

Music two-point-zero: music, technology and digital independence

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Abstract

Internet technologies have enabled a participatory culture which is transforming value systems and opening new pathways for autonomous creativity and innovation. In this 'web 2.0' phenomenon, social networks continue to define the information society and in turn, redefine music career opportunities quite different to traditional preconceptions. In parallel, higher education ideology is consumed by a preoccupation with branding where universities control web sites as information delivery tools, while classroom timetables and e-learning systems systematise pedagogical models which limit students' professional potential. This paper examines this disconnect and frames a praxis intervention project to address the need for dynamic ontologies which can be maintained in a training environment reminiscent of social networking. The project details the outcomes of a longitudinal action research project and makes the case for 'music 2.0' education, that is, for independent musical craft and technological expertise set in authentic learning contexts.

Keywords

Action research, knowledge transfer, music 2.0, music technology, praxis intervention, social networking, web 2.0

Introduction

To the layperson, the idea of 'music technology' once conjured up a mental picture of audio engineering personnel operating complex equipment in impressive recording studios, working in a Fordist manufacturing chain including technical staff, producers, artists, music arrangers and record company A&R managers. In the twenty-first century however, such workflow is increasingly devolved to musicians creating with portable digital systems, home recording studios and independent networks. Despite the resistance of the world's major record labels (Knowledge@Wharton, 2006), the Internet has enabled a participatory culture which is transforming value systems, undermining notions of authority, and creating rhizomatic pathways for autonomous innovation. Music-making has evolved rapidly from systematised control systems of old to where digital technologies now empower musicians and audiences to make their own judgments, if necessary, to reject divisions of labour and the assertions for what constitutes 'truth' or 'quality' by big media power agencies (Benkler, 2006; Lessig, 2004). In a so-called 'web 2.0' phenomena (O'Reilly, 2005) young people continue to redefine the information society:

. . . a new paradigm in which users are co-producer of services: of content (blog, wiki, Flickr), of taste/emotion (Amazon, de.li.cious), of goods (eBay), of contacts (MySpace), of relevance (Google pagerank), of reputation/feedback (eBay, TripAdvisor), of storage/server capacity (Peer-2-Peer), of connectivity (wifi sharing, mesh networks) or of intelligence (business web2.0) (Reding, 2006: para. 6).

Artists interact both directly and virally in what Thomas Friedman (2005) calls The Flat World, while attending to a new economics of attention (Lanham, 2006) to launch and support independent careers. This includes composing, recording, filming, direct merchandising, concert tour promotions, engaging with fan bases and other communities of practice via resources such as wikis, blogs, podcasting services and digital music download stores. Music technology is recast as 'music 2.0'.

The research location

This project was set in a music technology department delivering a range of undergraduate and postgraduate degree specialisations within an Australian university-based conservatorium of music. From its inception in 1983, the department featured a strong sense of community, to some degree propelled by practical product outcomes and a vocational focus. Being technologically oriented, the cohort was an early adopter of what has come to be known as 'blended learning' (Bersin, 2004), that is, a pedagogically crafted amalgam of ICT and face-to-face studio teaching.

Since the turn of the century however, higher education ideology has been increasingly consumed by massification. This includes a preoccupation with branding where universities controlled web sites

as marketing and information delivery tools, while classroom timetables and e-learning systems aimed to systematise, scale and distribute pedagogical models which in effect, compartmentalised students' educational opportunities, both on-line and off (Draper, 2007). This has not proven to be a good fit with conservatoria traditions of collaboration, project-based learning, studio-based teaching and 'thinking through making' (Fitzgerald, 2007). In the music technology department in question, concerned academic discussion and subsequent student program evaluations revealed that increasingly:

- Knowledge transfer was poor across classes or degree year levels
- Students remained separated into persistent cliques of smaller groups
- Networking was viewed as unimportant
- There was a disconnect with the changing nature of career pathways

