Learning in and Through Technology: Modes of Engagement

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As more of our daily activities become electronically mediated our increasing connectedness to the computer has come under close investigation, not only in terms of social, cultural and philosophic effects, but also in terms of psychodynamic effects. Of particular importance to educators and researchers of new technology is the convincing argument by theorists such as Turkle (1984), Idhe (1990) and Sofia (1993) that all of these aspects of our relations with this tool-object-idea should be considered in any analysis of human-technology-world relations. This paper will profile an analytical model that responds to this argument that was used in a recently completed ARC Discovery Research Project which inquired into the applicability of new information and communication technologies and systems (NICTS) to the assessment and evaluation of learning in a tertiary setting.

Introduction
This paper profiles the Visual Arts/Media component of the first phase of an Australian Research Council funded cross-discipline, cross-institution research project entitled "Constructing a new conceptual framework for using digital technologies in achieving better arts assessment". The research project brought together five Chief Investigators—Steve Dillon (Music Education, QUT) Glenda Nalder (Visual Arts/Media Education, Griffith University) Andrew Brown (Digital Music, QUT) Jude Smith (Dance, QUT) and Judith McLean (Drama, QUT). The research aimed to address a significant problem identified by arts educators—that the contribution of arts learning in education is often overlooked and undervalued because its emphasis on intuitive/creative (non-rational) ways of knowing is commonly perceived to be unable to be adequately documented and/or measured. Whilst within the arts we have developed effective textual and numerical means of evaluating arts products and processes, these means are frequently criticised by arts educators because they fail to capture the essence of artistic knowledge or the ephemeral qualities of arts making. Innovations in digital recording and information management systems present the opportunity to capture, store and manage multiple forms of evidence about artistic product and processes.

Research objectives
The objectives of the 2001 ARC Discovery proposal were:

- to identify the qualities of artistic knowing across arts disciplines; to identify gaps in the present approaches to the assessment and evaluation of arts learning and teaching; and,
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- to discover ways that digital technologies might be used to improve the scope, depth, relevance and frequency of feedback.

The proposed outcomes of the first phase, "Digital Media Assessment Portfolio" (DMAP) action research project, in which we applied digital technologies to the collection of evidence of student learning in our own courses in semester one 2002, were

- a theoretical framework for a feedback system, and
- a model for the use of digital media in arts learning assessment that can be applied to the later development of new learning and teaching support software tools with industry partners.

Data Forms in Phase 1 comprised

- Student portfolios which include: DVD shots of work and processes, Arts products, marks and critical/reflective comments that show evidence of changes in thinking.
- Teacher's Reflective comments from the organisational and working point of view as well as personal feelings about student's progress and observations.
- Students marks.
- Purposively selected interviews with students with the portfolios ie, talk aloud with portfolio.

Data Analysis for Phase 2, to date, has involved collating and coding the interview material collected by a research assistant. A focus group session was convened with all CIs and the research assistant to draw some conclusions from the data. Each CI presented a summary of their discipline's perspective, and pertinent themes were examined across disciplines. This session was summarised by a research assistant and the recommendations and results will be written up in 6 papers—one for each discipline and one cross discipline paper. In the paragraphs that follow, I have teased out some preliminary findings that will be presented for feedback to Evaluations 2002 (a National education evaluations conference convened in Brisbane by the Australian Technology Network Universities) on November 14.

DMAP research questions—visual arts/media

- What are the grounds for recognition of an artwork, as such, in an educational context (whether a school, community or TAFE, university creative arts faculty, or a production studio)?
- What are the current assessment and evaluation practices (A&EP) in the Arts?
- What are the specificities of new information and communication technologies and systems (NICTS) that could be advantageous to A&EP?

Research context

My research subjects were volunteers from among the 100 second-year, generalist primary education students of the Visual Arts Education course 2124VTA at the Logan campus of Griffith University. The education context was their preparation to implement
the new (2002) 1–10 Arts Key Learning Area (KLA) Syllabus—specifically the Visual Arts and Media strands covered in the course 2124VTA Arts 2 (Visual Arts.) That is, to make and teach art within the range of acceptable performance for a tertiary student, taking into account the fact that they are education students undertaking one visual arts-media hybrid course in their degree program.

