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Reclaiming Teacher Agency in a Student-Centred Digital World

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Abstract

This article examines the current dilemma faced by many teachers: the drive for a modern day pedagogy advocating student-centred, technology-enabled learning is at odds with teacher comfort zones still nestled in a teacher-talk, print-based classroom. Put another way, the ‘techno-reluctance’ of many teachers represents a negative reaction to the perception that new technologies represent a threat to their traditional roles and general sense of practical agency in the learning process or classroom. The paper interprets some of the key factors impacting on techno-reluctance as a means of moving beyond such a simplistic view of the connection between digital technologies and changing teacher roles. On this basis, it goes on to discuss the concept of ‘techno-literacy’ as a means of reclaiming teacher agency in a student-centred, computer-mediated environment and also reframing teacher attitudes to electronic texts and related literacy practices.

Introduction

Recent educational directives like President Clinton’s *Bridging the Digital Divide* (1999), the *Adelaide Declaration on National Goals for Schooling in the Twenty-First Century* (1999), and Education Queensland’s *The Next Decade* (1999a,b) have valorised the role of technology in education and insinuated wider notions of literacy practices in a digital world. They endorse the productive use of new technologies for locating and analysing information—identified as essential skills for literate citizens of the ‘knowledge society’. The speed and increasing sophistication of technology accentuate the need for students to cope with different modes of representation in accessing and processing information, and developing more critical understanding of these different texts. Our rapidly changing digital

world confirms multimedia as the dominant communication channel in all sectors of the community (Healy, 2000) and the indisputable fact that current notions of literacy will be obsolete when today's new readers and writers have finished primary school (Lemke, 1993). The nature of electronic texts and networked systems understandably impact on questions of what students are taught, how they are taught, and how they react to such texts and teaching approaches. Thus educational institutions cannot remain totally wedded to print-based texts alone and teachers need to include multimodal texts and computer-mediated learning in their repertoires of classroom strategies.

While most teachers recognise the changing nature of literacy practices, issues of confidence, access and application remain crucial factors in their framing of teaching practices. Current literature promotes the need for students to become proficient in multiple literacies but rarely bolsters teacher confidence about changing pedagogical paradigms. Some speak of the need to shift the industrial age teaching paradigm (Peach, 1997; Moran, 1999) to one more suited to the knowledge age, inferring that teachers who do not make the transition are failing their students. Views of literacy practices, tied to emerging technologies of information and communication, challenge the creativity of educators in envisioning new ways of utilising them (Leu & Kinzer, 2000). In many cases, these thoughts are alarmist to teachers who themselves have experienced and been trained in industrial age approaches and attitudes to learning. This accelerating period of change represents an identity crisis for these teachers who would perhaps respond more confidently when a redefinition of their pedagogy reaffirms their valued role in the classroom.

If calls for addressing new technologies of communication in the classroom were framed in less threatening terms, with appropriate human and technological resources as support, then teachers might embrace new tools of literacy more readily. If the view of the teacher's role were reframed to teacher-as-designer of tasks for student-centred learning, then teachers might welcome this redefinition of role and be more enthused about using those new tools of literacy. If an appropriate model for approaching teaching in a computer-mediated environment were offered as a practical foundation, then perhaps the transition for teachers from industrial age to knowledge age paradigm might be easier. This paper thus discusses how a sense of teacher agency need not be seen as necessarily at odds with a student-centred digital world—but might be reconceptualised in a different way but still as a precondition of effective learning and educational practices.

New educational goals are required to ensure that students not only conquer the complex knowledge acquisition processes of the digital world but also critique the seductive allure of cyberspace. Students can no longer rely on textbooks alone to stimulate their learning; internet searching can be daunting, given the seemingly infinite cyber-library of virtual texts. The incursion of the corporate and consumer world into cyberspace has increased the daily bombardment of advertising and ideological messages for hapless 'surfers'—illustrating how the scope of literacy practices today has expanded and multiplied, with particular consequences for students and their teachers. The monolithic structure of print has been transformed into a kaleidoscopic multimodal world requiring a complex set of abilities for critical appreciation and comprehension. Now students need to be proficient in multiple literacies to cope with the increasing complexity of literacy practices abounding in daily life.

