Teaching Technology as an Adjunct to Core Practice in Traditional Arts

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Introduction

Developments in digital technology over the past 30 years have given rise to a bewildering array of interpretations concerning the ability to "sense and control the real world" (O'Sullivan and Igoe. 2004) and an interest in synergistic possibilities between the digital and the analogue but more importantly between computation and physical objects. Ken Camarata et al from an architectural perspective present their interpretation:

> Increasingly, computational capabilities are becoming embedded in our built environment. As architects with a background in computing, the intersection between the physical and computation has sparked our imagination and driven us to explore the relationship. We refer to these explorations as "physical computing" which overlaps other paradigms: ubiquitous, wearable, tangible, invisible, etc., computing. By physical computing we mean systems that incorporate both material and computational media, perhaps, for example, employing mechanical and electronic systems. (2009, p.171)

Initially, the technology responsible for this direction, the micro-controller, evolved pragmatically in commercial products we now take for granted (motor vehicles, washing machines, microwave ovens, mobile phones, etc.). However, it was quickly realized that what the technology was doing for these objects of our contemporary life, it could do to objects created in a more inspired and unfettered creative domain. This is exemplified in the content of Troika's striking publication (Freyer, Noel and Rucki. 2008) that showcases digitally integrated/inspired creations from around the world and also the projects of *Greyworld*[1]. While this new synergistic direction is a radical departure from conventional arts practices, in one respect, its outcomes have aligned more with the general agenda of technology. That is, having a principal interest in leading edge technical innovation and idiosyncratic futuristic outcomes. Many innovative projects often reflexively demonstrate or articulate technology itself (for example, The *Wooden Mirror* discussed below) and so do not dependent or are beholden to traditional arts techniques (Painting, Glass, Ceramics, etc.) practices and aesthetics. The key to acceptance of this digital art direction is the presentation of attributes readily identifiable with digital engagement. Arguably, this is appropriate because this creative practice is seeking to establish its own identity and relevance.

Historically, the media best suited to the new digital technologies were sound and image. And so arose the pre-eminence of digital sound and digital image in a world increasingly configured for the digitization of all things. However, this position has changed ironically with the pervasiveness of digital

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[1] (Viewed 22 July 2011) <http://greyworld.org>

technology. The following discussion on two works not only articulate this change but provide some insight into how this technological direction is influencing contemporary creative practice.

Impetus for a Creative Integration

By the late 1990's, artists such as Daniel Rozin were voicing dissent towards the prevailing digital momentum, curiously from a digital position. Wired magazine aired Rozin's views:

> "I don't like digital," says Daniel Rozin, director of research and adjunct professor at New York University's Interactive Telecommunications Program. "I use digital. My Inspirations are all from the analog world." Wooden Mirror, Rozin's latest creation (on view at program headquarters at 721 Broadway), reflects this tension.

Since the focus of interest is the "Wooden Mirror", the text quickly turns to what it is and how it works. In explaining how it works, it becomes necessary to explain the role of digital technology and inevitably that it wouldn't be possible otherwise.

> The 6-foot-tall video display consists of 830 pieces of gold-toned pine, each wired to its own tiny servomotor. Stand before it and a hidden camera feeds your image, in real time, to a souped-up Macintosh, which parses you into an 830-byte video signal. The Mac then tells each motor to position its pinewood pixel to reflect a specific intensity of light. The result: the world's first live animated woodcut. (Bobow, 1999).

