Growing in digital maturity: Students and their computers in an academic laptop programme in Singapore

Using data collected through two focus group interviews with 14-16 year olds involved in a one-to-one laptop academic programme in a Singapore secondary school, this paper shows some student disengagement and dissatisfaction in class, and this poses questions about the relevance of the school’s laptop programme. Our findings illustrate low productivity in the students’ use of their computers as they respond to their teachers’ instructional agendas. Our work indicates research into one-to-one laptop learning needs to pay greater attention to the minds, motivations and hands of students as they embark on learning they do not fully understand or can control for themselves. We determine that educators and policy-makers need to know a lot more about how growth in students’ digital maturity operates. In the final analysis, we understand and explain the students’ views about how their learning experiences might be improved, and their behaviour (as a digital wisdom journey centred on learning) to be digitally mature.

Keywords: one-to-one laptop computing; Net Generation; students’ engagement; digital wisdom; mobile pedagogy

Introduction

Research into one-to-one laptop computing in secondary or high schools has tended to focus on what teachers and students do (e.g., Livingston, 2009; Warschauer, 2006) or can do (e.g., Lei, Conway, & Zhao, 2008; Warschauer, 2011) with their devices rather than on how or why ubiquitous, mobile teaching and learning is apt and appropriate for mainstream subject-based curricula. While it is useful to showcase exemplary practices at the intersection of teaching and learning, and digital technology, most approaches are squarely technologist in perspective; that is they are interested in demonstrating how technology enhances learning. However, what might happen pedagogically when the power of laptops is underestimated or not fully realised by teachers and students?
Prototypically, we might think opportunities for impactful teaching and learning would be lost or go wanting when potential—for whatever reason—outstrips practice. However, as this article attempts to show, students can still learn valuable lessons from their laptop-mediated experiences both in and outside of classrooms despite restrictive and limiting instructional agendas and standardised testing.

This article draws on data collected from two grade levels at a high achieving (both academically and in other non-academic fields) all-boys secondary school in Singapore we shall call, Fox Hill. Teachers and students at Fox Hill use English as the language of instruction but there are additional resources available from the government’s Ministry of Education for the school and students to enrich their learning of Mandarin and Chinese culture through advanced bilingual and bicultural programmes. In January 2008, the school embarked on a one-to-one laptop ownership programme as part of a larger school-wide infrastructure and curriculum development plan to improve its students’ engagement in learning and strengthen their critical and creative capabilities. We designed and conducted (at the invitation of the Principal) a pilot laptop study in the English language department in 2008. Our findings showed that despite free, open and continuous access to digital technology both in school and at home for teachers and students alike, and considerable latitude in curriculum planning and implementation, teachers at Fox Hill preferred direct instruction and required students’ unconditional compliance with their content-specific and exam-oriented instructional agendas. As a result, laptop use was largely contingent on existing and available levels of trust with students, and not learning or task requirements necessarily. This operating condition severely restricted the students’ agency in their learning even though our evidence suggested that they had prior exposure to the use of technology in prior school years both at primary and secondary levels (author + one other, 2009).
Subsequently, from 2009-2010, a research programme with nine teachers and their respective students at Fox Hill aimed to intervene in one-to-one English language laptop work by co-designing and co-teaching a series of assessment tasks featuring digital tools and new media at their core (see author + two others, 2011). In mid-2010, as part of the evaluation (Mertens, 1998) phase of our study, we directly sought the in-depth insights (Hitchcock & Hughes, 1995) of students with a shared background and a pool of common knowledge relating to the laptop learning programme. Our chosen technique was focus group interviews designed to answer three research questions in the broad context of English language and literature teaching across three school levels (Secondary 1 to Secondary 3):

(1) How do students use their laptop computers in a secondary school academic setting?
(2) What concerns do students have in using laptop computers in their learning?
   How do they think these concerns might be addressed?
(3) How might we understand and explain students’ behaviour and views in and through academic laptop computing?

