate the fundamental tensions of being digital and/or diligent. In scrutinising the tensions around a digital or a diligent student identity in this way, the paper contributes new empirical evidence to understanding the problematic relationship between *student-led learning using new digital media tools* and *formal schooling*.

Introduction

There has been for some time now a palpable reluctance on the part of mainstream education to get serious about the revolutionary impact that digital technologies are having on the way young people live, learn, and earn. Such reluctance belies the spectacular growth in economic and social importance of digital tools and the digital content industries such as computer games, digital video and film, post-production, animation and websites. Most recently, developments in digital technologies have constituted a new era of advancement known as Web 2.0 (O'Reilly, 2005). Although the phrase 'Web 2.0' is at times contested, it is most commonly understood as a set of second-generation web-based communities and hosted services, such as social-networking sites, wikis and folksonomies, which aim to facilitate collaboration and sharing among users (Arola, 2006; Downes, 2004; O'Reilly, 2005; Wikipedia, 2007). The effects of Web 2.0 are already pervasive in social, economic, and intellectual life, as evidenced through the many familiar examples of highly-populated websites and e-communities that fall under the moniker of Web 2.0, such as the blogosphere (e.g. Blogger), MySpace, YouTube, Facebook, Flickr, and Wikipedia, among others (see Korica *et al.*, 2006 for comprehensive descriptions).

According to Australian economist John Quiggan (2007), the digital industries are difficult to monetarise, but there is no doubt about their spectacular growth (despite the wipe-out of the dot.com fiasco), nor their increasingly household-driven character. The household driven innovation in the 21st century is, he argues, very different from the consumer passivity that characterised households in the 20th century. Like many of its 21st century counterparts, Web 2.0 action emanates predominantly from households rather than being commercially driven. This means that much of the enterprise is in 'the long tail' of distribution, not in the more recognisable entities like Yahoo, eBay, YouTube or MySpace. And this is where kid-to-kid networks thrive. Put simply, 'going digital' is now *de rigueur* as a form of value-adding exchange.

A number of social and work-related effects flow from the new dynamics of digital content creation and dissemination, and the importance placed on them by young people. Beyond their capacity to blur class distinctions and workplace hierarchies, they also blur distinctions between production and consumption, labour and citizenship, and commercial and non-commercial enterprise. Digitalisation makes enterprise much less about routinised labour, centrally located offices and 9-to-5 ism, and much more about understanding, developing and maintaining the dispositions and conditions that people need to turn symbolic knowledge into economic and social assets. Yet while old routines of work and productivity are being overturned in social and economic spheres, schools and universities struggle to come to terms with the implications of all this for education, clinging to the well-worn routines of content transmission, worksheets and pen-and-paper memory tests. At best, we are seeing gestures towards Web 2.0 – at worst, a sector in digital denial.

This paper investigates a scenario in which a Web 2.0 student-led media centre has been created within a formal school setting where academic achievement is high and where diligence is measured in terms of academic success. Specifically, it draws on a current doctoral study being done by one of the authors to examine the relationship between *student-led learning using new digital media tools* and *formal schooling*, as it is experienced by students and teachers in this long-established, well-resourced and high-performing senior schooling environment. In so doing, it aims to explore the ways students negotiate the tensions between engaging in the student-led online learning initiative in the school and adhering to the value, legitimacy and priority given to traditional modes of learning and literacy practices, goal orientations and school achievement.

The doctoral study on which this paper draws takes a systemic approach to understanding innovation adoption and diffusion within the formal schooling environment context from the perspective of both students and their teachers. What is presented in this paper, however, is the research that is focused squarely on student experience and voice. In so doing, it addresses the gap that a comprehensive literature review of relevant studies over the past 5 years reveals about technological innovation and schooling, namely that school students are a strikingly *under-researched* and *under-represented* group of critical stakeholders. A review of four major academic databases (Proquest Dissertations, Proquest Education, ERIC via EBSCOhost, ScienceDirect), conducted as part of the doctoral study, indicates that, of a total of 157 studies on school's adoption and use of ICTs, only 31 (or 19%) took into consideration the point of view of students, while the rest focused primarily on teachers' and school leaders' perspectives and experiences. Furthermore, of the small number of studies that considered the student's standpoint, only a minority (7 of 31 studies, or 22%) were conducted in secondary schools, with the rest focusing mainly on tertiary settings. Put simply, we need to know more about how post-compulsory students understand and negotiate the complexities of integrating new digital technologies into formal schooling.

