ual:

Vol 2 / Issue 2 (2017) pp. 102-110

Spark: UAL Creative Teaching and Learning Journal

Here today, virtual tomorrow: Future proofing your digital presence

Dr Pete Rive, Lecturer in Creative Technologies, Auckland University of Technology

Abstract

Art and design students growing up with the Internet could justifiably believe that it has a certain persistence. Students are educated to build their digital career and concomitant digital identity, using a digital portfolio, and could feel that their work is secure. However, even a cursory review of the past fifty years of information technology would suggest that this confidence could be misplaced. What happens if the companies that host these services go out of business, or outdated file formats make files inaccessible? Issues related to privacy, security, access and preservation could result in student anxiety.

Keywords

anxiety; security; privacy; access; preservation; e-portfolio

Introduction

Art and design students who have grown up with the Internet could justifiably believe that the web medium has a certain persistence, if not an un-erasable actuality. Many of these students have been educated about the importance of documenting their work in a 'digital portfolio' and applying critical and reflective thinking to their practice. As they begin to build their digital career and concomitant digital identity, they could feel secure in creating a digital portfolio, a lasting digital reputation as a lifelong record of their work. However, what if that digital biography was lost, damaged, or compromised?

The future is ultimately uncertain (Poerksen, 2013), therefore, any discussion of future proofing could appear as an exercise in futility, and the predictions of dark and dangerous futures can arouse anxieties. For today's 'digital natives' (Prensky, 2001), who are heavily invested in the Internet stack (Bratton, 2015) it is their past, present and future that is instantiated in their e-portfolio and their online presence, much more so than the storage and distribution of physical media. This is also supported by a survey of employers who found that a 'resounding 95 percent of respondents preferred to access the e-portfolio via a web-based link' (Ward and Moser, 2008, p.14).

Students working across a wide variety of disciplines – especially art and design students, who may only exhibit online – are increasingly expected to develop and maintain an e-portfolio of work for assessment and advised to further curate these for the purposes of employment and future professional development, illustrating personal and reflexive critical thinking (Ainsa, 2016; Bowell and Kemp, 2015). Students are typically told that their 'professional portfolio is a tool judiciously and carefully crafted to appropriately showcase the work of a professional while providing evidence of career growth' (DeLisio, n.d.). Furthermore, in a study by Ainsa, students 'perceived that using their digital identity for career purposes would affect their job or job possibilities, perhaps being a promotion, or a better year-end evaluation' (2016, p.50). This was validated by a recent class survey at Auckland University of Technology, which asked whether students had 'been taught about the benefits of having a digital portfolio?' In response, 63% of first year undergraduate creative technology students selected 'Yes, and I do see it as important'.

The trend towards e-portfolios is further reinforced by the social media habits of students. This liminal blurring between the physical and virtual – the private and public nature of the self (Dumitrica and Gaden, 2009; Levy, 1998) – is described by Fornas as a 'boundary war' (2002). This blurring reinforces a digital fragmentation of identity and a concomitant pressure for students to maintain multiple online personas and, according to Haraway results in transformation into 'human cyborgs' (1992; 1993). As Rhodes describes, the 'capability to provide multi-dimensional evidence through e-portfolios and the desire of students to integrate their lives beyond the academy with their academic experiences are converging to transform how we measure and conceive of student success' (2010, p.12). This has moved beyond simple textual digital personas developed on websites and blogs, and is flourishing in various other media such as YouTube, and embodied in avatars in virtual worlds and games, all of which contribute to rich digital biographies that can be curated within an e-portfolio.

These multiple personas fit and contribute to a complex world, facing an accelerating rate of change (Kurzweil, 2005). In this environment, students find that a unitary ontological approach is woefully inadequate in communicating the multifaceted nuances of their lives and the world around them. This methodological openness requires a trans-disciplinary approach, which can, according to McGregor result in a personal 'professional development (emerging into a new complex self)', this:

> can happen through the transdisciplinary practice of one's profession and discipline *in concert with* divergent others who are co-generating new knowledge. Conversely, transdisciplinary knowledge creation would help participants grow into new and progressively more complex global selves and collaborative, complex problem solvers (McGregor in Gibbs, 2015, p.11).