Although the romanticised 70s styled, star-driven model of the record company, the artist and the multi-million dollar recording studio is no longer widespread, the classroom revealed that many students maintained outdated conceptions of just what professional musicians did and how they made a living. Inexperience, together with the folklore of the trade magazines and mass media hyperbole tended to assure this (Lessig, 2004). Older or time-poor faculty staff and administrators often remained decades out of touch with contemporary, perhaps puzzling new viral practices as elaborated in a recent US MacArthur Foundation report:

. . . our schools are still focused on generating autonomous learners; to seek information from others is still classified as cheating. Yet, in our adult lives, we are depending more and more on others to provide information we cannot process ourselves. Our workplaces have become more collaborative; our political process has become more decentered . . . our schools are not teaching what it means to live and work in such knowledge communities, but popular culture may be doing so (Jenkins, Purushotma, Clinton, Weigel & Robison, 2007: 129).

A 'long tail' environment (Anderson, 2006) has been enabled where hierarchies are flattened and value is created less within vertical silos and more through horizontal collaboration. This allows for niche music, eclectic tastes, new audiences and a breakdown of former cultural, territorial or stylistic barriers. Disintermediation removes the middleman (Wikipedia, 2007a) so that the role of producers and consumers blurs and merges across networks of so-called 'prosumers' (Toffler, 1980). In his book *The Wisdom of Crowds*, James Surowiecki (2004) explores this further: the idea that large groups of people are smarter than an elite few, no matter how brilliant – better at solving problems, fostering innovation, coming to wise decisions, even predicting the future. Or as philosopher Pierre Lévy puts it in his concept of collective intelligence:

Rather than distribute a message to recipients who are outside the process of creation and invited to give meaning to a work of art belatedly, the artist now attempts to construct an environment, a system of communication and production, a collective event that implies its recipients, transforms interpreters into actors, enables interpretation to enter the loop with collective action (Lévy, 1994: 123)

Aims of the study: maintaining authentic ontologies

This project aimed to incorporate such web 2.0 characteristics into the ways in which a music technology department intervened in response to contemporary challenges for pedagogy, learning environments and graduate opportunities. It did so by approaching this from an ontological perspective to consider social networking as a tool to embed and stimulate department-wide dynamic knowledge transfer within learning processes and creative projects, as suggested in the work-integrated learning literature:

. . . current research and development concentrates more on what we can do as soon we have ontologies – rather than having a closer look at the processes of creating and especially maintaining such domain-specific ontologies . . . users are almost constantly constructing and negotiating shared meaning in collaboration with others by augmenting and evolving a community vocabulary. The main challenge is then how to leverage this implicit and informal ontology building for explicit formal models needed for semantic approaches (Braun, Schmidt and Walter, 2007: 1).

Rather than begin with the application of technological solutions to learning problems applied from the 'top down', this project worked from the 'inside out', that is, from an intention to reclaim a natural participatory ecology as may be appropriate to the aforementioned music 2.0 proposition.

Methodology: praxis intervention through action research

The term *praxis* denotes the interaction between theory and application that keeps both vivid, relevant and truthful (Wilson, 1994). Given the concerns raised above re. the changed contexts for such interaction, this paper approaches the research as a praxis intervention project (Wikipedia, 2007b) through a series of action research cycles (Kemmis & McTaggart, 1988) – to plan, act, observe, review – in a reflective process of progressive problem-solving led by individuals working as part of a community of practice in order to improve the way it addresses issues of authenticity where music education is caught amid the triple-pincer pressures of

1. The demands of conformity in systematised classroom, timetabling and e-learning systems
2. Outmoded preconceptions of professional music practice
3. An imperative for authentic literacies, ontologies and 21st century praxis

The research design presents a longitudinal study which examines the outcomes of interrelated projects, all of which have been the subject of both traditional and non-traditional publication outcomes over time (that is, scholarly papers, web sites and multimedia products). The study has been arranged sequentially as three action cycles, each of which summarise discreet themes, approaches and findings, but with the additional benefit of hindsight and historical perspective, maps the community's evolving practice across the period 2002–2007. Common methodological details are as follows:

Demographics

The project focused on the department's flagship offering, the Bachelor of Music Technology, a three year degree with a fourth year honours option. While the program once attracted a wide range of age groups and backgrounds, more recently since 2000, the cohort almost exclusively comprised school leavers and younger students in the 17–21 age group. In the same period, female enrolments had increased and stabilised at approximately one quarter of all students in a population of 65 at any given time. Each year graduated and enrolled around 20 places, therefore this study captured aspects of the activities of some 165 students over a six year period. In terms of professional input, the project drew upon the collaboration of two music technology academics, six casual teaching staff and a range of external colleagues in education and industry, all of whom have contributed to various outputs as cited in each of the action cycles.

Research instruments

The most common data collection instrument used throughout has been the university's course evaluation questionnaire, electronically administered to all students at the end of each semester via the online Blackboard system. This picked up common quality-related themes but may have been under-utilised by students if left only to self-administration. Therefore, in addition, staff convened end-of-semester debriefs which enlivened aspects of the survey process and facilitated workshop discussion in topics closely related to a specific concern, for example, in each action cycle it was an increasingly natural activity for students and teachers to critique initiatives such as the online discussion board, work-placements, podcasting or team-based creative projects.

Such sessions were surveyed, noted, recorded or in some cases video-taped. Ethics were managed in an open fashion where students agreed that the data could be used for the purposes of teaching, learning and research and especially in terms of continually improving their environment. In cases where a student's intellectual property may have been utilised outside this framework, creative commons licences provided clarification and assurance re. the integrity of the attribution for their work. Regular academic meetings were held to review data sets, the quality and intent of course assessment items, to discuss perspectives, problem-solve, and came to common understandings of what the feedback and the on-the-ground interactions might have indicated. Typically, around 75% of all students actively participated in both the data collection and the subsequent critique of analyses and/or outcomes including new resources, systems and publications.

Application

The first action cycle was primarily concerned with setting the pedagogical framework, the resources and local culture from which the following cycles emerged. This drew upon earlier research into problem-based learning (Draper, 1999), discovery learning (Shulman & Keislar, 1966; Bruner, 1959) and experiential learning (Kolb, 1984) resulting in the creation of project-based assessment activities, team assignments, inter-year student fora and other informal networks or on-line resources. Data collection, analyses and publications were drawn from student surveys and workshops.

The second cycle investigated student industry placements and the development of professional skills in new contexts, often quite different to student (and staff) preconceptions. Placements were

implemented with the full support, insurance and legal framework of the university and were managed by academic and industry supervision teams. The data collection and analysis here widened beyond student surveys to include the assessment activities themselves: students presented ongoing workshops and reporting to their peers, teaching staff and industry employers. Results were discussed broadly across the entire cohort and employers had extensive opportunity to provide input via interviews, presentations to the student body and other university networking events.

The third cycle examined the step of disseminating original work and assessment items via the Internet and public performance. This phase acknowledged the evaluation mechanisms developed earlier, but also incorporated national/international interactions, web 2.0 metrics and virtual collaboration. Students began to deliver their own self-reviews and analyses of material, became more proactive in suggesting novel ways of approaching artistic and academic development and the research interrogation began to focus on data from specific case studies.

In sum, the task here is now to present a coherent summary of the findings over time, to elaborate on notable aspects of the interventions, and to posit a future trajectory for the research.

Action cycle 1: redefining the learning ecology (from 2002)

When e-learning (Blackboard) was introduced in 2000, this worked as a simple delivery device for teacher-authored content but was weak in supporting a cohort-wide community of practice. Segregated by subject and year level, artistic communication and collaboration became difficult while assessment policy for creative works was systematised and criteria-driven (increasingly, managed by casual staff). Yet, in 'thinking through making', music is typically social and highly interactive, with contributors sharing ideas, techniques and performances to make a whole. Therefore a number of approaches evolved to reclaim the curriculum and its pedagogy, as shown below:

Activity	Approach	Resources
Problem-based Learning (PBL)	In studio courses, assessment included responding to a range of 'problems' such as the production of concert recordings, popular music and jazz albums and original music /sound for film. Projects were led by the creative brief; theory and technique was unpacked in supporting courses where students draw upon the examples of more advanced peers in cross-year, team-based projects.	Student gallery and media archives available at www29.griffith.edu.au/mutech/eportfolio_archives
Music Technology Forum (MTF)	A face-to-face, weekly meeting to facilitate interactions between students and staff, where problem solving outcomes were reviewed. Forum also served to feature alumni workshops and student work placement reports.	MTF: cohort-wide staff and student workshops utilising smart lecture theatre, including wireless access, OHP, 5.1 sound.
Resource Booking System (RBS)	Students self-managed their access to institutional resources including recording studios, mobile equipment and sound-reinforcement systems. They worked from time-based quotas and learned to interact with technical staff and the institution just as professionals would be expected to.	RBS: available at www29.griffith.edu.au/rbs (requires LDAP authentication). Based on open source MRBS mrbs.sourceforge.net
MuTech Discussion Board (MDB)	A moderated, web-based discussion board drove key themes and aided in promoting exemplars of student achievements, cross-faculty project calls and job opportunities. This resource retained the membership and input of alumni, other university schools and industry partners.	MDB: a moderated forum for students, staff and alumni. Available at: www29.griffith.edu.au/discussions Based on open source phpb2 www.phpbb.com

Table 1: Knowledge transfer across the music technology learning ecology

Synopsis 1

Peer review and assessment was undertaken both in class settings and through cohort-wide discussion groups and teams: students presented their thinking to others who provided feedback and questions, discussed variants and in general, learned about the meta-contexts in which their work resided. A semiotics of the discipline developed and exemplars of excellence were acknowledged and rewarded not only through course grades, but also through informal networks. Overall, students were

encouraged to be responsible to their peers, aiding the need, “not for more professional knowledge from external sources, but for greater self examination skills and higher levels of self awareness to appreciate the skills they already have” (Grainger, 2001: 2).

Local research (Carey, Draper, Lebler & McWilliam, 2006; Draper, 2005) indicated that such mechanisms continued to improve and enhance the intended learning aims, overall engagement and creative outcomes for these students. However, while the context for on-campus collaboration became more refined, the concept of ‘the workplace’ remained elusive. Students and staff tended to cling to the ‘star-driven’ model while the university sought inappropriate metrics around graduate destination surveys and corporate employer profiles – for freelance creatives, this often made little sense, thus prompting another action cycle accordingly.

Action cycle 2: reconceptualizing work-integrated learning (from 2005)

Work-integrated Learning (WIL) became increasingly popular in the Australian higher education sector (Flinders University, 2006), aiming to provide a structured method of combining education with practical work experience by providing academic credit for career work under the supervision of teachers and industry partners. However, WIL suffered from ‘boomer’ preconceptions, where notions of the shopfloor, apprenticeship and professional progression were embedded into the thinking. In new creative industries and on-line environments, these ideas increasingly lacked meaning when there was no longer a physical factory to work in, nor a management command structure to negotiate with.

As evidenced by Forum and Discussion Board exchanges, the range of work opportunities for audio specialists had increased exponentially to include radio, film, ICT, education, forensics, arts management and other creative clusters (Hartley, 2005). It was also revealed that graduates did not necessarily identify with these workplaces and often experienced integration difficulties in their first few years out. Despite excellent learning ecology interactions with staff, alumni and industry, it was apparent that students required *in situ* work experiences before they graduated; while still a university resident, students with work-experience might then also be able to feed back their experiences to peers. Led by a small start-up grant, music technology’s first WIL offering was subsequently devised – the Music Technology Industry Affiliates Program (MTIAP) was launched in 2005 as a single semester, 13 week placement for final year undergraduates who took on a range of jobs with schools, television broadcasters, live sound agencies and independent music production houses.