Recognition of multiple literacies as a new requirement in education challenges the range of responsibilities for all teachers to ensure that students become proficient yet critical users of print, visual, information and electronic literacy. Just as more complex reading practices are required to locate and construct meaning from nonlinear, frequently multimodal text, then knowledge construction processes become more complex as well. Multimedia authoring skills, multimedia critical analysis, internet exploration strategies, and internet navigation skills are now regarded as the essential skills for literate, twenty-first century individuals (Lo Bianco & Freebody, 1997). Giving press prominence to reductionist notions of 'the old basics' of reading and writing (Snyder, 1999) clouds the issue: changing notions of literacy are obscured; the demands placed on literacy by the escalation of technology and societal changes are ignored; and excuses are given for not meeting the challenges of knowledge construction in a digital world.

These complex demands for students to negotiate in their learning impact on expectations of the teacher's role in the classroom. Teachers not only need an understanding of the operational potential of the medium, but appropriate and creative technological application in a subject domain as well. Yet attitudes of educators to technology based purely on operational skills or notions of 'computency' (Bigum & Green, 1993) fail to address the critical need for teachers and students to move beyond merely using computers as word processing or computational machines; they equate with reductionist notions of 'back to basics' literacy. Deeper processing, interpretation, evaluation of information and reflection on cultural practices resulting from new technologies for transforming into knowledge are required. Well-developed systems such as networked computers have the potential to 'renew, revitalise and improve our teaching/learning processes' if teachers successfully integrate computers and

learning to produce ‘self-directed learners, collaborative workers, complex thinkers, quality producers, community contributors’ (Moran, 1999, pp. 7–9). These are not totally new concepts yet they are seen as disrupting the teaching/learning process. Teachers need to critically analyse and understand these attributes before they make judgements about their role in technology-based classrooms. Educators should ensure that students move beyond being passive receivers of technologically mediated information to become actively critical and creative users of these new technologies—an expectation that is equally valid in traditional classrooms.

Thus, teachers need to find ways to harness the changing textuality of digital media and their ways of thinking about technology, so that appropriate pedagogical strategies can be established. Considering the findings from teacher efficacy studies we know teachers’ attitudes to and use of technology affect how students accept and utilise the new tool for learning. As the permeation of new technologies into everyday life is inescapable, teachers cannot continue to resist or retain traditional pedagogical models. More demanding questions on how to harness new information and communication technologies for teaching and learning should be raised (Snyder, 1997; Moran, 1999). Teachers should be involved in shaping directions for technology use in enhancing knowledge construction processes for learners (Lidstone & Duncan, 1996; Claeys, Lowyck & Van der Perre, 1997; Garfield & McDonough, 1997) instead of merely debating the relative merits or demerits of technology use in learning. Such a focus would seem to answer Comber’s (1998) plea ‘that in these times it is absolutely necessary that the literacies available to young people in schools are multiple, inclusive, critical, sophisticated and pleasurable’ (p. 2). Teachers with a passion for and commitment to the generation of quality learning in students are the ones most ready to accept this challenge.

Factors Affecting Teacher Adoption of Computer-mediated Learning

One strong reason frequently touted by teachers for their hesitancy about using technology in the classroom is the issue of access, whether expressed in terms of general funding dilemmas or questions about the specific deployment of resources within a school. Technological imperatives drive global, national and state policies to ‘wire’ schools. But providing adequate classroom ‘access’ does not necessarily translate into full and effective participation, better learning or technologically adept students and staff. Tyner (1998) argues that access should provide opportunity and achieve fairness, but often this goal is undermined

through lack of provision of back-up resources and human infrastructure/support. Access is not the same as participation.

Besides, concentrating on the provision of access seems to deflect attention from the need to improve levels of participation or critical thinking about aspects of technology and its role in society. Active classroom participation using digital learning tools and texts invokes issues of teacher responsibility and accountability for addressing the multi-literate needs of students. The scope and effectiveness of this active participation rests on classroom practice—on the teacher and his/her fundamental beliefs about teaching and learning, about the place of technology in this learning process, and on the school policy.