Professional context
On graduation the research subjects will teach an outcomes-based curriculum to students in years 1–10 that is organised around 8 Key Learning Areas. In the Visual Arts/Media strands of the Arts KLA they will assess the student's ability to demonstrate the learning outcomes that are set for the various levels (1–6) identified in the Queensland Studies Authority (QSA) syllabus. Overlaying this outcomes-based approach is a New Basics Framework (NBF) for 1–10 curriculum based on the development of repertoires of practice that draw on clusters of discipline specific knowledge. The aim of the NBF is to achieve quality student learning outcomes and prepare students for 'new times' through the provision of 'rich tasks' that encourage knowledge transfer to contexts beyond the classroom, by providing 'real world' ('authentic') learning experiences that relate to students' lives. This new framework was an outcome of the Queensland Schools Reform Longitudinal Study (QSRLS 1998–2000) which examined and reported on the key educational issues of productive pedagogies; productive assessment; professional development; productive assessment; and system alignment and support. The QSRLS identified a practical misalignment between pedagogies and assessment tasks. It found that assessment tasks that teachers set were often low in intellectual demand, disconnected to the world, and intellectually unchallenging. To address this problem, Education Queensland proposed a 'productive assessment' strategy where teachers in the middle years of schooling would engage in 'moderation' meetings on setting and grading assessment tasks across and within schools, and reflective dialogue between the primary and secondary sectors on assessment would be encouraged.

In the professional context, the NBF rich tasks are described as outcomes that are transformational (enable students to function in real-life roles). The KLA outcomes are used in planning to ensure that the full intent of the KLA is realised. The KLA learning outcomes are seen as traditional when they refer to the content and skills of a learning area as demonstrated in everyday classroom situations, and transitional when they refer to the higher-order competencies and performances in tasks at a (comparatively) macro level. Because these 1–10 frameworks are new, reporting devices and assessment practices are still evolving. The feedback and reports published during the pilot phase of the NBF rich tasks suggest that the social moderation of evidence of learning—which has been a key assessment strategy in the Visual Arts, and Film and Television in senior secondary education in Queensland for at least 20 years—may be the preferred strategy for the 1–10 sector. In Senior Secondary Art, matrices are used that describe the standard for each grade (A to E) for both making and appraising artworks. As well, many secondary educators would maintain that the tertiary arts education sector has much to learn from them in this regard. Having taught in both sectors, I would concur with this perception.
Learning context
Students research, and critically analyse artworks and media images, and study the art-making trajectories of children. They explore concepts, receive technical instruction in art media and techniques, participating in interactive, guided, and shared learning in small groups to develop visual literacy by making and reflecting on art in terms of the objectives for each workshop. They study art education theory and design curriculum and plan lessons for the 1–10 sector. Learning experiences are based on 'real world' contexts for art-making. The studio is noisy as learning takes place in conversations between students about what is being made—whether an individual or collaborative work. The art-making experiments culminate in one fully developed artwork for display. The students write a statement of intention for this artwork (informed by their study of the discipline) that responds to the learning objectives, and meets the specific task and overall course criteria. They study the standards statements and give feedback to each other on the standard of the evidence each has collected for submission. They are required to indicate what they believe is the standard at which they (themselves) are working. Assessment is embedded and the process is transparent. Assignments are designed to encourage transformational learning, and objectives, criteria, and grading standards are explained in detail. Students monitor their progress by cross checking the evidence they are providing of their learning with the learning objectives, and the criteria and standards for the learning context.

Discipline knowledge ('artistic knowing')
It is important to stress that in my research setting the students are not being trained as artists, but as educators who may be having their first experience of art-making. Less than 30% of students have formally studied art beyond one semester in year 8. Their portfolios contain experiments, only one of which is developed into a completed artwork for exhibition at the University open day. I guess the experiments would equate with performing art "rehearsals", and completed works with the public performance.

The regular (non-digital) portfolio assessment item is formative, and provides evidence of:
- research into art and visual culture from past and present contexts and non-western cultures
- understanding of the qualities of the medium used
- understanding of the making techniques
- awareness of resource, management and safety requirements
- understanding of the technical and symbolic codes and conventions of visual communication/expressions (applies elements and principles of design)
- insightful reflection on processes and success or otherwise of achievement in terms of objectives for each workshop
- effective management of information and resources.

Embedded within the above list are references to the elemental, procedural, technical
and conceptual aspects of art-making. The portfolio collects together the results of the students’ engagements with the concepts explored in each workshop. Students reflect on their achievements in terms of the objectives set for each workshop. The workshop objectives are based on the knowledge demands of the discipline (or key learning area) syllabus that the students will be required to implement. These include: a critical awareness of art's philosophic tradition (aesthetics), recognition and use of technical and symbolic codes of visual communication (including the elements and principles of design and awareness of intended audience), expressivity, and creativity.