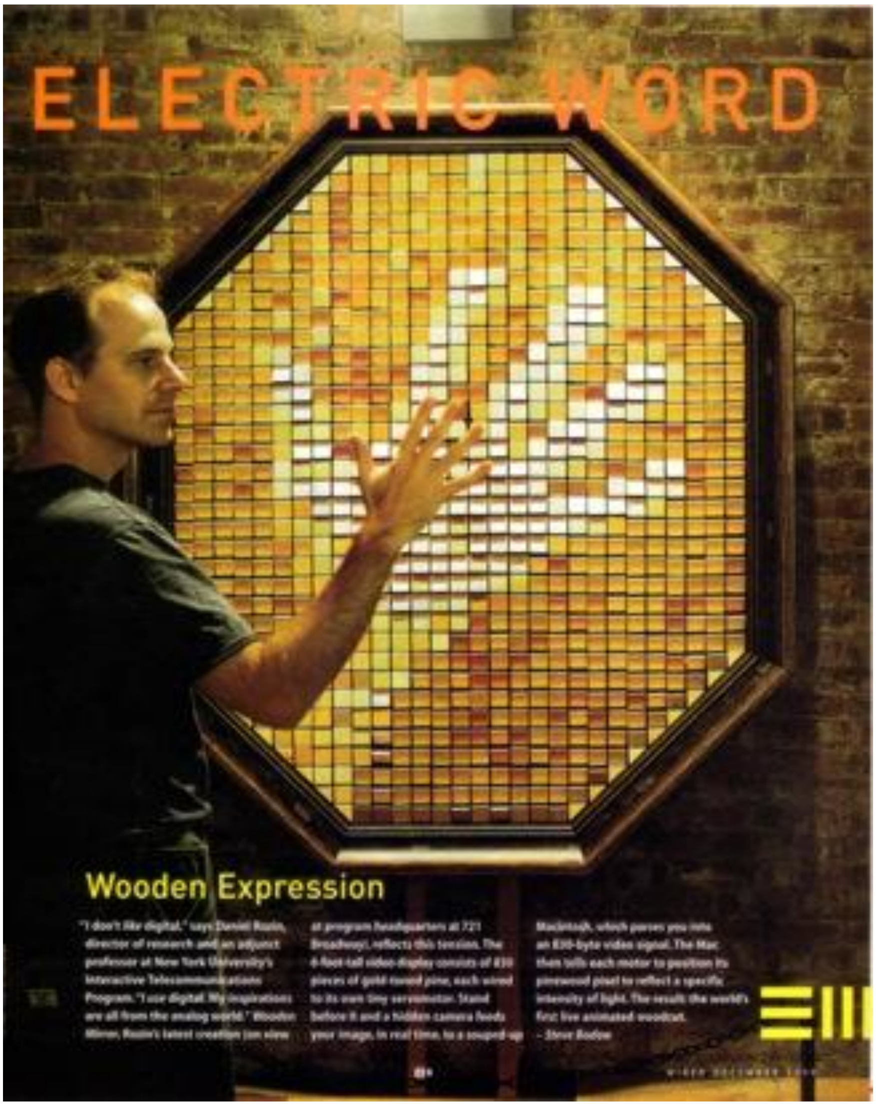

Figure 1. Daniel Rozin and the *Wooden Mirror*

So a decade ago this was the kind of rhetoric employed to integrate art with technology such that the creative outcome was the primary focus and objective. It seems a heavy-handed conceit today and could be interpreted as promoting the use of technology through a unique, let's say, singular aesthetic experience. But of course, that is exactly the point.

The attempt to shift attention from the application of digital technology to an appreciation of the dynamic nature of the creative object in the brevity of the quoted text above is not without a sense of contradiction. The object has a temporal condition that is clearly always dependent technology. Two in fact: digital video and digital control. It is obvious that these technologies are central to the *Wooden Mirror's* function and so it necessitates explicit discussion at some point. Yet at the same time the object is about the magic of the experience. Even if we can't experience the object directly itself, in video we can see what it does and we still want to know how it works.

A decade later collaborative work between digital and traditional artists less frequently engages a discourse of rebalancing. The result of the application of technology to a physical object can be something that comfortably stands on its aesthetic merits.

An example here is "Restless Habitat", a kinetic textile installation by *FyberMotion*[2] first exhibited in 2009. This large silk covered structure moved silently, almost imperceptibly, as people walked through it. The concept played with the idea of a communal structure (a Yurt for instance) that moved but didn't go anywhere. The delicate rhythmic motion of the silk, as if affected by a breeze, produced a sense of calm as well as wonderment. How it moved was completely transparent, yet the mechanism was almost invisible. Even though technology was crucial to its operation, there was almost no evidence of technological involvement, so in this respect, for those present it initially invoked a sense of magic.