Ultimately, our goals are to identify, understand and explain the meanings, beliefs and culture that influence the feelings, attitudes and behaviours (Rabiee, 2004) of the students in the laptop programme at Fox Hill. Our expectation is that our material will contribute to knowledge about the Net Generation in Singapore and a conversation about how their needs can be addressed. In the first section of this article, we review briefly two aspects of digital life: (i) the literature about growing up, and (ii) learning in the digital age. Second, we present our one-to-one laptop study findings as they relate to digital identity work. Finally, we discuss the results and draw some implications for classroom pedagogy and practice.
Literature Review

**Net Generation Education Needs**

The search for an acceptable conceptualisation of children and adolescents who have grown up surrounded by, and who use, digital tools and new media is complex and sometimes contested. Whether we refer to the ‘Digital Age’ (Gee & Hayes, 2011) or the ‘Information Age’ (Bucy, 2005), or the ‘Net Gen’[eration] (Tapscott, 1997, 2009) or the ‘Digital Generation’ (Jukes, McCain, & Crockett, 2010) a familiar starting point is summarised as follows: Through technology, the world has changed and continues to do so at a rate, and in directions, that few educators can barely grasp or address in thought and practice. To confound matters further: the technical landscape is smaller and larger (Negroponte, 1995), closer together and further apart (Turkle, 2011), and less informed (Stoll, 2000) and vastly empowered intellectually (Prensky, 2010). The consequences of these confluencies are striking.

For example, according to Brooks-Young (2010) there currently exists a range of underused mobile technologies and Web-based tools in mainstream education. These items include, mobile phones, MP3 players, social networks, virtual worlds, images, videos and games. Furthermore, the argument goes, due to the effects of globalisation, students who live in industrialised nations are becoming increasingly disenchanted with school. They rankle at completing the same projects and assignments their parents did, and argue that the technology tools banned on campuses are, in fact, the very keys to their success in the future. The disengaged-enraged student camp wants students to ‘flourish’ (Brooks-Young, 2010, p. 10) in and through their learning.

Jukes, McCain and Crocket (2010) also identify “… a crisis of relevance in … schools” (p. 9). As they explain:
Children today are completely comfortable with the visual bombardment of simultaneous images, text and sounds because, for them, such experiences provide relevant and compelling experiences that can convey more information in a few seconds than can be communicated by reading an entire book. … This generation no longer wants just to be the audience; they want to be the actors. They expect, want, and need interactive information, interactive resources, interactive communications, and relevant, real-life experiences. (Jukes, McCain, & Crocket, 2010, p. 14)

In response, Jukes and his associates advocate a mode of education that moves away from memorisation and telling towards ‘whole-mind instruction’ (p. 73). This approach is based on the acquisition and practice of skills in five basic areas: Solution Fluency, Information Fluency, Collaboration Fluency, Creative Fluency and Media Fluency. With Solution Fluency, students develop the ability to think creatively to solve problems in real time by clearly defining problems, designing and applying appropriate solutions, and then evaluating processes and outcomes. In Information Fluency, students work on: (i) accessing digital information sources to retrieve desired information, and (ii) effectively assessing the information retrieved. Collaboration Fluency is distinguished by the ability to work cooperatively with real and virtual partners in the creation of original digital artefacts. Creative Fluency captures the process where significance is added to instruction and learning through design, art and storytelling. Finally, Media Fluency embraces two potentials: (i) looking analytically and critically at communication to see how chosen media are used to shape thinking and meaning-making, and (ii) making meanings through the selection and use of specific media for a particular message and audience.

For Prensky (2010) today’s students—by virtue of being born in the digital age—are digital natives by definition. The ‘digital native’ moniker is widely adopted in contemporary circles despite some misgivings about its empirical bases (e.g., Bennett,
Maton, & Kervin, 2008). As originally characterised (Prensky, 2001) digital natives ‘…are all “native speakers” of the digital language of computers, video games and the Internet’ (p. 1) and this is contrasted with the behaviour of ‘digital immigrants’. Prensky continues:

As Digital Immigrants learn—like all immigrants, some better than others—to adapt to their environment, they always retain, to some degree, their “accent,” that is their foot in the past. The “digital immigrant” accent can be seen in such things as turning to the Internet for information second rather than first, or in reading the manuel for a program rather than assuming that the program itself will teach us to use it. Today’s older folk were “socialized” differently from their kids, and are now in the process of learning a new language. And a language learned later in life, scientists tell us, goes into a different part of the brain. (Prensky, 2001, p. 2)