In attributing electronic texts with qualities akin to popular culture texts—that is, transient and inconsequential—some teachers voice their resistance as fear of the erosion of those golden literary values from the western canon. Resistance to any new form of literacy, regardless of historical period, is tied to fear of the ‘new’ supplanting the ‘old’ where dominant discourses have held supremacy and established credence for valued literacy practices of the day. Plato and Socrates decried the supplanting of rhetoric by written texts as destructive of the immediacy of their highly revered oral tradition. The medieval scribes who created the beautifully embellished illuminated manuscripts fiercely opposed the threat of Gutenberg’s printing press to their religious omniscience. In both these cases, resistance was linked to the preservation of the authority of the oral or written text, and the sanctity of the social practices nesting around those texts. The custodians of those literary forms also feared the loss of the textual features distinct to their practice, and there was a gradual adaptation and morphing of form. Early book production resembled the illuminated manuscripts in layout but the printed word gradually took precedence over the visual embellishments. The change in form did impact on meaning-making for the author and the reader of the text; they were different media; they did involve different literacy practices; but ‘new’, while initially threatening, did not mean the end of a ‘golden age’ of literacy (Luke, 2000).

Unlike the gradual change from oral to print culture, that took several hundred years, the change to techno-culture is happening in a generation, and this is perhaps what alarms most teachers. As new technologies emerge, regardless of historical context, they are ultimately woven into the social fabric of everyday life. The illuminated manuscripts of the past have metamorphosed into their modern-day counterparts—multimodal web screens with a more fluid and dynamic relationship between word, sound and visual. Multimodal texts represent the convergence of modern-day literacy practices and new communications technologies. They herald the realities of new genres, new social and literacy practices, and the need for

teachers to rethink whether their pedagogical beliefs and practices do in fact match those of the Knowledge Age.

Another key reason for resistance to adopting computer technology is that of teachers' basic beliefs about the inability of electronic communications to enhance learning in their print-based classrooms. Often this resistance is tied to fear about the electronic incursion into their comfort zones; lack of confidence is protected by denial. Honey & Moeller (1990) found that high technology-use teachers consistently demonstrated their student-centred beliefs in classroom practice. In contrast, low technology-use teachers not only had predominantly teacher-centred beliefs but also stated a personal fear of technology, especially in terms of how technology might diminish their authority. Comfortable with their existing teaching strategies, these teachers seem to fear 'losing face' before 'computer-compatible' students, their loss of interactivity with their students, or even the conversion of their students into hyperactive screen-flickers. Leu & Kinzer (2000) argued that while the strength of these feelings might vary between individuals, they do tend to mirror some of the major staff objections. Techno-reluctant staff require considerable catalysts to overcome their inertia.

Fundamentally, techno-reluctant staff need reassurance that working in a computer-mediated classroom makes them neither obsolete nor powerless. Technology is not a substitute for teachers; rather it is a tool for delivering instruction. Key tenets of learning remain intact. It *is* essential to retain the human dimension in teaching with close attention to student needs (Delors, 1996; Ordonez, 1998; Moran, 1999). It *is* essential to ensure that reflection is part of learning experiences (Montgomery, 1994; Gordon, 1996). It *is* essential to understand the relationship between students and computers and their impact on understanding (Papert, 1993). There is, however, a need to challenge staff to rethink teaching strategies for alignment with the changing literacy needs of their students for the future. All teachers have the responsibility to ensure that all their students are given ample opportunity to develop their multi-literate skills. Collegial sharing, reflection and theory-building about learning and teaching strategies for this type of environment are positive steps towards reclaiming the significant role of teachers in the knowledge age and ensuring that teachers are supported in focusing on the holistic needs of students.

However, the current concept of student-centred learning tends to cloak one fundamental fact—the teachers are instrumental in the creation of student-centred learning environments. Teacher definition is not diminished although considerable knowledge and creativity are required in the new role as facilitator of learning. Re-emphasising the teacher role as central to creating the learning environment—through designing rich tasks capable of facilitating

higher order thinking and learning—could help recover the teacher’s sense of agency.

Allaying those fears that the new technologies will threaten the omniscience of the traditional teacher role could assist teachers in gaining confidence to experiment with technology in the teaching/learning process. Resistance is akin to lack of confidence or conviction that student-centred learning can be enhanced by teacher-designed technological applications in any subject domain. Framing the implications of the advent of electronic communication technologies within an historical context could be the first step towards reframing teacher attitudes to new electronic texts.