Synopsis 2

A subsequent study (Draper & Hitchcock, 2006) highlighted the following key findings:

- Students provided positive feedback about their growth in self-confidence and workplace appreciation for what they had to offer as highly trained, creative people
- There was widespread realisation that being a professional was less about applying set skills in known situations, but more about the application of abilities in unknown situations
- Students said they enjoyed ‘real world’ pressures which focussed their abilities to put knowledge into action (puzzling to academics, who found such apparently desirable pressure difficult to replicate in the classroom – students continued to cram and leave projects to the last minute)
- Many workplace supervisors initially underestimated the specialist skill level and creativity of students, and later indicated positive changes, upgrades in practice and genuine knowledge transfer that often occurred in the workplace as a result of student input

On the negative side, industry was repeatedly, highly critical about the lack of inclusion of context-related abilities within arts programs in general. Employers and alumni commented that universities separated business development classes from craft studies – students could technically ‘do the job’ (craft) but had no idea of meaning in relation to a ‘big picture’ (context), that is, the curriculum neither represented the ‘real world’ of law and business, nor the commonsense world of the creative artist (Draper, Hall & Wilson, 2006). This included matters relating to workflow, collaborative roles, deliverables and Intellectual Property (IP) – for example, under music copyright law, unless otherwise agreed, the ownership of sound recordings resides with all of the creators: sound producers, composers and performers. Some industry partners called for better small business-like sub-contracting arrangements, including virtual workflow, team collaboration and timeframe flexibility. It was subsequently proposed that music technology review its resources to explore the embedding of professional interaction in craft production utilising the Internet as a common vehicle to span developments thus far.

Action cycle 3: open publishing project (from 2006)

Given the preceding discussion, a number of considerations therefore came into play:

1. Music technology infrastructure included two Apple computer servers (Xserves) and some 40 workstations across recording studios, laboratories and mobile units. These facilities were interconnected with the conservatorium's concert halls which regularly delivered student and staff concerts to paying audiences. If the conservatorium could effectively run as a professional arts organization and place student learning in the public domain, perhaps the technology might be utilised more deliberately in this local creative industry to develop and promote new WIL modes?
2. In an effort to provide a greater range of literacy opportunities, students were offered the option to develop podcasts as reflective reviews and analyses of the creative works in question.
3. IMERSD (Intermedia, Music Education and Research Design) (2004) is a 5.1 surround sound and multimedia production studio which was quarantined outside of the traditional learning and teaching framework and commissioned to target key development projects, undertake research and provide a trickle-down to the mainstream. It was proposed that the unit could also provide work-placement and/or research assistant roles for music technology and research higher degree students where they assisted staff and visiting artists in this professional setting.
4. Because IP and the idea of 'contracts' was one of the most oft-cited areas of confusion, this was also a target for development. Just as WIL employers had suggested (Draper & Hitchcock, 2006), to date, the curriculum had responded only through music industry lecture-based electives. Given the recent establishment of the Creative Commons Australia project (CCau, 2006), this was seen as one way to develop practical insights into ownership, attribution and related negotiations.

A pilot Commons project was held across an intensive project week in May 2006 where a handbook of materials was devised (Draper, 2006) and published to discuss, teach and embed basic IP understanding within practical final year undergraduate music-making projects: in this case, through original musical compositions, live concert performances, studio recordings, and subsequent streaming and podcasting. Workshops were prepared and delivered by music technology and jazz department staff with the assistance of a leading Australian digital IP attorney. The process utilised a CCau Attribution-NonCommercial-NoDerivatives License where IP was positioned as a licensing agreement – from the students to the university. The two Apple Xserves were re-developed for dedicated functions as follows below. From the outset, Google Analytics (2006) was used to gather web metrics for later evaluation.

One Xserve operated as a dedicated webserver to host the *Radio IMERSD* (2006) content management system, modelled on a e-journal approach by inviting original digital contributions from academic staff, students and visitors. Submissions were peer-reviewed and utilised CCau licenses together with media format guidelines. Publications were disseminated on the Internet as on-demand audio, podcasts and vidcasts utilising iTunes 'one-click subscribe'.