From this we see digital natives acting and thinking differently, but being a digital native is more than a birthright or even a set of learned capabilities. Rather, Prensky clarifies; it is a matter of socialisation and ‘growing up’ in a digital nation or culture (Prensky, 2011, p. 17). However, Prensky is not interested in simply echoing Tapscott (1997). In fact, he wants to go considerably further by claiming that using digital technology can not only make us smarter but also wiser both in and through ‘… the prudent use of technology to enhance our capabilities’ (Prensky, 2011, p. 18). He adds:

Digital wisdom can be, and must be, learned and taught. As we offer more courses in digital literacy, we should also offer students guidance in developing digital wisdom. Parents and educators are digitally wise when they recognize this imperative and prepare the children in their care for the future—educators by letting students learn by using new technologies, putting themselves in the role of guides, context providers, and quality controllers, and parents by recognizing the extent to which the future will be mediated by technology and encouraging their children to use digital technology wisely. (Prensky, 2011, p. 26)
If Prensky is correct and we accept his views, skilling in the digital age—however new or different—is no longer sufficient. Indeed, with the addition of wisdom, digital education now requires a philosophical stance that can answer demanding questions about ethics, morality and citizenship. But, unfortunately, to date, there is little guidance in the literature about what is involved, in real pedagogical and practical terms, in teaching and learning digital wisdom.

**Digital Identity Work**

Whatever learning to be digitally wise consists of, it is likely to include identity work. By this, we do not mean the listing of characteristics or themes of digital youth, but refer instead to the active and time-consuming processes involved in creating, reshaping and maintaining a digital self. In Ohler's analysis (2010) the introduction of cyberspace into the human experience propels identity management into the realms of invention and experimentation. On-line, we can try on a new self, or selves, for fit and use them as the basis for something we might call identity performance where honesty and tolerance can be pushed beyond what is acceptable in real-life. But there are costs involved. As Turkle (2011) explicates in her excellent societal and cultural commentary titled, 'Alone together: Why we expect more from technology and less from each other', the maintenance of an edited life—for instance, making decisions about which photos to post on Facebook or creating an avatar—requires energy and time. Yet, being connected, making contributions, being involved and social interaction are also essential and constitute the mainstays of a vibrant digital life.

Digital identity work has two conflicting potentials that must be balanced by the digitally wise. First, for Ohler (2010) electronic connection allows individuals to surpass the limitations of physical communities by opening up multicultural perspectives that can be subsequently synthesized to produce better understandings of
our real-life world. But, second, expanded digital horizons can also be, for some, an unregulated and inauthentic site of behaviour. For example, Ohler (2010), Tapscott (2009) and Turkle (2011) provide illustrations of disinhibition online—a lack of restraint and disregard of social conventions that can have repercussions in the real world. This could occur through unrestrained communication (e.g., using social media to criticise people and situations), sharing intimate details that may be regretted in later life (e.g., posting compromising photographs on Facebook), and dishonesty (e.g., telling lies). As we will attempt to show in the next two sections, negotiating and balancing digital identities and learning to be digitally wise are not straightforward matters.

**Methodology**

**Participants**

We recruited the participants for the focus group interviews on a class-by-class and school-level basis. Teachers (with the requisite participants’ assent, and school and parental written consent) nominated one student representative from each class in school levels Secondary 2 \( (n = 9, \text{age } 14-15) \) and Secondary 3 \( (n = 12, \text{age } 15-16) \). By this time, the Secondary 2 and Secondary 3 students had had one-and-a-half and two-and-a-half year’s prior school and home experience, respectively, with their laptops and so could draw on what we hoped was established and informed practice in English language and literature learning and beyond to other subjects. We guaranteed full confidentiality and anonymity throughout.

Each group interview lasted approximately 1 hour and took place during school time in an available location (teachers released the students from their regular English classes and we gave each one a $10 book voucher and a $4 school canteen ticket as tokens of appreciation). As moderators and facilitators, we tried to be as encouraging as
possible and attempted to create an environment conducive to the free exchange of views—we arranged the seats in a horseshoe to keep eye contact (Hitchcock & Hughes, 1995).