Acknowledging a trans-disciplinary approach assumes there is no such thing as a unitary reality, but only the context of multiple social realities mediated by what Nicolescu describes as the 'hidden third level' of reality (in Gibbs, 2015), which mediates between people's experiences, models, formulas, and so forth.

The virtualisation and dematerialisation of the traditional curriculum vitae or 'biography' is encapsulated in the broader context of these global trends, sometimes recognized as Web 2.0, often seen as one of the requisite skills for existing in the 21st century (Ainsa, 2016). With this in mind, any damage, loss or compromise to e-portfolios could present a significant threat and cause for anxiety. This paper outlines some possible fears relating to current discussions on e-learning and e-portfolios, to present some suggestions about how these concerns could be minimized, moving through four areas that could incite anxiety in art and design students with relation to e-portfolios and a digital identity and presence on the Internet: privacy; security; access; and preservation.

Bratton observes that since the Global Financial Crisis (GFC) of 2008, attitudes towards the Internet and planetary computing have shifted from sunny optimism to darkened pessimism. In this setting, the Cloud now 'portends instead state surveillance, tax evasion, structural unemployment, troll culture, and flash crashes' (Bratton, 2015). The concerns of whistleblowers such as Julian Assange and Edward Snowdon have exposed wholesale mass surveillance of both domestic and foreign populations by many government agencies with the assistance of platforms such as Facebook, Google and Apple (Bratton, 2015). However, with respect to the loss of privacy, millennials have only limited concerns about sharing personal information on social media sites such as Facebook (Smith and Kidder, 2010). Furthermore, addiction to social media and mobile phone technology (Dlodlo and Mahlangu, 2013) could result in ignoring the privacy trade-off, as the price of access involves in a hasty 'agree' to End User License Agreements (EULA) without reading them. While they develop their online public profile, users give little thought to the possible negative consequences of identity theft; criminal fraud; government surveillance; unauthorized big data analytics, or intellectual property theft.

Many social media platforms either have no explicit business model or hide it and only reveal advertising or marketing models once they have achieved lock-in (Shapiro and Varian, 1999). It has been said that when 'something online is free, you're not the customer, you're the product' (Rushkoff, 2016; Zittrain, 2012). It is entirely possible that users will eventually object to the sale of their data, but that they no longer control it. The more these de facto monopoly platforms are used the greater the network effect, and the more it becomes the repository for the users' digital artefacts, contacts, even memories: effectively locking the user into a digital biography they do not fully control (Shapiro and Varian, 1999). Over time the data recorded and maintained in these dynamic digital biographies grows in value, for the user, the intended audience – for example a prospective employer – and for those who would seek to extract (Rushkoff, 2016), if not steal, value from that personal data. It therefore becomes increasingly important to ensure the integrity, security and preservation of these personal artefacts. While the explosion in user generated content and 'prosumer' content (Tapscott and Williams, 2006) has been supported by an impressive reduction in the cost of storage, bandwidth and cloud computing – thus making it free or low cost for students and professionals to archive their e-portfolios – awareness of professional archival preservation and access management systems is not widely shared (Yoon, 2013). While it is not known whether there is any correlation to amateur user generated content in blogs or student professional e-portfolios, according to a survey of amateur bloggers, over half of the respondents (63.2%) had considered the importance of preserving aspects of their blog, however, most of the methods were minimal, with the majority archived to a local hard drive (Yoon, 2013). It is not yet known to what extent those who create and curate their e-portfolio rely on their host to provide or ensure preservation of their work.

Privacy

There is a particular emphasis upon reflexive critical thinking in art and design (Bowell and Kemp, 2015), as part of which students are often encouraged to personally express their feelings and emotions with respect to e-portfolio assessments. Potential employers often mention critical thinking as an essential cognitive skill and reflection is also considered an important attribute for future employees (Guthrie and McCracken, 2014), both of which are considered an important part of forming a digital portfolio.