To this end, the study explores individual, interactional and institutional issues that emerge as significant in predicting students' preparedness to engage with a new digital learning innovation despite the restrictions of a traditional learning culture. The focus is on the individual learning dispositions of nearly 500 senior school students, ie, how their personal constructs and perceived levels of peer support influence their evaluation of and engagement with a multimodal Web 2.0 open-source, community-based digital learning innovation, namely, the Student Media Centre (SMC).

The SMC was set up in the school in 2006, with the specific purpose of engaging the whole senior school student population in flexible networked digital learning that extends beyond conventional classroom pedagogies and traditional literacies, in order to develop in the senior student cohort autonomous and leaderly dispositions, as well as creative capacities in relation to student learning (see Appendix A for a further elaboration of the SMC, its learning features, pedagogical design and objectives).

The study analysed the roles that (i) student learning dispositions, (ii) peer support and (iii) perceptions of the SMC's ease of use and usefulness, played in determining the extent to which students consider the SMC to be relevant for their living and learning, and therefore, choose to engage with it as a non-traditional learning context. What emerges from the study is the finding that, at the individual level, a *disposition towards learning* rather than performance, and *cognitive playfulness*, defined as 'the learner's dexterity and agility in terms of intellectual curiosity and imagination/creativity', were crucial in predicting students' valuing of the opportunities SMC presented and their level of engagement with and usage of the innovation. Another related finding is that on the whole, although *ease of use* and *usefulness* of the technology and a *disposition towards learning* are important, the *level of peer support* experienced by students becomes *imperative* in influencing the choices that students make in negotiating the fundamental tensions of being digital and/or diligent. While this may not surprise, given the extent to which 'peer pressure' has been understood to be *the* factor influencing the choices that young people make, the picture is a more complex one than this finding alone would suggest.

Individual learning dispositions

Before moving to the findings of the quantitative study in more detail, it is useful to understand what is meant by a *learning disposition*. It is understandable that many educators and non-educators see a learning disposition as synonymous with the disposition to academic achievement. However, social psychological researcher and educator, Carol Dweck, makes a clear distinction between the two, indicating that *learning goals* are very different from, and often in conflict with *performance goals*. As she puts it, an individual's performance goals are focused on "winning positive judgment of your competence and avoiding negative ones", while an individual's learning goals are characterised by a desire to develop "new skills, master new tasks or understand new things" (Dweck, 2000, p. 15).

In Dweck's research on the performance and learning activities of young people, performance goals and learning goals were found to be present in most of these individuals in about a 50/50 ratio. They can, however, be manipulated by external social conditions or an influential significant 'other' (eg, a parent, trainer or teacher). When this occurs, the students for whom learning goals are paramount continue to seek new strategies and to tolerate error without self-blame, while those who are performance-driven are more likely to give up on the task set, berating themselves for their inability to complete it. In other words, although both types of goals can lead to high achievement, generally, learning goals-oriented individuals tend to exhibit more adaptive responses to complexities and challenges, which is characteristic of our postmillennial creative economy, while performance goals-oriented individuals have a higher tendency to feel overwhelmed by their inability to 'get the right answer' and experience intellectual paralysis in the face of challenging problems that encompass multiplicity and ambiguity.

In practice, this means that students who were being encouraged to learn juggling might, if healthily learning-oriented, approach the task by considering a number the strategies. They might appropriately decide that listening to a lecture on juggling might not be as useful as trial and error attempts with just two balls. Once they feel competent with two, they may move to three. When they drop the balls, as they will frequently do, they know that the problem is that they have not yet had enough practice and that they will need regular, more sustained rehearsals to acquire juggling skill. They do not think they are stupid for being unable to juggle. It is finding a successful strategy that matters.