The finished artwork is a summative assessment piece. Students select a portfolio experiment for development into a completed work, providing evidence of

- **the intention for the artwork** (a statement indicating the concept and art function (ie, substitution, personal expression, narrative, embellishment, persuasion) they wish the work to communicate and perform)
- **conceptual development** (development of the original idea is evident in the record of planning and in the work as it evolves toward completion)
- **creative development** (experimentation leads to novelty in the resolution of the art work)
- **visual literacy** (effective use of elements, principles and concepts of design, and technical and symbolic codes and conventions of the visual arts)
- **presentation and display** (the integrity of the work is preserved and/or enhanced in its completion and display)
- **peer and self review** (an appropriate model for appraising and evaluating artworks in the course context is applied, with reference to the intended function of the artwork).

In the above list are features that I would argue need to be present for the work to be recognised as 'artwork' within the course context.

**Going digital—choices**

Constructing a digital media portfolio could involve (1) using the computer to generate experiments and subsequent artworks (2) translating evidence into digital media by scanning and video recording (3) adopting a hybrid approach that provides options for computer mediation in the art-making process. Choice was influenced by several factors which could be categorised as pedagogical, logistical and ethical, such as

- prior knowledge of the medium (teacher and students)
- the scope for the use of the medium (NICtS) in the art-form
- technology resourcing (teacher and student access to technology)
- support for the use of NICtS in the learning context
- impact on the learning process.

The scope for the use of the medium in the art-form in any learning context will be constrained by lack of prior student knowledge and digital technology resources. In this context, limitations were that a majority of students had little prior knowledge apart from one semester of art in year 8. The studio has one pc and one Macintosh computer, one
scanner, one still digital camera and a digital video camera and tripod shared between 25 students in any one session. Options for the type of portfolio were limited to translating (option 2, above) in the research context, because of the demands of the course for a broad range of art-making techniques, and time constraints. In any context there will be ethical constraints. In the research context, a social justice consideration meant ensuring that the research project did not disadvantage students. Disadvantage was avoided by refraining from using the video camera to monitor the learning that took place through peer discussions of works-in-progress during art-making. Instead, a more ethical approach was taken whereby volunteer students used the video camera to record their own artworks and their reflections on the artworks outside of class time. Only one student among the volunteers had prior knowledge of media production, having studied the board subject Film and Television to year 12, and this proved to be advantageous as a more extensive analysis of the technological encounter could be undertaken.

**Some reflections on the technological encounter in the visual arts/media strand**

Research data relating to the Visual Arts and Media experience will contribute to the overall analysis of the research data, for which the Multiple Perception Analysis (MPA) method (Ecker et al 1984) has been adopted. MPA involves capturing the observations and reflections of the research subjects and researchers during the study. The theoretical perspective underpinning my analysis is derived from a framework devised by Sofia (1993) which built on Idhe's (1990) phenomenology of technics (the human use of technology in the world.) Sofia demonstrated that adding semiotic and psychoanalytic perspectives extended the vocabulary through which human-technology-world relations might be examined. A semiotic analysis focuses on significations, tropes, forms, and processes. Psychoanalytic theory focuses our attention on the irrational tendencies in human-technology-world relations, highlighting the bias inherent in assumed intentionality.

It is important to acknowledge at the outset that Visual Art and Media productions, like the other art-forms under investigation in this project, are, in any case, technologically-based. Historically, visual artistic practice has involved technological innovation that requires a more than passing knowledge of the physical sciences. We only need think of the technological and scientific knowledge underpinning ceramics, bronze sculpture, brass instruments, photography, print-making, lighting and mechanical stage machinery, experimental video and computer graphics. While computer mediation of art's processes is growing, computers still do not displace 'hand-work', or 'craft' or 'artistry', or 'ideas.' Rather, our art-forms are evolving conceptually through computer mediation, for example, the genre of netArt, the conceptual basis for which is the informational mode. Our first year students take a compulsory course in IT. Their success or otherwise in this course tends to set the tone for how they relate to computers for a while after that.

I noted, for example, that during a routine scanning task that I embedded in the course to encourage all students to consider using the computer as an imaging tool that some students claimed they were 'technophobic'. They found their engagements with the
computer disempowering and alienating. Anecdotally, this attitude appears to be connected to prior experience of 'the hand is faster than the eye' regime of 'expert' tutors with whom most of us would be familiar. I discovered, through implementing a simple management technique, that there can be advantages attached to lack of resources that help to eliminate techno-fear. Students can be empowered by a simple 'domino' peer tutoring process using a single computer in a large class. Students indicate when they wish to receive instruction in a procedure, and gather around the computer in 'threes.' First in the queue is shown the procedure, observed by the tutor whilst executing the task, and then goes on to teach the procedure to the next in line. Less confident students can watch for a while before taking their turn. Our etiquette is that a 'novice' learner of a concept or technique is not 'told' what to do during his or her execution of the task after receiving instruction, but given time to think through the process, asking for further guidance when necessary. New knowledge is reinforced, and a sense of satisfaction gained through teaching the process to the next 'novice' in the queue. A recommendation arising from this experience is that it remains important for teachers to demystify new technologies, and to develop strategies to empower students by making computer-mediated tasks non-threatening and the computer as user-friendly as a pair of scissors, a notepad or a whiteboard.