During art and design student assessments, teachers employ rubrics to evaluate the students' reflections in order to communicate a rich and personal perspective of their work. The ability to express feelings and emotional responses are especially useful with respect to design thinking, co-design and human centred design. As Herner-Panode outlines (2011), 'for meaningful reflective inquiry to occur, secure intellectual and emotional spaces within virtual academic environments must be created' (cited in Guthrie and McCracken, 2014, p.239). With this in mind, security should not just apply to providing a safe supportive space, it should also apply to data security. The Yahoo security breach of 2014 – enacted by a 'state sponsored actor' of half a billion accounts – took two years to be revealed, which highlights the vulnerability of almost any private data held online (Tsosie, 2016).

Reflective writing – when undertaken in the context of creating an e-portfolio – can also expose the student to risks related to identity theft. Intimate details can be gathered and used to spoof a profile and the reader does not have to be human to do so. The ability to use advanced big data analytics to collect unstructured data from multiple sources, including e-portfolios and online presence, represents another security vulnerability and significant source of anxiety. For example, future advances in artificial intelligence (AI) algorithms could conceivably use this personal data, mined from sources such as Facebook, to persuade friends and family to purchase a product or service, or even to join the social network. Virtual worlds have been shown to be a believable testing ground for AI chatbots – where they could conceivably pass the Turing Test – and this is likely to significantly increase with the greater photo-realism of avatars and supercomputers such as Siri and IBM's Watson (Gilbert and

Forney, 2015). Someone looking to exploit personal data could not only compile sensitive qualitative data extracted from e-portfolios, blogs, geotagging and digital biographies, they could also – by simply adding 4 additional data location points – predict where that individual will be, down to the hour, within a city block, a year and a half from now with over 80% accuracy (Tucker, 2014). Students need to be made aware of potential privacy risks and informed about how to avoid revealing personal data that could be damaging to them if misused.

Security

Security is a complex and large question with respect to valuable data and, with the rise of 'ubiquitous computing' also known as the Internet of Things (IoT) and big data analytics, it has become a major concern. Many IoT devices are inherently insecure and simple hacks have illustrated how a basic 'smart' light bulb can reveal passwords to hackers (BBC News, 2016). The US Federal Trade Commission chairwoman, Edith Ramirez, has warned that embedding sensors into everyday devices and letting them record what we do could pose significant privacy and security risks (2015). Likewise privacy and security issues could come to the fore, especially as the IoT becomes more pervasive: it is expected that 100 trillion devices will be connected by 2030 (Rifkin, 2014). The IoT is included by the US National Intelligence Council in the list of six 'Disruptive Civil Technologies' and foresees that 'by 2025 Internet nodes may reside in everyday things – food packages, furniture, paper documents, and more' (Atzori, Iera and Morabito, 2010).

Many companies will not allow employees to use cloud based storage solutions for fear of hackers, yet these can also have a physical vulnerability. Although the poor security around Cloud computing is frequently discussed – with respect to software attacks such as 'denial of service' and illegal copying of passwords – there has been little attention paid to physical attacks, often committed by insiders; natural disasters; physical terrorist attacks; company failure with discontinued service; internal employee attacks; or catastrophic technology failure (Szefer *et al*, 2014).

E-portfolio security includes a number of vulnerabilities and possible causes of anxiety for students and graduate professionals, including:

- authentication
- data integrity
- intrusion
- Intellectual Property theft
- cyber and physical attacks

Security threats should be understood as the loss of an e-portfolio, which for a student could impact assessments but more importantly, future employment prospects and worse, identity theft or cyber attack.

Access

Rifkin discusses how, in an age of abundance, access and not ownership will be increasingly important (2014). Access to e-portfolios is closely related to security, managed through user names and passwords. One consideration, less often discussed, relates to private companies and the services they provide to students and professional users such as Software as a Service (SaaS) or Platform as a Service (PaaS). According to Rushkoff, many such Internet companies are bound by a fiduciary duty to pursue a 'winner takes all' business model, driven by the one hundred times ROI demanded by venture capitalist investors (2016). These platform businesses, such as Facebook and Google, often attempt to become walled gardens that lock in their users into an ecosystem that is painful and expensive to leave. For those who have curated their e-portfolios on these platforms there may be limited, or worse, have no means to migrate to another platform. If that company should go

out of business, or shut down a service, the student could face 'involuntary migration' (Fang and Tang, 2017). This can be problematic if the company denies access to the raw data by not offering an open data format. Proprietary file formats can lock in users and also prevent conversion and migration to other platforms.