As McWilliam (2008) has commented, it is much more useful for students to see this sort of strategizing as 'serious play' rather than hard work that can be done through routine thinking and doing. This disposition to *play* with ideas – to hold large numbers of associations together in the mind, and imagine the interesting possibilities that arise from making novel associations – is argued by Kane, Pink and others to be a key creative capacity (Kane, 2004; Pink, 2005; Florida, 2003). As explained by psychologist Teresa Amabile and her colleagues (2002, p.53):

> It's as if the mind is throwing a bunch of balls into the cognitive space, juggling them around until they collide in interesting ways. The process has a certain playful quality to it…. If associations are made between concepts that are rarely combined – that is, if the balls that don't normally come near each other collide – the ultimate novelty of the situation will be greater.

This capacity for serious intellectual play is named in the study as *cognitive playfulness*. Cognitively playful individuals have a predisposition to curiosity, inventiveness and the desire to play with novel ideas and innovations, dispositions that can build increased levels of personal innovativeness and a greater capacity for learning. In the study, *cognitive playfulness*, understood in terms of two dimensions, *intellectual curiosity* (or level of *inquisitiveness)* and *intellectual creativity* (or level of *imagination* and *spontaneity*), emerged as highly significant in explaining the extent to which students appreciate the digital space of the SMC and engage with it in order to extend their learning in and out of school.

Technological and social-contextual influences

As indicated earlier, the school within which the study is located has a strong focus on academic achievement as a key component of educational success. Thus the extent to which an initiative such as the Student Media Centre is perceived by the senior school students (and staff) as either *valuable* to their academic success or a *distraction* from success – or some combination of the two - is very important. In addition to the individual learning dispositions, the perceptions of the technology and the institutional context that these students bring to their decision-making about engagement or non-engagement with SMC are also central to understanding whether and how new technologies like the SMC are able to be integrated into traditional educational practices. Can deep and sustained engagement with

digital technologies enhance diligent performance outcomes, or must it be condemned to be a distraction from 'real' schoolwork?

To understand this issue in terms of students' real technological uptake, the study drew on Davis's (1989) simple yet powerful empirical model of technology adoption and usage, known as the Technology Acceptance Model (TAM), based on Ajzen and Fishbein's theory of reasoned action (1975). This model has consolidated substantial theoretical and empirical support since its conception, and is one of the most widely-used and accepted conceptual framework to examine technological factors influencing users' adoption of a technology-related innovation.

The TAM posits that innovation adoption and use is influenced by two major technological factors: *perceived ease of use* and *perceived usefulness*. *Perceived ease of use* is defined as the degree to which the user believes that using the innovation is free of effort (Davis, 1989). Everett Rogers (1995), a leading scholar in the field of innovation diffusion, argues that potential adopters evaluate an innovation in terms of its complexity, with the rate of diffusion increasing when the innovation is considered not overly complex and easy to use. On the other hand, *perceived usefulness* is defined as the degree to which the user believes that using the innovation enhances his/her work or learning performance (Davis, 1989; Ngai *et al.*, 2006). Rogers (1995) and other researchers have shown that the rate of diffusion of an innovation increases when it is perceived to provide the user with a relative advantage over existing technology or modes of practice.

Given that the TAM has its roots in organisational behaviour and business information systems fields, previous studies that utilise TAM in the educational context have tended to conceptualise 'learning performance' in an instrumental or functional manner, ie, in terms of increasing 'learning productivity', 'learning efficiency', and 'learning effectiveness'. As we move from the Industrial and Information Ages into the Conceptual Age, however, the notion of 'usefulness' is expanding (Pink, 2005). Contemporary users are more likely to evaluate an innovation or practice for its aesthetic value, not simply its functional value, and there is a cross-over between the two kinds of value. In line with this conceptual development, the study expanded the notion of 'usefulness' to include the more aesthetic/interactive aspects of schooling and learning, such as (i) socialisation, (ii) identity and self-fashioning (developing and expressing one's personal identity), and (iii) exploring new ways of learning, acquiring and creating knowledge beyond traditional academic disciplines (Turvey, 2005; Oblinger & Oblinger, 2005).

Of interest here is how students' decisions to adopt and use the SMC are associated with the ways in which they evaluate the SMC in terms of its *ease of use* and *usefulness* to their learning and schooling. These include student opinions about how easy it is to access and use the SMC, as well as their opinions about how useful the SMC is for (i) their academic learning, (ii) their socialisation, (iii) their exploration and expression of their identity and

opinions, and (iv) their creative development, including the skills and literacies needed in a Conceptual Age that go beyond those taught in the classroom.