**Data Collection**

We followed a semi-structured protocol with both closed- and open-ended questions (Mertens, 1998). We began with a set of predetermined questions (suited particularly for fact-finding) but allowed, where possible, for the student-participants to direct their comments towards topics of relevance and interest to them (see Appendix 1 for the full list of questions used for both student groups). We therefore explored particular lines of talk with ad hoc follow-through questions (Freebody, 2003). We videotaped both focus groups in digital high-definition. We used the camera’s directional microphone together with strategically-placed digital devices to capture the audio at multiple points. As the interviews proceeded, we observed and noted (on paper) other off-camera and non-verbal interactions.

**Data Analysis**

We combined the video and audio sources to create two combined files (one for each level) using QuickTime™ software (Apple Computer, 2010). Next, we produced verbatim transcripts of the audio tracks for subsequent analysis. Our analytical approach was qualitative in nature using open and axial coding (Strauss & Corbin, 1998) to identify phenomena and their interrelationships within the broad context of the students’ actions, beliefs and values. Our coding and analytical procedures consisted of three main steps (Rabiee, 2004). First, we familiarised ourselves with the videographic and audio data through several passes of viewing, listening and reading. Second, we began work on developing a thematic framework by writing memos, and noting ideas and
concepts in the margins of the transcripts; this produced 162 coded items under 18 broad category headings. Third, using a word-processor, we compared and contrasted the data within and across the focus groups. This resulted in some consolidation, reclassification and data reduction until we were left with 12 final categories. We were guided in our interpretations of the focus group data by a number of considerations including: the use of words and their intended meanings, and the frequency, extensiveness, specificity and intensity of the comments made and coded. Overall, we triangulated our findings and interpretations with previously published results from the same school (see Author + one other, 2009) based on other data sources including: lesson observations, minutes from departmental meetings, and interviews with teachers.

Findings
In this section we present illustrative findings from our analysis of the two focus group interviews in three sections; one for each of the research questions outlined above. In section one we describe the students’ uses of their laptops in the school’s academic programme using English language and literature learning as an entry point to the wider laptop mediated school curriculum. In section two, we identify the students’ concerns in using their laptops and detail some of their major suggestions for how these might best be addressed. Finally, section three describes the students’ behaviour and views in and through the laptop programme. We will attempt to make sense of and explain the students’ viewpoints in the discussion that follows.

Students’ Laptop Uses
In general, the students’ uses of their laptops both in- and out-of-school correspond to what we might expect from having constant access to information via wireless computers loaded with applications and productivity software (cf. Warschauer, 2006).
The range of activities the students mention in the discussions include language skills-based work (e.g., reading and preparing oral presentations), writing (note-taking, essay planning and writing), vocabulary building (using an online dictionary to find the meanings of words and phrases), research (mostly, surfing the Web for factual and procedural information), communication (e.g., distributing information, on-line postings and email), assessment (taking on-line quizzes and obtaining feedback on drafts from teachers and peers), and downloading instructional materials (e.g., worksheets).

**Students’ Concerns and Suggestions**

While the students in both school levels ‘like’ their computers (in the sense that they wouldn’t want anyone to take them away) and keenly appreciate the convenience they afford in terms of typing, text revision, and anytime-anywhere access to materials and communication, they still have two broad areas of concern relating to their laptop use (or not) both in- and out-of-school. These are: (i) Instructional and learning practices, and (ii) Utility and usefulness.

A major issue in terms of instructional and learning practices relates to frequency of use. This is illustrated in Extracts 1a (Secondary 2) and 1b (Secondary 3) where I = Interviewer and S = Student.

**Extract 1a**

1. I How often do you use your computers in class on an average day? One hour? Two hours?
2. S3 We don’t normally use them in class. We only use them very rarely.
3. I Is that just for English language or for all of your lessons?
4. All Almost all.