"Restless Habitat" was the outcome of a collaborative project. It was the second work by *FyberMotion* and benefitted from several years of creative and technical discussions and a history of collaboration.

[2] (Viewed 15 July 2011) <http://www.fybermotion.com.au>

Figure 2. *Restless Habitat II* by FyberMotion. ANU School of Art Gallery. June 2009.

From such examples as above, students draw inspiration and motivation. These idiosyncratic works convey a great sense of potential and inclusiveness for future individual creativity. Both works feature materials common in traditional arts: wood and fabric. Both works, to some extent hide or attempt to deflect attention from the underlying technology. However, in both cases the presence of technology is explicitly stated in their descriptions and crucially, the works owe their existence to an engagement with technology that articulates a different aesthetic statement from what they would be just as static objects. This is not to say that they would not be intriguing in their own right but arguably, their narrative would depend on history rather than the future.

Motivation for Learning

Reflecting on the above examples, an art student could possibly recognize three directions for achieving an outcome:

1. Personally acquiring all necessary technical knowledge
2. Through collaboration
3. A combination of points 1 and 2

Which of these points a student initially feels drawn to depends on their current learning environment. The student could ask, “what direction will I take in the future?” and have to reflect on where their current education is taking them.

But first, let us consider the context of a traditional arts education. This involves at least 3 years of study largely in a specialist area that aims to educate the student in two primary ways:

1. Acquiring knowledge and skill in techniques necessary to create the art form

2. Understanding the historical and contemporary culture of the art form practice

In the context of a traditional Art School where understanding the core practice is the paramount experience, extending technique and creative vision typically takes place at a point in time given over to personal research projects (the later part of third year or during the forth year). At this time, the student has reached an understanding of the practice that is relatively advanced and self-directed practice is the next logical step. It is also a time when learning something new outside the core practice is particularly difficult. Yet it is timely because the desire to engage with something new that provides innovative possibilities for the future is hard to ignore.

It might cross the mind of the student that augmenting their practice through the acquisition of new and challenging skills could have been undertaken earlier in the degree even if it was introductory. However, that will always remain at the discretion of the student.

An art student engaged in learning a single practice has to realize that the study of Physical Computing is to pursue a new and often cognitively distinct discipline. Although it may seem unrelated to their core practice, the student needs to imagine ways in which they come together as a unified work. To effectively make this decision, a student needs to acquire foundational skills such as:

1. A knowledge of the fundamentals of electronics and programming
2. Confidence in dealing with technology
3. How to find information about a particular technology
4. Access to the appropriate tools for analysis and construction
5. The will to find an effective solution

Artistic objectives may not appear to conform to the agenda of technological applications, such as mass production and dissemination, robustness for everyday use, logical functionality and convenience. What the student has to grasp is that technological integration with an idiosyncratic aesthetic can be attained and importantly, that technology allows an artist to think about their core practice in an entirely different.

Specialist Study

In considering Daniel Rozin’s work, the student may recognize a high degree of autonomy in the development of the project. This requires an understanding of technology at a sophisticated level. This might seem obvious but intuitively it could also be felt that such extra-curricular study will be too demanding, requiring study in a completely different area and embracing modes of thinking which are unfamiliar. While specific education in technology might provide the necessary experience, covering many areas that may or may not be useful to the student in the future, there are issues that work against the pursuit of further education in a seemingly remote field from their primary interest. Not the least of these issues is cost.

In the previous discussion it has been assumed that appreciation of what technology offers comes at a later stage of an arts education. While this is common in the author’s experience, it has been recognized that offering electives in technology early in a degree program that clearly link traditional arts practices with technology enables a student to make informed decisions about the future of their practice. Students who are comfortable with technology or appreciate what technology might do for them are drawn to such courses but it is clear that they need to be structured in ways that:

1. Are engaging and project driven
2. Teach abstract technical concepts by example
3. Offer support and solutions that minimize frustration
4. Maximise the student's control over resources

Such courses are inevitably limited in time, secondary to the overall education experience and so need to focus on outcomes that are achievable and effective. Lectures that deal with abstract technical material have to be relevant. For example, teaching Boolean Logic[3] should come as a consequence of the nature a project. When a student realizes that decision-making relates directly to the sophistication of their project, they will endeavour to understand it.