In addition to the technological factors discussed above, technology use is mediated through a social system in which it acts and is acted upon in a multitude of planned, unplanned, foreseen and unforeseen ways (Sclove, 1995). Following this move to expand the scope of inquiry, researchers who use TAM have more recently moved beyond technological factors alone, to consider social contextual influences on users' adoption and continued use of innovations (Venkatesh & Davis, 2000; Venkatesh *et al.*, 2003). In line with this move, the research took into consideration one important social-contextual variable that is unsurprising but for which empirical evidence remains wanting, that is, the concept of *peer support*. *Peer support* is defined here as the "level of peer encouragement and social acceptance that the learner perceives in the use of the technology or innovation". By including *peer support* in the analysis, the intention was to contribute empirically-grounded understandings and insights into larger educational tensions and complexities that get played out across digital and traditional learning in the selected high-achieving senior schooling environment.

Method and Results

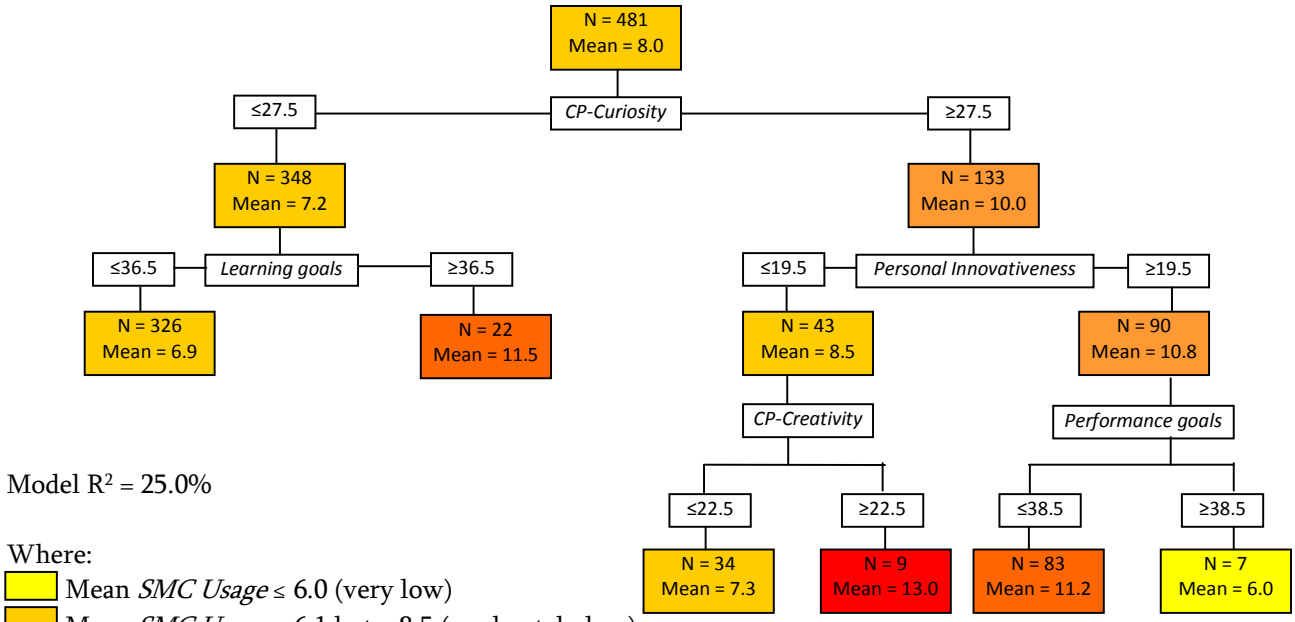
We now focus our discussion more specifically on the empirical evidence that demonstrates how the individual learning dispositions, technological and social-contextual variables described above, emerge as significant determinants of different pathways taken by students in negotiating the tensions and affordances of being 'digital kids' and 'diligent students'.