Extract 1b

10. I You don’t use your computers very much in school, is that right?
11. All Yeah.

The students also question the utility and usefulness of their laptops in school-related work. As we can see in Extract 2a, two Secondary 3 students raise issues affecting the potential success of the school’s laptop programme: Student S10 mentions portability (Line 21) and hints at a deeper concern in that there’s “no point” in carrying their computers around. Then, S11, in Line 23 pinpoints a conflict—as he sees it—in laptop use and exam preparation. This insight is echoed and explained by Student S2 (Secondary 2) in Extract 2b. His viewpoint is that computers are of no use if all students have to do is memorise and reproduce material in high-stakes examinations.

Extract 2a

20. I Now, guys, why don’t you bring your computers to school?
21. S1 They’re too heavy. No point.
22. I OK. Let’s say you had a teacher who wanted to use the
laptops a lot. Would you then bring your laptops to school?

23. S1 Yes, but then there’s a problem. Because the teachers’
    overall goal is to prepare you for the O-levels [the national examinations at the end of secondary schooling].

Extract 2b

30. S2 … we don’t really need our laptops.

31. I You don’t?

32. S2 We really don’t need the computers especially for memorising skills. Because if you’re writing down, you can memorise stuff easily. So, really, studying is about memorising a lot of things so, we really have to write more often.

There is also a sentiment expressed that there are lost opportunities in the present laptop programme implementation. For instance, in Extract 3, Line 41, Student S6 (Secondary 2) responds to the follow-up question, “So, what do you think about having a laptop when you don’t use it in class?” with the remark, “A bit wasted”. He does not say anymore than this.

Extract 3

40. I So, what do you think about having a laptop when you
Despite the reports of low usage, the students can identify and articulate for their teachers a number of ways to engage them (cf. Prensky, 2010) in laptop-mediated learning. Their ideas include:

- More distance learning;
- Less written assignments;
- Create quizzes for formative assessment purposes;
- Provide extra lessons online for students who need help;
- Make learning fun through puzzles, problem-solving and games;
- More teamwork; and
- Writing essays about something they like doing.

Overall, given the breadth of these suggestions, we can infer a student desire for greater interaction with their teachers and peers. They would especially welcome opportunities to explore online and express their views. The use of Facebook in class exemplifies an alternative communicative space.

50. I Let me do a quick poll. How many of you have a Facebook account? [After a pause of approximately four seconds, all the students raise their hands.] So how often do you use Facebook in your classes?
52. S6 I don’t think it’s allowed.
53. I Why not?
54. S6 It’s alright during recess, but not during class because it will disrupt the lesson and we won’t concentrate.
55. I But if you had the opportunity would it help the class learn?
56. S6 Yes.
57. I How exactly?
58. S6 Because [in] Facebook they have discussion forums for you to write. You just post in them and you can say … what’s on your mind. Because some people are shy to raise up their hands.

In Extract 4, Student S6 (Secondary 2) indicates in Line 58 that Facebook forums can promote discussion and information sharing in class. This suggestion may be a way of addressing the institutional anxiety about the potentially disruptive nature of social media he refers to in Line 54.

*Students’ Views and Behaviour In and Through Academic Laptop Computing*

The students’ views and behaviour in and through the academic laptop programme are both complex and potentially contradictory. Yet, a good place to start in understanding and explaining their perspectives is to identify their characteristics as ‘Net Geners’ (Tapscott, 1997, 2009). There are three points worth making. First, throughout the discussions there is mention of the students’ in-school capabilities and talents (e.g., public speaking, filming, music, information technology, science, mathematics, English, literature and sport), and out-of-school interests and passions (e.g., art, gaming, writing,
music and travel). Yet, there is a noticeable disconnect between these interests and what happens in school. In fact, when the students are noticeably disengaged this leads, on occasion, to non-conformist conduct in class. The matter of engagement arises in connection with setting up and playing networked, multi-user games in class behind the teachers’ backs.

Extract 5

60. S1 I think some teachers don’t want to let students use [their laptops] in class because they are afraid they may just play games.

61. I So, is that what happens?

62. S1 Yes.

63. I So, why do you guys do that in class?

64. S4 Guess it’s that lack of self-control maybe.

65. S3 Teens like to rebel. We will play games when we are not supposed to. Like you make any unnecessary rules in the school [and] people will try to break them.