A second Xserve provided the media streaming 'back end' and also hosted copyright-protected materials for distribution on the university intranet via a NetRadio (2006) feature. Until 2006, commercial recordings could not be legally duplicated or distributed for the purposes of teaching and research. The recent signing of the AVCC-Music Societies agreement by Griffith University (2006) allowed this, albeit, given substantial licensing fees and IP-restricted streaming only. To highlight the copyright complexities enforced herein: *Radio IMERSD* provided conservatorium cohorts with intranet playlists of *original sound productions*, of *original staff and student concert performances*, of only those *approved compositions* controlled by Australian collection societies APRA/AMCOS (2006).

Synopsis 3

At the time of writing the content is significant: hundreds of performances are now disseminated on *Radio IMERSD* for review and reflection by the conservatorium's staff and student body. Open Internet publications include categories for original music in concert performances, public lectures by visiting scholars, recording studio productions, student portfolios and self-reflective reviews located under e-learning. After a six month trial, at December 2006 *Radio IMERSD* was ranked 14 in education podcasting on the Australian iTunes Store (2006).

Initial research (Draper, 2007) indicated promising engagement and an overall strengthening of an established community of practice. CCau licensing unpacked new meaning for students and staff in recognising their rights and those of others, in understanding more about the often multiple-owner nature of the music business and in preparing such discussion as an integral part of the creative process. As public broadcasts, student creations often invoked greater professionalism, innovation and personal independence. For example, a final year undergraduate undertook parallel classes that he argued as usefully connected: one required the development of a written research paper, the other, the production of original sound production portfolio. The connecting theme he proposed was 'What is a Music Technologist?', expressing some frustration in how his industry and art form was

poorly understood. Along with the paper, he realised an engaging sound production concept through a non-specialist, enhanced podcast series (Wyeth, 2006).

Further enquiry (Draper & Hitchcock, forthcoming) extracted additional insights about students' attitudes to their use of the web in the curriculum. Common themes are summarised as shown:

Question	Positives	Negatives
<i>Has use of the web changed as a result of this project?</i>	Awareness of web as workspace	Didn't affect any change as they already knew what to do
	Observing others' work had changed their own work	Did not know that <i>Radio IMERSD</i> existed
	Exemplars and context stimulated personal research into the area	The web is for fun, not work.
	Realisation that it could help employment prospects	
<i>Impact on professional standards and personal development?</i>	A greater sense of involvement and ownership of learning	Did not know that <i>Radio IMERSD</i> existed
	Understanding of context and application of technology	
	Helped understand future expectations and directions	No 'self-change', wait for 'teaching'
	Raised the standard of work	
<i>Impact on learning and the learning community?</i>	A greater sense of involvement in teamwork to produce content	Irrelevant activity for students.
	Sharing and promoting new ideas	Didn't know about the project
	Produced a sense of competition	No one told me
	Pride and ownership for those whose had their work posted	No 'self-change', wait for 'teaching'
<i>Has the prospect of external publication altered approaches to assessment?</i>	Greater aesthetic awareness	My work is always high quality
	More attention to emulating quality of others work	
	More effort was applied	The web is for fun, not work
	Better detail in presentation	Didn't know about the project

Table 2: Survey results of N=45 music technology undergraduates; M=34, F=11.

It was revealed that more than three quarters of surveyed students maintained a MySpace account and/or external website for the purposes of self-promotion and creative opportunities. However, there was apparently poor connection (resistance even) between the personal context for their art or 'fun' and the university setting for learning, assessment and degree progression rules; that while some of this activity notionally sought small business-styled outcomes, this was unsupported by relevant technical or practical application, where limited success came by chance or personal connections rather than by any informed approach *per se*.

Summary comments: the hidden curriculum

The most significant impacts have been in the areas of the local learning community and in terms of assessment, logically so, because much foundation work has been undertaken here in past years (see Action cycle 1), and where students actively passed such ecological understanding on to each new year of student intake. The areas lacking in uptake were those where the art was placed in the external domain, or in as not yet considered 'working' contexts. To reflect on *Radio IMERSD* as a one year old project, the results are encouraging, but clearly more work is to be done in terms of embedding this further in teaching approaches, alumni/industry participation, and in the development of specialised opportunities for students to engage in this new territory in meaningful ways.