The research design and mode of data collection comprised an extensive quantitative self-reported student questionnaire administered to the senior school student population of approximately 500 students. This student questionnaire was implemented in mid-2007, by which time the SMC had been in operation for approximately one year. The questionnaire (achieving as it did a remarkably high response rate of 93%) provided numeric data relevant to socio-psychological scales that measure students' learning dispositions, pertinent technological and social-contextual variables, as well as *usage* behaviours related to the SMC, in terms of volume and frequency of use. The learning dispositions measured included *learning and performance goals* and *cognitive playfulness*, as well as *personal innovativeness*, which is, in turn, closely related to the concept of *cognitive playfulness* and commonly defined as 'one's willingness to change, an openness to new experiences and the propensity to go out of one's way to experience different and novel stimuli particularly of the meaningful sort' (Leavitt & Walton, 1975; Hurt *et al.,* 1977; Rogers, 1995). The technological and social-contextual factors measured include perceived *ease of use*, *perceived usefulness*, and perceived levels of *peer support*. Measurement scales incorporated self-developed items

as well as adapted items from previously validated studies in the field, and reported strong reliability and validity test results[1].

A Classification and Regression Tree (CART) technique of analysis[1] was employed to analyse the relationships between students' *learning dispositions*, perceived levels of *peer support*, *ease of use* and *usefulness* (predictor variables) and their *usage* of the SMC (target variable). This technique was developed by Briemann and colleagues (1984) more than two decades ago for predictive modelling of non-parametric datasets that is widely used in fields as diverse as econometrics, finance and banking, international relations and social welfare policy (see Bridgstock, 2007; Yohannes & Webb, 1999; Furnkrantz *et al.*, 1997; Gibb *et al.*, 1993). Figures 1 and 2 on the following pages provide visual representations of the decision tree modelling results that demonstrate the extent to which learning dispositions influence the students' usage of the SMC and their perceptions of how useful the online learning innovation is for furthering their learning opportunities and extend their learning experiences in school. Interpretation and discussion of these results follow.

Figure 1- Decision Tree 1: Individual Learning Dispositions (predictors) and SMC Usage (target)



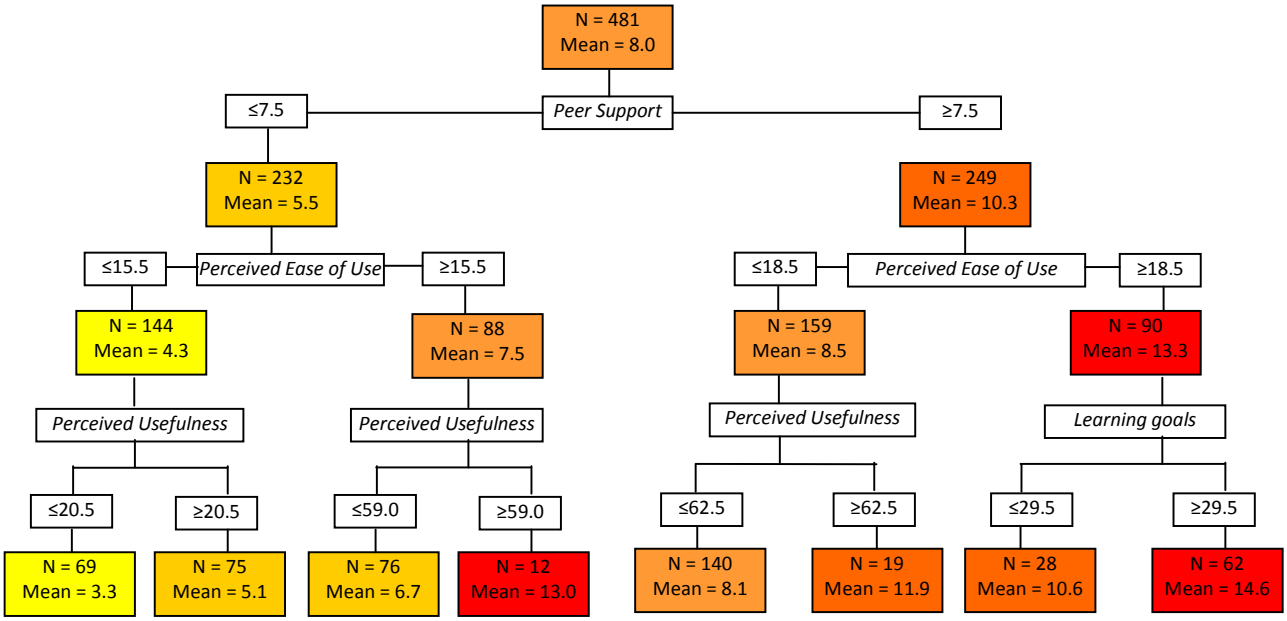
Model R^2 = 25.0%

Where:

- Mean *SMC Usage* ≤ 6.0 (very low)
- Mean *SMC Usage* ≥ 6.1 but ≤ 8.5 (moderately low)
- Mean *SMC Usage* ≥ 8.6 but ≤ 11.0 (moderate)
- Mean *SMC Usage* ≥ 11.1 but ≤ 12.9 (moderately high)
- Mean *SMC Usage* ≥ 13.0 (high)

[1] A detailed discussion of the CART statistical technique, as well as scale validation procedures and results are beyond the scope of this paper but can be made available to interested readers on request.

Figure 2 - Decision Tree 2: Individual, Technological & Social-Contextual Variables (predictors) and SMC Usage (target)



Model R^2 = 53.8%

Where:

Mean *SMC Usage* ≤ 4.5 (very low)
Mean *SMC Usage* ≥ 4.6 but ≤ 7.0 (moderately low)
Mean *SMC Usage* ≥ 7.1 but ≤ 10.0 (moderate)
Mean *SMC Usage* ≥ 10.1 but ≤ 13.0 (moderately high)
Mean *SMC Usage* ≥ 13.0 (high)

The two optimal decision trees depicted above are convincing in terms of their explanatory power, with the predictor variables explaining about 25% (Optimal Decision Tree 1) and 53.8% (Optimal Decision Tree 2) of the variance in the target variable respectively[2]. Results of the decision tree models can be interpreted as follows.

First and most importantly, at the individual level, as shown in Figure 1, *cognitive playfulness* in terms of *intellectual curiosity* emerged as the primary splitter variable and

[2] In the field of innovation adoption and diffusion studies where the target variable measures *actual usage* rather than the *usage intentions*, this R^2 value of 25% represents a reasonably significant percentage of variance explained in the target variable, particularly when only individual-level factors have been taken into consideration for the purpose of this paper. In comparison, a landmark innovation adoption predictive model proposed by Chwelos and Benbasat (2001) which considered a range of individual, technological and institutional factors reported an R^2 value of 32%, which is marginally higher than that reported in the decision tree model discussed in this paper. The full predictive model of innovation usage developed and tested in the doctoral study incorporating systemic factors reported an R^2 value of 54%.

strongest predictor of SMC usage. In other words, students that exhibit higher levels of intellectual inquisitiveness, which is a learning disposition that causes them to 'explore and *play* with a problem until it is solved' (Glynn & Webster, 1993; Dunn, 2004) are most likely to engage with the SMC learning innovation to a large extent, in comparison with the general student population. Second, students who exhibit *higher levels of cognitive playfulness* in terms of *both* intellectual curiosity and intellectual creativity, relative to their peers, emerge as the learner category that reports the *highest usage* of the SMC (mean=13.0). On the other hand, students who report low levels of engagement with the SMC (mean=6.0; 7.2; 7.3) exhibit relatively low levels of cognitive playfulness (both intellectual curiosity and creativity) and learning goals-orientation. This finding underscores the importance of *cognitive playfulness* as a learning disposition that motivates individuals to engage with and embrace novel situations and inventions put before them, in turn a propensity that represents a vital component of creative capacity. This does suggest that *cognitive playfulness* may well be a deciding factor/disposition for successfully negotiating the digital/diligence conundrum.

Two other interesting trends emerge from the results of Decision Tree 1, which call attention to the value of being healthily learning-oriented rather than merely performance-focused. Specifically, the profile of the lowest SMC user-group (mean=6.0) suggest that despite possessing an above-average level of *cognitive playfulness* and *personal innovativeness*, an individual who tends towards being highly performance-driven, may value 'performing' in ways that overwhelm the former learning dispositions, and this in turn may well be a barrier to the individual's capacity to experiment with new ideas, innovations and learning opportunities. On the contrary, as indicated by the profile results of the second-highest SMC user-group (mean=11.5), individuals who may not be particularly dexterous or agile in the cognitive domain but exhibit robust levels of learning-orientation, may nonetheless be open to experiencing new ways of living and learning by engaging with innovative technologies available to them. Once again, they may be able to 'self-fashion' in ways that incorporate both academic achievement and new strategies for learning.