Reframing Teacher Attitudes to Computer-mediated Learning

The issue of access has been raised as a legitimate hurdle to be crossed. But for the purpose of this paper, it is assumed that all schools have access to some computers and that this will be increasingly less of an issue as government policies are enacted. Thus the goal becomes one of finding ways to increase levels of participation in computer-mediated learning. To reframe teacher attitudes and increase levels of participation in technology, notions of fear and apathy need to be addressed.

When resistance is linked to the fear of losing valued print-based literacy practices, then the reframing of new technologies in an historical context is recommended. Knowing that electronic texts are part of the evolutionary nature of literacy tools and practices helps promote a more familiar and less threatening framework. The tools of literacy have obviously changed since the medieval manuscripts: from stylus to mouse; from inks to electronic codes; from parchment to cyberspace. The solitary scribes have been replaced by collaborative teams of artist/web designer, project manager, software engineer and business person. If teachers can accept the process of literacy evolution (or even revolution) as part of the inevitable cycle of change, and not see it as cause to lament the loss of pure and perfect literary forms, then teachers may be more receptive to notions that technology might be integrated into knowledge construction or learning processes.

Choices of terminology will play a crucial role in encouraging teachers to accept the metamorphosis of literacy, and also the new and related learning requirements represented by digital technologies, texts and media of human communication generally. Notions of industrial age teaching paradigms match the factory model production lines, invoking stereotypical images of packed classrooms, students at regimentally rowed desks, Napoleonic delivered curriculum, and teachers as fonts of all knowledge filling students’ heads with facts. The end of the twentieth century has been termed the ‘late age of print’ (Bolter, 1991),

inferring the supplanting of print by electronic texts, or the post-industrial age, a rather soulless construct offering purely a temporal identification. In speaking of our current time as the 'information age' or the 'knowledge age', the magnitude and ease of collecting data is foregrounded, but the distinction between them is blurred.

Obtaining a vast collection of facts or details is information-gathering and only the first step towards knowledge construction. Considerable skill in synthesising ideas and sources and forging links and associations between them is required to shape information into a meaningful, lasting knowledge base. If educators think of this early twenty-first century period as the 'knowledge age', then the emphasis is firmly placed on the knowledge construction process for individuals, accentuating the need to think about enhancing learning experiences as the foundation for the knowledge age teaching paradigm. Rushkoff (2000) is wary of emphasising data at the expense of human interaction as exemplified by the term 'information age'. He advocates renaming this as the 'Interpersonal Age' to reflect how the boundaries between people are disintegrating via technology. This term should reconfirm for educators the need for building interpersonal relationships in learning experiences, reclaiming teacher agency. From these perspectives, the challenge for educators becomes a balancing act as they seek to integrate studies of technology tools, multimodal texts and print-based texts with collaborative tasks to enhance both knowledge construction and interpersonal skills.

Metaphorical choices also impact on how technology is viewed, used or avoided. Turkle's (1997) 'culture of calculation' infers the mechanistic view of computers as computational tools or conveyors of information. Such purely operational dimensions are necessary but not conducive to enriching learning experiences. Moving beyond notions of computers as conveyers of information, towards computers as mediums of communication and interaction (Rushkoff, 2000) expands the social dimension of the learning experience. This is similar to Turkle's (1997) 'culture of simulation' which invokes the surreal quality of many virtual interactions. The notion of 'constructionism' (Papert, 1993) extends the constructivist view of learning to students exploring learning through technology. Similarly Jonassen (1993) argues that technology should be rethought as a mediator of learning, thus encouraging teachers to build more meaningful student learning experiences. Viewing technology as a representational medium (Murray, 1999) gives further encouragement to teachers to consider how students can use technology to represent their developing knowledge. Some studies on attitudes to technology use of staff and students (Stokes, 2000) have investigated how a person's preferred metaphor constructs value-laden attitudes to the machine and its perceived uses—negative metaphors reflect negative values, creative

metaphors suggest creativity in application. Thus by reframing attitudes to the contemporary period, technology and the tools of literacy, teachers may be more inclined to embrace the computer-mediated knowledge age.