66. S1 They like to attract attention.

67. S3 They’re bored.

In Extract 5, three Secondary 3 students offer reasons for their unsanctioned and clearly disruptive in-class computer gaming. Student S3 (Line 65) points to a rebellious attitude, Student S10 (Line 66) suggests being noticed, and Student S3 (Line 67) plainly
cites lack of interest in classroom work. S4’s mention in Line 64 of a lack of self-control (the students can’t help themselves doing what they know is wrong) is a recurring topic.

Extract 6

70. S4 The computers, right now, are a very strong distraction from everything. So, I think there isn’t exactly a concrete way to get rid of the distraction, but it’s just [that] we have to train ourselves to be more disciplined.

Second, and connectedly, the laptops are a cause and object of disturbance in class (Extract 6, Secondary 3) and consequently a personal concern. As a case in point, Student 4’s explanation in Extract 6, Line 70, concerning self-discipline shows admirable problem-solution awareness but some of his peers conclude differently. Additionally, in Extract 7, Student S3 (Secondary 3) thinks his computer is too powerful for schoolwork. And even further, Student S3 goes on to explain in Extract 8, Line 91, that he would be better off not using his computer at all, in school. Clearly, the best way of dealing with a source of disturbance is to remove its immediate presence (Student S10, Line 97).

Extract 7

80. S3 I think our computers are too powerful.
Third, there is evidence in the focus group discussions of students using their computers and access to social media as platforms for identity work. Furthermore, the consequences of this behaviour are seen in their behaviour in school, and relate to views of the wider social world. The need to participate by having choices and making decisions is underpinned by a familiarity with online connectivity and its benefits. As Student S4 (Secondary 3) affirms in Extract 9, his computer is a part of his life.

Extract 9

100. S4 I guess over time we’ve grown attached to these things.
For others, their online presence allows them to act differently and perhaps distinctively; Student S4 (Secondary 3) in Extract 10, Line 111, is more relaxed, and his peer, S4 is more expansive, socially (Line 113). Interestingly, whereas S11 (Line 114) thinks he is no different on-line, S3 has discovered that his online past weighs on his real-life present—he’s perceived as a nerd (Line 115); ‘an unstylish, unattractive, or socially inept person; especially: one slavishly devoted to intellectual or academic pursuits’ (Merriam-Webster.com).

Extract 10

110.  I  Do you think you have cyber-identity?
111.  S4  Yes, you can say that because when you’re online you tend to have more time to think about what you’re trying to say instead of just shooting your mouth around. So, I find myself being, I guess, calmer.
112.  I  Anyone else?
113.  S5  On the Net, I tend to be more social and I talk more than in real life. I mix around people; I’m actually quieter than online.
114.  S1  I don’t exaggerate myself and I don’t put [portray] myself any different[ly].
115.  S3  My cyber identity is around the same as mine [in real life] but I used to blog on actual Websites so people think I’m a … nerd.
There is also a sense in which online activity supports disinhibited behaviour characteristic of Net Geners. Consider the exchange in Extract 11 with Student S9 (Secondary 2). Although, not typical, this 14-year-old momentarily casts aside restraint and voices criticism of his teachers (Line 125) shielded—probably—by the anonymity of a blog pseudonym.

Extract 11

120. I How many of you have a blog? [Three second pause].
    Okay, half of you. What do you use your blog for?
121. S9 Ranting, complaining.
122. I What do you complain about?
123. S9 School, the teachers.
124. I What’s wrong with the teachers?
125. S9 Some of them are very bossy and stuff like that; very hot tempered.

Finally, even though there is partial awareness of their rebelliousness and lack of restraint, there is a sign of conscious—against the background of the school’s rules and regulations—of the self-management issues inherent in computer-mediated living and learning. For example, in Extract 12, Student S9 (Secondary 3) responds to S5’s problem with an intriguing suggestion (Line 134): that he and his classmates need to develop a sense of collective responsibility and care for others in the use of powerful
personal learning devices. Apparently, accountability in ubiquitous laptop use has its origins in social behaviour.

Extract 12

130. I Is there anything else you want to tell me about your use of computers in school or at home?
131. S5 I think the main thing is self-discipline, which must come from within. There’s nothing much the teachers can do because if a student rebels—however the Discipline Master will punish him, if he still rebels, he will still be a rebel. Unless he chooses to change.
132. I Yeah.
133. S5 So, I think it must come from within.
134. S9 I think the other point is also influence from other classmates. Because, if one of them starts playing then the others will be tempted to try playing too.