In summary, individuals who are intrinsically motivated to learn new things and acquire new skills are likely to appreciate the opportunities presented by innovations such as the SMC to extend their range of abilities and competencies. By contrast, individuals who are primarily focused on 'getting the right answer' and winning positive judgments of their competence while avoiding 'looking dumb', are likely to resist experimenting with new learning technologies that challenge the comfort zones of traditional pedagogical practices. This resistance or unwillingness to take on new ways of learning and engaging may militate against the sort of robust learning disposition needed for 21st century digital-age lifeworlds characterised by forces of rapid change, shifting and multiple identities, and exponential technological advancements and growth.

Let us now consider the results of Decision Tree 2. The inclusion of the social-contextual and technological variables, namely, *peer support*, *perceived ease of use* and *perceived usefulness* in the analysis, allows for a more sophisticated predictive model increasing it substantially from 25% (Decision Tree 1) to 53.8%. This is reflective of the importance of including contextual technological and institutional issues in the data collection, to understand better the implementation and uptake of new technologies in the specific context, not just individual level factors. Specifically, the results show that *peer support* is the primary split variable and the *most significant predictor* of SMC usage, while both technological factors *perceived ease of use* and *perceived usefulness*, emerge as important predictors of the target variable. This is consistent with prior empirical studies in technology adoption models (TAM) where perceived ease of use and perceived usefulness are consistently found to significantly influence usage intentions and behaviours. These results, however, extend the TAM model by providing empirical evidence demonstrating the vital role that *peer support* plays in influencing users to engage with a new innovation, in this case the SMC. Correspondingly, students who perceive *low levels of peer support* in using the SMC, and find the SMC to be *difficult to use*, and consider it to be *lacking in usefulness* or relevance for their learning and schooling practice report the *lowest levels of SMC usage* (mean=3.3). This may well imply that students for whom the SMC is an 'uncool' or irrelevant space are unlikely to engage *whether or not* they are digital enthusiasts outside the school context.

Two other interesting insights emerge from the results of Decision Tree 2. First, if students perceive *low levels of peer support* but perceive the SMC to be *easy to use* and *useful* for their learning and schooling practice, they may still *engage* with the SMC to a *reasonably large extent* (mean=13.0 or the second highest user group). Second, and more importantly, students who report the highest levels of SMC usage (mean=14.6) display the following characteristics: (i) they experience high levels of peer support and social acceptance in using the SMC, (ii) they perceive a low level of complexity associated with accessing and using the SMC, and (iii) they exhibit greater tendencies towards being learning-oriented rather than merely performance-oriented. In other words, students that *engage with the SMC most frequently and most comprehensively* (in terms of learning features) tend to consider the SMC *easy to use*, experience *high levels of peer support* and encouragement in using the SMC, and are at the same time predisposed to being *mastery-oriented* or *learning goals-oriented*, and enjoy opportunities to learn new skills and extend their competencies.

Again, this finding reinforces the value of students being healthily learning-oriented rather than merely performance-focused, because such a learning disposition allows them to more effectively negotiate the affordances of engaging with innovative technologies available to them, despite the pull of a traditional schooling culture that privileges academic achievement and measures diligence primarily in terms of academic success.

So What?

While the generalisability of the quantitative findings discussed above must be considered with caution given that the study was conducted in one specific formal schooling environment, some important theoretical understandings and insights can nonetheless be drawn. An important insight is the significance of *cognitive playfulness* as a key learning disposition that promotes creative capacity in terms of a willingness to experiment with new ideas and engage with innovations. The study also appears to indicate that, where learning goals wither in relation to performance goals, then it is less likely that the disposition to 'be creative' (ie, to play with novel ideas in novel ways to achieve novel ends) will be forthcoming. Conversely, where learning goals are robust in relation to performance goals, then strategic thinking, and therefore, *cognitive playfulness*, is a more likely outcome. In other words, digital engagement and a diligent academic disposition are not seen as mutually exclusive. Last but not least, the findings suggest that while the individual learning dispositions discussed above and technological factors such as perceived ease of use and usefulness are important, social influence in the form of peer support and encouragement is absolutely crucial in motivating students to engage with innovative digital learning opportunities such as the SMC, and consequently extend their learning opportunities and develop essential 21st century digital literacies.