When digital natives lack historical perspective, they can falsely assume that many of the global brands such as Microsoft, Apple, Google, Facebook, Twitter and Tumblr have some relative permanence and, therefore, also assume that if they provide a free hosting service they will be in existence well beyond the 'use by' date of the e-portfolio. However, the closure of Microsoft's MSN Messenger service forced an 'involuntary migration' of millions of users to other instant messaging services.

Preservation

Finally, preservation is an essential aspect of data confidence, which can assist in avoiding anxiety through loss or damage. For art and design students who have invested – sometimes years of time in their e-portfolio – with the value growing with each year, one area of preservation worth discussing is the technology infrastructure to support personal archives. E-portfolios can be considered 'living' archives as they can contain very early work as well as an historic record of subsequent and contemporary work. However, the history of technology has shown how even if outdated software might be able to play on hardware emulators, there are circumstances when this is no longer possible. One has to only consider a 1984 file written on Apple's 'large format floppy disc', before being faced with the problems of retrieving that file, and an inability to read it, not to mention 'punch cards' and 'punch card readers'. It is usually essential to have a compatible operating system to be able to open a file. In particular, Apple has a reputation for quickly abandoning technology it considers redundant (large floppy discs, small floppy discs, CD-Rom, DVD-Rom, serial ports, firewire, Ethernet, to mention a few). On their website Microsoft explains that 'Word for DOS files can't be opened natively with the current versions of Microsoft Word anymore. However, it is possible to import such old Word files with an additional converter.' (Microsoft, 2016).

Closely related to preservation, is the issue of hosting and whether it is the responsibility of art and design schools to offer a permanent repository, upon which alumni can store the professional digital portfolios created whilst they were students. Many universities and schools find that the overhead and cost of both administering and maintaining a host site for digital portfolios is unsustainable, as this responsibility is often voluntarily assumed by course teachers or allied staff. For example, while our school offers students a site to host their assessment portfolios, the students are encouraged to develop a professional portfolio using reliable hosts such as Wordpress and Tumblr. Our students are informed that their 'portfolio should be a perpetual workspace in which to examine and evaluate various aspects of your creative development and career preparation' (Colab, 2016). The students are also advised to preserve their personal data and to 'electronically scan and save items, including graphics and photographs, to be available as needed.' All of this advice is aimed at preparing students for their professional careers and they are further informed that, you 'should continue to develop your portfolio as you navigate through the rest of your study and your ongoing career.' (Colab, 2016).

Future proof?

Given the certainty of uncertainty, it is unrealistic to claim that it is possible to future proof anything (Poerksen, 2013). This paper has only briefly touched upon some of the potential sources of e-portfolio anxiety and though there are possible solutions, some areas are nearly intractable and students and teachers should be aware of them. When teachers and students consider e-portfolios they should discuss the 4 big areas of privacy, security, access and preservation. With privacy, it is

important to understand the business model of the organisation hosting the e-portfolio. What do the EULA terms and conditions say about privacy? Who owns the data? Can they sell your data? Security is difficult to assess but teachers should discuss the vulnerabilities of possible platforms and caution against hosting sensitive information, even on well-known cloud platforms. The most secure methods are offline and physically protected. Access should be properly protected with 'un-guessable' complex passwords, although our current cryptography will soon be eclipsed by quantum computing that will decrypt current unbreakable codes within seconds (Gribbin, 2013). On the positive side, the same quantum computing will also create un-hackable phones and computers (Gribbin, 2013). Open data storage, open source and non-proprietary file formats can prevent lock-in or lock-out and students/teachers should consider exporting and storing on an extensible file format as well as proprietary formats. Before making a long-term investment in a platform or host, consider how you might backup and preserve data. Preservation is an art form studied by archivists and the short life of most hard drives is cause for concern. Simple methods include backing up work on to solid state hard drives. With spindle drives, it is generally assumed there will be a high failure rate, so it is recommended that students adopt a triple backup policy with annual migration to new backups. The geneticist George Church has demonstrated how the world's information could be encoded in a small amount of DNA weighing grams, with a potential preservation time of 1.5 million years (Church and Regis, 2012; Kaplan, 2012). Keep important backups on various media. When a technology is phased out, migrate files to new media and infrastructure. Students should be encouraged to consider migrating their work to a new application if it can be exported and imported. Thinking more deeply about these four areas – privacy, security, access and preservation – will help to alleviate anxiety and ensure that it will be both here today and virtual tomorrow.