Discussion and Implications

Set against the background of an established and on-going Singapore secondary school one-to-one laptop programme intended to improve its students’ engagement in learning and strengthen their critical and creative capabilities, the findings from two focus group interviews with 14-16 year olds illustrate some of the effects that can occur when the power of mobile technologies is not fully realised as an instructional and learning platform (cf., Brooks-Young, 2010). There are two strands of evidence to support this
viewpoint using English language and literature learning as an entry point into the field of information technology-mediated learning across the broader curriculum. First, in answer to our first research question concerning the students’ laptop uses, we see low-level productivity across the board. The students’ reported activities relate mostly to responding to teacher-directed, classroom-based work. This cannot be discounted out of hand, but we contend there is much unexplored scope for the design and implementation of a fluencies-based skills agenda that allows students to use digital tools and social media to construct meanings that are personal and transformative (Ajayi, 2009; Cummins, Brown, & Sayers, 2007), and move beyond the written and/or spoken word to multimodal representations of knowledge (Kress, 2003).

Second and connectedly, the students’ concerns (see research question 2) about the academic laptop programme fall squarely into the disengaged camp and hint strongly at relevance issues although these are not at crisis level nor is their annoyance deeply-seated or systematic as Brooks-Young or Prensky would have it. Interestingly, while the students’ suggestions about how their concerns might be addressed are useful, there is little mentioned that is distinctively non-academic. Overall, the students have a small number of novel ideas about how their teachers could use the laptops differently to produce different outcomes. This is an important finding, as prototypically, we would expect digitally wise students to have definite and abundant ideas about how to use digital technology effectively. How can we understand and explain this disparity?

In some respects, the students in our study display positive signs of being digitally wise to the strengths and weakness of their laptop use (see research question 3). For instance, there is a sense and knowledge that their out of school interests can feed into school-based work, and that their computers are not always best suited to classroom work especially when memorisation and repetition are paramount.
Importantly, the students want to participate as Ohler says they must as online personae, but their wisdom is complicated, difficult and ultimately incomplete as seen through their behaviour and views.

Notably, while some of our participants turn to their technological devices, in class, to maintain their interest (Tapscott, 2009), they also recognise their shortcomings with discipline. For example, a student secretly plays networked video games in class, he knows his covert gaming, challenges authority. This conduct hints at a lack of self-control and self-direction. Then again, the idea that the students take collective responsibility for their actions in class is striking and truly sensible.

We can also see in our data some evidence of digital identity work taking place through social media (Facebook profiling, blogging etc.). Perhaps this involves learning to ‘be’ someone else or displaying a different kind of character trait (see Extract 10) but we did not see anything greater than this—for example, we have no indications of identity reinvention or reshaping (Turkle, 2011).

Overall, we view our participants as learning to be digitally wise. We see they are learning from, and being challenged by, their experiences of working within an academic laptop programme but possibly outside of official expectations. Yet, it is not easy to see how digital wisdom might be taught in its entirely through a specified curriculum that goes far beyond skilling. We, therefore, understand and explain the students’ behaviour and views in our study as forming part of a digital wisdom journey we call ‘maturation’. For us, growing in digital maturity can take predictable paths but it is also bound to run into uncharted territory. It may begin with teachers inviting their students to see for themselves how digital tools and new media can be used to make personal and transforming communication come alive, and end with adults taking full responsibility for mentoring or shepherding others in digital production-reproduction in
later life. This is likely to involve taking responsibility in situations that schools cannot or currently find difficult to provide or support. For example, making explicit political statements, managing money, religion, ethics or anything else connected intimately to authentic human experience. In short, we will never be able to claim digital maturity status just as full digital wisdom is likely to be unattainable. Digital life is about learning and it would seem to make sense to provide the flexibility within laptop programmes to allow this to occur—even in unexpected and perhaps undesirable ways.