As Sofia (1993) noted, Idhe (1987, 1990) gave us a very useful model for distinguishing between different kinds of technologies in terms of the kinds of experiences, knowledge, and human-world relationships they enable and constrain. Idhe's "Genres of Technics" are organised around four categories of relationships between humans technology and world: Embodiment, Hermeneutic, Alterity and Background. All of these generic relationships are identifiable in our technological encounters. But I would argue, like Sofia, that the specificities of the computer have, over and above those of other technologies, not only heightened these generic relationships and made them much more obvious, but elicited more intense feelings. This intensity may be attributable to the sense of alienation described above, compounded by the computer's (irrational) mythologisation as a rational 'thinking machine.' Over time, this phenomenological relationship of alterity—the distinction between self and object—begins to break down, and the computer becomes a second self. An important understanding to be reached here is that computers are machines programmed by humans, despite appearing to have minds of their own, but that they might also make us think and do things differently.

In our art studio, the networked computer, scanner, printer and digital still camera take their place as mere tools among the many that we use. The video camera, however, does not. When the camera is around, we feel threatened by its 'eye' and 'ear' and its 'memory' which we (somewhat irrationally) believe will steal our image, voice, and our personal moments or interactions, turning them back at us in ways that do not correlate with our own perceptions of events. The video camera halts our conversation mid-sentence. This phenomenological response signals that the sudden introduction of the video camera—particularly by the researcher—can be a threatening intervention. This outcome has implications for the researcher/teacher to be aware of the impossibility of objectivity in this kind of research. Idhe would describe this phenomenological relationship as one of embodiment (where technology operates as body/prothesis.) In
Sofia’s psychoanalysis, pathologic tendencies would be voyeurism or narcissism where the boundary between the body and the machine breaks down, and the body incorporates the machine. The impact of invasive technologies on the student, the creative process, and its evaluation, must not be underestimated. Video documentation has cultural, moral and ethical implications. Students should be allowed to negotiate an acceptable alternative to video documentation. They need to be given time to become comfortable with the presence of the camera at the very least. At best, s/he needs to be in absolute control—preferably behind the lens or at least directing and/or editing what the camera sees and captures of her/him self or work. Students should also have final approval of the recording, and copyright clearance should be obtained for its subsequent use.

Conclusion
To return to the research questions outlined above, the digital encounter has resulted in an extended vocabulary through which the specificities of artistic knowing, and evidence of artistic learning, can be articulated. The research process has emphasised that a conceptual framework for assessment in the arts in the tertiary and 1–10 sectors needs to be underpinned by clear statements of the qualities that allow a work of art to be recognised as such in each learning context. A model for the use of digital media in assessment portfolios must be based on a critical awareness of the specificities of NICTS. This includes the recognition that technological reproduction of an artwork subsequent to its creation is not the artwork itself but a representation of the artwork. Furthermore, in translation into digital format, features of an artwork—such as scale and colour—can be easily distorted. An artwork produced in minute dimensions can be reproduced and projected in a significantly enlarged version. In some cases this enhances the artwork, in others, it may diminish the artwork. As well, artworks translated into informational mode can be easily decontextualised and recontextualised. There are specificities of the informational mode that make digitally generated artworks replicable, rather than merely reproducible, without degeneration. (Nalder 2001). Each replicant is indistinguishable from the original. A model for digital documentation of artworks must take into account the specificities of technology and technique. For example, there are differences between digitising an artwork with a scanner, photographing it with a still digital camera, and recording it with a moving digital video camera with audio that have implications for equity in the assessment process. While tele-mediation may not suit all learning styles, there are specificities of the informational mode that have implications for extending both the conceptual and creative processes. Both the scope and the grounds for such extension must be well understood by participating students. A semiotic understanding (Sofia 1993) of the significations, tropes, forms, and processes of the informational mode is crucial to aesthetic decision-making. Finally, a clear message emerging from a preliminary analysis of the perceptions of both the researcher and the research subjects is that opportunities provided for additional reflection by students and teachers through the introduction of new processes within a critical inquiry context leads to deeper learning. Having student generated and managed evidence in digital format and information mode (databased, retrievable, with feedback loops) would support and
facilitate reflective learning and flexible learning while furthering the new media skills development demanded by the professions.

References