References

Ainsa, T. (2016) 'College students' digital identity: perceptions towards employment and career', *College Student Journal*, 50(1), pp.47-52.

Atzori, L., Iera, A. and Morabito, G. (2010) 'The Internet of things: a survey', *Computer Networks*, 54(15), pp.2787-2805. https://doi.org/10.1016/j.comnet.2010.05.010.

BBC News (2016) 'Osram Lightify light bulbs "vulnerable to hack"', *BBC News: Technology*, 27 July. Available at: http://www.bbc.co.uk/news/technology-36903274 (Accessed: 23 March 2017).

Bowell, T. and Kemp, G. (2015) *Critical thinking: a concise guide*. 4th edn. New York: Routledge.

Bratton, B.H. (2015) *The stack - on software and sovereignty*. Cambridge, Mass.; London: MIT Press.

Church, G.M. and Regis, E. (2012) *Regenesis: how synthetic biology will reinvent nature and ourselves*. New York: Basic Books.

Colab (2016) *Student Powerpoint Presentation*. Auckland University of Technology.

DeLisio, J.E. (n.d.). *Developing your professional portfolio* [student guide]. Interdisciplinary Studies programme, Towson University. Available at: www.ufh.ac.za/tlc/sites/default/files/PortfolioPrep.pdf (Accessed: 23 March 2017).

Dlodlo, N. and Mahlangu, H.B. (2013) 'Usage of mobile-devices for recreation among the millennial generation', *African Journal for Physical, Health Education, Recreation and Dance*, 19(4.1), pp.874-890.

Dumitrica, D. and Gaden, G. (2009) 'Knee-high boots and six-pack abs: autoethnographic reflections on gender and technology in second life', *Journal of Virtual Worlds Research*, 1(3), pp.3-23. Available at: http://journals.tdl.org/jvwr/article/viewArticle/323 (Accessed: 23 March 2017).

Fang, Y.H. and Tang, K. (2017) 'Involuntary migration in cyberspaces: the case of MSN messenger discontinuation', *Telematics and Informatics*, 34(1), pp.177-193. https://doi.org/10.1016/j.tele.2016.05.004.

Fornas, J. (ed.) (2002) *Digital borderlands: cultural studies of identity and interactivity on the Internet*. New York: Peter Lang.

Gibbs, P. (ed.) (2015) *Transdisciplinary professional learning and practice*. Cham: Springer.

Gilbert, R.L. and Forney, A. (2015) 'Can avatars pass the Turing test? Intelligent agent perception in a 3D virtual environment', *International Journal of Human-Computer Studies*, 73, pp.30-36. https://doi.org/10.1016/j.ijhcs.2014.08.001.

Gribbin, J. (2013) *Computing with quantum cats: from colossus to qubits*. London: Bantam Press.

Guthrie, K.L. and McCracken, H.J. (2014) 'Reflection: the importance of making meaning in e-service-learning courses', *Journal of Computing in Higher Education*, 26(3), pp.238-252. https://doi.org/10.1007/s12528-014-9087-9.

Haraway, D. (1993) 'A cyborg manifesto' in During, S. (ed.) *The Cultural Studies Reader*. London: Routledge, pp.271-291.

Haraway, D. (1992) 'The promises of monsters: a regenerative politics for inappropriate/d others' in Grossberg, L., Nelson, C. and Treichler, P.A. (eds.) *Cultural Studies*. New York: Routledge, pp. 295-337.

Kaplan, M. (2012) 'DNA has a 521-year half-life', *Nature International Weekly Journal of Science*, 10 October. Available at: http://www.nature.com/news/dna-has-a-521-year-half-life-1.11555 (Accessed: 23 March 2017).