As Warschauer (2007) points out, the move from the industrial age to a digital knowledge economy sees education systems and schools currently experiencing an awkward transition between what Bolter (1991) called *the late age of print* and others (e.g. Attewell & Winston, 2003) have called a *post-typographic society*. Viewed through the lens of supply-push and demand-pull approaches to education and schooling, this transition is indeed a complex process. In this late age of print, the logic of mainstream schooling practices is still constructed through a supply-push approach to education that privileges credentialing through standardised testing and strong academic performance in tests of hand-written memory.

Progressive school leaders advocate the need to expand learning opportunities for their students to acquire essential 21st century digital-age literacies and skills in new and innovative ways that capitalise on emergent networked technologies. In doing so, these educators have to negotiate immense pressure from parents and other stakeholders to maintain high levels of print literacy, in turn identified through high academic achievement and qualifications amongst their students. In the same way, students are acculturated and socialised to value the types of literacy practices that they, their families, and their community believe will contribute to academic success and thereby enhancing their life opportunities, while resisting others that are not perceived as directly related to academic success, such as non-academic online activity (Albright *et al.,* 2005; Warschauer, 2007).

Despite and because of these challenges and complexities, the need to integrate digital and technological literacies and skills with traditional academic knowledge and skills

(Prensky, 2001, 2006) is becoming increasing urgent. Simply introducing new technologies into schools is a necessary but insufficient move, in terms of the 'rubber' of digital tools hitting the 'road' of pedagogical practice in schools. The challenge is to introduce the practices, dispositions, and values that are able to be *sustained* within that context, all of which are more relevant to the future of the students and the culture of the school. The issue is that the increasingly widespread use of these technologies will not *of itself* deliver these practices, dispositions, and values. School experience itself must change in terms of the practices, dispositions, and values of mainstream schooling as experienced by its most important stakeholders, the students. As this doctoral study further unfolds, it is hoped that the implications for schooling will become clearer. However, there is little doubt that the nexus of technological innovation and traditional schooling presents a culturally and pedagogically complex educational challenge. One implication that does emerge from the findings discussed in this paper is that we need a more nuanced understanding, and therefore a more informed methodology for investigating how students experience the tension of being called simultaneously to develop powerful digital capacities *and* to perform as diligent members of their school community. It is our intent to further research into possible and effective ways of addressing this digital/diligent student identity dilemma, and continue to work collaboratively with educational leaders and teacher professionals to deliver a relevant education for postmillennial times.

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APPENDIX A

Student Media Centre (SMC), learning features, pedagogical design and objects

The SMC was endorsed by the executive staff of the school as a student-centred, student-led learning initiative. It was developed, implemented and managed by a core group of 30 senior year students that comprised a number of student leaders and others who have been identified as either 'gifted and talented' students, or exhibited some form of 'creative inclinations', such as creative writing (print literacy), digital media, graphics and design, and the like.

The online SMC site was designed and implemented with the key objectives of engaging the whole school community in (i) promoting a well-rounded schooling experience, (ii) developing critical and digital media literacies, as well as individual and collaborative creative processes and relevant real-world skills, and (iii) encouraging a stronger student voice within the school community. Specifically, the online SMC was hosted on the school intranet server and comprised the following features that students could access and engage with:

(i) *student-created multimodal content* organised and presented online in various sections (tabs or web pages) as follows:

- *News* – for articles on news and events within the school community
- *Your Work* – for critical social commentaries on issues relevant to students within and beyond the school community, as well as exemplary student academic work from various disciplines
- *Podcasts* – for audio recordings of school events, such as sports games and debates, as well as music performances by bands or vocal groups within the school
- *Videos* – for streaming media of videos created by senior school students including documentaries and music videos, either as part of their curriculum (e.g. Film and Media, Religious Education) or out of personal interest in their own time
- *Images* – for digital photos covering a range of events at school, such as debating teams, competitions, sports days, and the like

(ii) an *interactive forum* which allowed students to create and contribute to forum discussions on a variety of topics that interested them

(iii) *online polls* created by students to collect and tabulate public opinion from the wider student community on issues of pertinent interest to them

(iv) a *backend content management system* that students assigned as SMC online moderators and technical team members could access in order to manage and moderate content. This included the flexibility to organise, add and edit relevant content, as well as remove inappropriate content where necessary.