The most striking aspect of the project was in relation to the enculturation and ownership that took place as a result of use of the MBD by students (see Table 1, MuTech Discussion Board). The MDB effectively functioned as a powerful 'hidden curriculum' (Jenkins, 2007) which not only maintained an

evolving and transparent historical record of local knowledge, it provided a bridge across university time and space which reclaimed and promoted the development of important personal and professional competencies. The music technology department's most recent 2007 exit survey indicated that the majority of students believed that the MDB provided:

- Promotion of collaboration and critical thought
- A tool for learning, research and discussion to support face-to-face projects and practices
- Enhanced opportunities for self-reflection (and were often surprised at these outcomes)
- A new kind of academic support – freedom vs. instruction
- Raised confidence due to community interactions
- Immediate access to the community, to meet a lot of people in a short amount of time
- An essential off-campus access point to university where peer networking and engagement is important – quite distinct from online materials such as texts or lectures

The MBD possesses integrated metrics tools which have demonstrated over six years of operation that the most highly ranked and engaged discussion themes included:

- Social networking and bonding
- Technical hints, tips and information
- Business, marketing and publication
- Creativity and perspectives of the creative process
- Qualitative judgements where there may be no 'right' answer

Internet metrics provided unexpected outcomes: over a six-month trial in the second half of 2006, the IMERSD website took part in a web tracking project utilising Google Analytics tools (2006). September 2006 attracted some 850,000 visitors while individual institutions in remote countries continued to return in significant numbers to access selected materials (Braue, 2006). In one case, an IP in Dublin downloaded a single work on some 700 occasions and overall podcasting reach has substantially expanded via aggregation on external sites (Podcast Directory, 2007). All of which continues to drive student engagement and commentary, but more centrally, has been of interest to other non-music academics and has generated plans for university e-research development. In music technology, this promises for engaging research-led teaching in the future.

Concluding remarks

Somewhat cautiously, Gabriel Jacobs (2005) produced some well-argued research in a recent education technology journal, questioning the benefits of hypermedia and so-called 'discovery learning'. In this she says, "the aim of educating students such that they can transfer learning to unfamiliar problems and situations is not . . . achieved by giving them their reins before they have learned to walk safely. Hypermedia technology, for all its great potential . . . is a dangerous weapon in the hands of the inexpert" (Jacobs, 2005: 7). University of Georgia's Tom Reeves adds,

Although there are many advocates of discovery-based environments for the learning of social studies, science, and even mathematics in schools, most of these people would probably prefer their brain surgeons to be trained via direct instruction. (Reeves, 1995: 8)

It would be fair to say that conservatoria have indeed maintained a strong tradition of direct instruction. Craft and technique reign supreme, but what is under scrutiny here is the changed context and nature of contemporary music-making identified herein as 'music 2.0' – which surely, is neither rocket science nor brain surgery. We also must be cognisant of the fact that conservatorium training is heavily impacted upon by an increasingly corporate-like 'one size fits all' higher education environment.

Clearly, music schools should rightly argue loudly and strongly to be places of higher learning – if you will, art for art's sake, not necessarily connected to commercial outcomes, but rather, to promote higher order thinking, creativity and excellence in craft. Still, neither can educators afford to ignore the fact that many students desire vocational success, in this case, to be able work rewardingly as a professional musician/technologist. Australian university targets and funding flows are increasingly tied to metrics-based schema, graduate destination surveys and measurements of value-adding to society as defined by the Federal government. If global 2.0 trends are significant indicators for consideration, then key drivers of authentic knowledge transfer will need to be further developed and enabled by creative arts faculties, in turn to be appropriated and adopted by the students themselves – not imposed from the top down, but evolved, maintained and valued from the inside out.

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