Another significant aspect of reframing teacher attitudes in terms of reclaiming teacher agency in the student-centred digital world is the concept of teacher-as-designer of tasks for that environment. This is no different from Dewey's (1944) experiential/discovery learning where the task of the teacher is to plan the learning activity and environment. Murray (1999) describes interactive designers of software and computer interfaces as 'architects of cyberspace' with the important task of shaping applications and the digital landscape to enhance communication. She believes those interactive designers possess a unique combination of verbal and visual skills with understanding of cognitive processing. Above all, she believes that interactive designers require vision to think beyond the current environment and to invent the new conventions of interaction that will help transform the exponentially increasing information into a corresponding advance in human knowledge. Murray could, in fact, be talking of teachers instead of interactive designers. By adopting the role of teacher-as-designer, teachers could meld coherent, well-balanced learning experiences for their students, responsive to multiple literacies and ensuring their critical, creative uses of technology in the knowledge construction process. By adopting the role of teacher-as-designer, teachers are foregrounded as instrumental in shaping the learning environment and process. Successfully reframed attitudes are more conducive to contemplating different teaching models and paradigms.

The Techno-literacy Model

The problem of integrating computer-based experiences into classroom practice challenges both educational administrators and classroom practitioners. Recognising that the electronic age spawns new technologies, different literacies and social practices is foundational to understanding a range of factors impacting on computer-mediated learning experiences for students. Bigum & Green (1993) and Lankshear (1997) differentiate between the different discourses and articulations of technology *for* literacy, literacy *for* technology, literacy *as* technology, and technology *as* literacy. Educational directives set goals for student attainment of basic literacy skills of writing and reading, and technological literacy, 'the ability to create, use, manage and understand technology in a range of contexts' (Queensland Years 1–10 Technology Key Learning Areas, 1999). The *Digital Rhetorics Model* (Lankshear, Bigum *et al.*, 1997; Lankshear & Snyder, 2000) advocates exposure to

operational, cultural and critical dimensions when learning about technology and literacy—a three dimensional approach to integrated technology use. This conceptual framework offers fundamental directions for the technology-literacy-learning pathways, but does not offer practical classroom guidelines to the curriculum-technology application. The term ‘techno-literacy’ (Kimber, 1998) represents the convergence of technology and literacy practices where those three dimensions are addressed in classroom activities.

Techno-literacy integrates technology skills with literacy practices to construct knowledge, whether factual, cultural or critical. It recognises that both technical and intellectual skills are integral to learning and communication in the knowledge community. Integrated technology use is a model of connectivity, fostering a more coherent view of domain knowledge, technology as serving students’ needs, and critical readings of both technology and society. If techno-literacy was adopted as one of the multiple literacies, and a fourth dimension of design added to the *Digital Rhetorics* model, then teachers could confidently reclaim their agency in the computer-mediated classroom. They would assume responsibility for designing tasks for the computer-mediated classroom that ensured all students moved across the four dimensions, designing their own representations of knowledge and clearly demonstrating their critical understanding of their level of multiple literacies.

Design: the fourth dimension

The notion of design is gaining acceptance in multi-literacy circles. The New London Group (2000) advocates a Design Curriculum to address the complexity and interrelatedness of different modes of meaning inherent in multiple literacies. They specifically outline six design elements (linguistic, visual, audio, gestural, spatial and multimodal) and four associated components of pedagogy (situated practice, overt instruction, critical framing and transformed practice). They argue that the element of design ‘restores human agency and cultural dynamism to the process of meaning-making’ (p. 36), also reinforcing Rushkoff’s (2000) notion of an interpersonal age.

The concept of design connotes artistry and creativity, an accomplished level of skills in a particular field, appreciative evaluation of existing elements, and a vision for doing things differently and hopefully better. Essentially this involves higher order thinking of evaluation, reflection and creativity. Mitchell (2000) sees design as the key factor adding intellectual value to content or concept in the Knowledge Age. If we accept that two positive outcomes of design are the new construction of meaning, whatever the mode, and its positive role in dynamic, communicative interactions, then its potential for transformation of knowledge is

closely forged. When combined with social constructivist principles of collaborative learning, then the application of design principles to classroom activities offers a powerful direction for generative, developmental learning. Often in a computer-mediated environment, where the machine is regarded as an isolating device, then the possibility for social interaction is curtailed. However, if the activity using the computer involves collaborative interaction, then the social dimension in the construction of knowledge is activated. In a digital classroom, the notion of design becomes both goal for creating reflective representations of knowledge, and process for linking and deepening the operational, cultural and critical dimensions inherent in the development of deeper levels of domain knowledge.