Overall, our indicative findings confirm and concur with previous studies where researchers raise issues and ask searching questions about school laptop learning programmes worldwide in terms of limited usage (Windschitl & Sahl, 2002), student distraction and off-task work (Lei & Zhou, 2008), and accommodating the conflicting pressures of preparing students for pen-and-paper high-stakes examinations and working digital media (McGrail, 2006; Sclater et al., 2006). And yet while it is beyond the scope of our present discussion to evaluate laptop learning programmes, in general, we consider that our data supplements and deepens the positive and enthusiastic digital media learning literature (e.g., Brooks-Young, 2010; Livingston, 2009; Warschauer, 2011) with glimpse of evidence from a situated-practice perspective that interrogates the reasons for embarking on programmes of technology-mediated learning (Author + one other, 2013) and provides a basis for programmes of responsive teacher professional development and growth initiatives (Author + one other, under review).

Concluding Remarks
As one-to-one laptop initiatives multiply rapidly, their relevance, methods and effectiveness can and should be open to evidence-based scrutiny. Our research efforts illustrate a mix of positive and negative affordances in mobile technology use. The pedagogical strengths and weaknesses of laptop provision stand side-by-side and must
be balanced both individually and collectively by students and teachers. Whereas
turning potential threats into opportunities is perhaps a greater challenge for school
policy-makers and teachers who are tied—perhaps through no fault of their own—to
restrictive and limiting instructional agendas.

We acknowledge the limitations of the material presented in this paper. First we
are sensitive to the fact that information study participants provide in interviews are not
infallible. Rather, as Freebody (2003, p. 136) notes, at best, participants provide
researchers and themselves, versions of the state of their beliefs as they consider them
appropriate to the specific interpretative occasions in which they find themselves. We,
therefore, cannot measure quantitatively the extent or effects of the focus group context
and organisation on the students. However, their information and views are consistent
with earlier study findings and resonate with international research and writing
concerning 21st Century learning. Second, while we are cautious about making
generalisations, our data does show some evidence of distinctive identity work although
we did not see any major changes of opinion or position. Clearly, it would take a more
detailed, longitudinal case study approach to show changes in students’ behaviour and
views over time.

In the final analysis, our work indicates and suggests that educators and policy-
makers need to know a lot more about how growth in digital maturity operates in
particular contexts. The effects and differential benefits of ubiquitous mobile learning
are only just beginning to surface after many years of purchasing and use. We believe
research into one-to-one laptop learning needs to pay greater attention to the minds,
motivations and hands of students as they embark on journeys they do not fully
understand or can control for themselves.
Acknowledgements removed for the purposes of peer review.
References


Author + one other (2009).

Author + two others (2011).

Author + one other (2013)

Author + one other (under review)


Word count: (7, 187 including references and the appendix)
### Appendix 1. Focus Group discussion questions

<table>
<thead>
<tr>
<th>Secondary 2</th>
<th>Secondary 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How have you used your laptop over the past 12 months in your English language/English literature learning? Provide examples.</td>
<td>1. How much (in terms of hours a day) do you use your computer in school/at home?</td>
</tr>
<tr>
<td>2. How has your teacher used IT over the past 12 months in your English language/English literature classes? Provide examples.</td>
<td>2. How have you used your laptop recently in your English language learning? Provide examples.</td>
</tr>
<tr>
<td>3. How would you like your teacher to use IT in class?</td>
<td>3. How has your teacher used IT recently in your English language classes? Provide examples.</td>
</tr>
<tr>
<td>4. What things relating to learning do you think you are you good at and would like to do more of?</td>
<td>4. What are you good at in school?</td>
</tr>
<tr>
<td>5. What could you or your teachers do to make your learning more challenging and interesting?</td>
<td>5. What’s your passion?</td>
</tr>
<tr>
<td>6. Any other questions or comments to make.</td>
<td>6. Do you think you have a cyber identity? How strong is it? What do you do?</td>
</tr>
<tr>
<td>7. What could you do to make your learning more challenging and interesting in school/at home?</td>
<td>7. What could you do to make your learning more challenging and interesting?</td>
</tr>
<tr>
<td>8. What could your teacher do to make your learning more challenging and interesting?</td>
<td>9. Any other questions or comments to make.</td>
</tr>
</tbody>
</table>