Learning Through Collaboration

The *Restless Habitat* work draws attention to an alternative learning experience, that of collaboration. Although it is a great luxury in the current educational environment, being able to collaborate with staff or other students from outside a student's discipline area on a specific project brings new knowledge and skill directly into the student's creative domain. What is important is that the student retains a sense of authority and identity because they are in control of their contribution. Whether a collaborative situation centred around one project is enough to inspire anyone to undertake a personal journey into the wider realm of technology seems doubtful. Effective collaborations tend to clearly partition creative roles based on existing expertise. For those not involved with technology, it is unlikely that they will learn enough to empower them to embark on a technical project of their own in the short term. Rather they might gain insight into how to work with technology as it relates to their own creative ambitions and perhaps they will be motivated to study it further.

One final point concerning the development technical awareness and confidence is exposure to public "Hacking" groups. Nancy Mauro-Flude explains:

> For beginners just to be present and exist (hang out) in the environment of a computer space, hearing the jargon and seeing computer users in action is not only basic research but an important part of one's first engagement with technology and the start of a path towards understanding technology. (Nancy Mauro-Flude, 2010)

This option is likely to appeal to students through its informality and cost. Those wishing to acquire knowledge about something may have the opportunity not only to talk with those who are knowledgeable but also to see first hand, a project that has some bearing on what they aspire to achieve. It is an osmotic experience for the most part but what is important is acquiring the language to discuss technical issues.

[3] Boolean Logic or Algebra is only concerned with values of 0 and 1 or false and true respectively. The mathematics of Boolean algebra has a direct bearing on how computers function and how they are programmed.

In Canberra, the *MakeHackVoid*[4] hacking group provide a unique opportunity for those motivated to learn more. This group has access to a substantial work place and a wide range of equipment. People attending the meetings have considerable expertise. It can be intimidating at first but the agenda of the group is the dissemination of technical knowledge and resources. Although the group has only been active for about 18 months or so, it is like that it will grow as more people realize the benefits of such a functional environment. Only time will tell whether this environment is beneficial or of interest to traditional arts students seeking to acquire knowledge of technology.

Conclusion

Teaching Physical Computing in the traditional creative arts remains an area of arts education under observation and review. While the cognate areas of Art and Science coalesce in certain areas under certain conditions, the structure of universities predominantly favours a separation between these areas. Opportunities for convergence appear largely to be student driven and offered in the form of electives.

One could imagine a degree program in traditional arts that focuses on the integration of digital technology with a traditional arts practice. It certainly exists in other creative educational contexts such as Design but within a traditional arts education, from the author's experience, the mode of integration is still being worked through.

A possible interim environment for learning and support, given constraints on resources, could perhaps be in the form of a studio practice that moves between workshops. This would vary the creative perspective for students and expose others to the learning potential. It is a significant departure from formal environments such as discussed below by Camarata et al:

> Our "physical computing" class, taught at the University of Washington's architecture department, brings students from a wide range of disciplines together into a collaborative studio learning environment. The studio is modeled after traditional architecture design studios… which teach an iterative design process informed by regular critiques. (Camarata, K., Gross, M. & Yi-Luen Do, E. 2002)

Yet moving between workshops need not forgo diversity and openness similar to that expressed by Camarata et al:

> We set no prerequisites. Students come with widely varying knowledge and experience, from art, music, engineering, and architecture. This challenges the course to be a collaborative open-minded learning environment that encourages individual growth and learning. (Camarata, K., Gross, M. & Yi-Luen Do, E. 2009. p.182)

Unlike the conventional studio practice described above, the idea of a movable studio practice would initially focus on individual projects and in that hopefully encourage and inspire other students to consider a technological dimension to their work. As an interim learning scenario it is envisioned that it would eventually include a formal teaching and production space supporting a greater diversity and number of students. It remains to be seen whether such a teaching strategy would be either feasible or effective for a range of arts institutions.

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4 (Viewed 17 July 2011) <http://www.makehackvoid.com>

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