Kurzweil, R. (2005) *The singularity is near: when humans transcend biology*. New York: Viking.

Levy, P. (1998) *Becoming virtual: reality in the digital age*. New York: Plenum Trade.

Microsoft (n.d,), 'Opening Word for DOS files in a modern Microsoft Word'. Available at: http://fileformats.archiveteam.org/wiki/DOC#Opening_Word_for_DOS_files_in_a_modern_Microsoft_Word (Accessed: 30 March 2017).

Poerksen, B. (2013) *Certainty of uncertainty: dialogues introducing constructivism*. Exeter: Imprint Academic.

Prensky, M. (2001) 'Digital natives, digital immigrants part 1', *On the Horizon*, 9(5), pp.1-6. http://dx.doi.org/10.1108/10748120110424816.

Ramirez, E. (2015), 'FTC Report on Internet of Things Urges Companies to Adopt Best Practices to Address Consumer Privacy and Security Risks'. Available at: https://www.ftc.gov/news-events/press-

releases/2015/01/ftc-report-internet-things-urges-companies-adopt-best-practices (Accessed 30 March 2017).

Rhodes, T.L. (2010) 'Making learning visible and meaningful through electronic portfolios', *Change: The Magazine of Higher Learning*, 43(1), pp.6-13. https://doi.org/10.1080/00091383.2011.538636.

Rifkin, J. (2014). *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism* (Reprint edition). New York: St. Martin's Press.

Rushkoff, D. (2016) *Throwing rocks at the Google bus: how growth became the enemy of prosperity*. New York: Portfolio.

Shapiro, C. and Varian, H.R. (1999) *Information rules: a strategic guide to the network economy*. Boston, Mass: Harvard Business School Press.

Smith, W.P. and Kidder, D.L. (2010) 'You've been tagged! (Then again, maybe not): employers and Facebook', *Business Horizons*, 53(5), pp.491-499. https://doi.org/10.1016/j.bushor.2010.04.004.

Szefer, J., Jamkhedkar, P., Perez-Botero, D. and Lee, R.B. (2014) 'Cyber defenses for physical attacks and insider threats in cloud computing', in *ASIA CCS 2014– Proceedings of the 9th ACM symposium on Information, computer and communications security*. New York: ACM Press, pp.519-524. https://doi.org/10.1145/2590296.2590310

Tapscott, D. and Williams, A.D. (2006) *Wikinomics: how mass collaboration changes everything*. New York: Portfolio.

Tsosie, C. (2016) 'Will the Yahoo breach compromise credit cards?', *CBS Money Watch: NerdWallet*, 26 September. Available at: http://www.cbsnews.com/news/will-the-yahoo-breach-compromise-credit-cards/ (Accessed: 23 March 2017).

Tucker, P. (2014) *The naked future: what happens in a world that anticipates your every move*. New York: Current.

Ward, C. and Moser, C. (2008) 'E-portfolios as a hiring tool: do employers really care?', *EDUCAUSE Quarterly,* 31(4), pp.13-14. Available at: http://er.educause.edu/~/media/files/articles/2008/11/eqm0842.pdf?la=en (Accessed: 23 March 2017).

Yoon, A. (2013) 'Defining what matters when preserving web-based personal digital collections: listening to bloggers', *International Journal of Digital Curation*, 8(1), pp.173-192. https://doi.org/10.2218/ijdc.v8i1.240.

Zittrain, J. (2012), 'Meme Patrol: "When something online is free, you're not the customer, you're the product."', *The Future of the Internet.* Available at: http://blogs.harvard.edu/futureoftheinternet/2012/03/21/meme-patrol-when-something-online-is-free-youre-not-the-customer-youre-the-product/ (Accessed: 23 March 2017).

Biography

Dr Pete Rive teaches and researches in creative technologies at AUT, Colab, in New Zealand. His research interests include design innovation, entrepreneurship and creative collaboration with a

specialism in virtual reality and virtual worlds. The former Chairman of Film Auckland, Co-Chair of Auckland Screen and Digital Content Strategy, and President of the Chinese animation company Mili Pictures, he has worked in a number of roles in the screen industry over 30 years, including producer, director, writer and editor.