In seeking to articulate a new theory to deal with the semiotic nature of electronic texts, Kress (1997) differentiates between critique and design. Critique, he argues, is looking back at texts, in a sense historically, evaluating their various elements, and understanding their constructions. This form of historical evaluation has been traditionally reflected in most subject disciplines as the basis for conceptual understanding of the subject knowledge base. It involves in part critical reflection on the socially constructed nature of knowledge to determine the interest groups which have constituted, legitimated and perpetuated such knowledge but also an identification of the ideological dimension of the texts (Lankshear, 1997). He suggests three potential objects of critique in respect of this critical literacy:

- Knowing literacy in general or particular literacies, critically; that is, having a critical perspective on literacy or literacies per se;
- Having a critical perspective on particular texts;
- Having a critical perspective on wider social practices, arrangements, relations, allocations and procedures that are mediated by, made possible, and partially sustained through reading, writing, viewing, transmitting texts (Lankshear, 1997, p. 44).

Kress (1997), however, contends that design is more suited to the multimodal texts of the digital age, as they build on critique and plan knowledgeably for the future, allowing for adaptations that could eventuate with any future technological and social changes. This concept encourages students to use their critiqued knowledge of the discipline to plan or devise a creative extension of subject matter. The process of designing therefore allows purposeful extension of knowledge in creative and critical ways.

Furthermore, Mayes (1991, 1993) discovered that the hypermedia authors who designed StrathTutor, a hypermedia system designed for university students on a problem-generating principle, actually learned more about the domain content than the students using the program. By transferring the technology tool construction and design to the learners, more powerful learning resulted. The application of design principles is believed to support communicative practices and constructive learning processes which are just as important as the actual knowledge representations themselves (Roschelle, 1996). Both these notions equate with constructivist theory and introduce the notion of teachers/students-as-designers or architects of knowledge who use their operational skills but apply reflective, critical and creative thinking to their studies. The metaphor of design helps teachers/students develop a conception of themselves as authors of knowledge, not just receivers of knowledge (Lehrer *et al.*, 1994). Techno-literate teachers who have a firm pedagogical philosophy would become designers of computer-mediated experiences, using computer-based cognitive tools and collaborative, problem-based approaches to enhance learning for their students. In this instance, the concept of teachers-as-designers would surely confirm the significance of the teacher's role in the student-centred, computer-mediated classroom.

From all these perspectives, there would seem to be a strong case for accepting design as the fourth dimension for teaching for multiple literacies. With design, the teacher becomes the architect of classroom experiences, balancing the development of multiple skills and knowledge's, ensuring the holistic development of all students, and taking pride in knowing that he/she has facilitated the student-centred learning. Adopting design as the fulcrum of the techno-literacy model could ensure full participation by teachers in shaping effective integration of literacy and technology, and the operational, cultural and critical dimensions. Being the designer, the teacher is responsive to current trends, reflective of the values of past and present practices, and future-orientated in thinking. Furthermore, as designers, teachers could engage in collaborative teams, with staff or students, to compose a spectacular pastiche of their own illuminated multimodal manuscript.

Embracing multimodal texts and the promotion of multiple literacies with students would reflect the realities of the digital world, but that is only the first of many steps. Careful thought also needs to be given to designing an appropriate range of assessment measures to match those different texts. If students are to be encouraged to create their own multimedia items, then confining assessment items to purely pen and paper exercises like traditional written assessment tasks is not well matched. Students who are at home in the visual, electronic world

should be able to show their prowess in those domains. Rethinking modes of assessment to meet these concerns presents a challenge to teachers in exploring their curricula.

Working with computer technology in a classroom does not make teachers obsolete or powerless. The fulcrum of design in the techno-literacy model offers a means of achieving balance and fairness in choice of texts, tasks, learning experience and assessment mode, and offers considerable opportunity for teachers to demonstrate their creativity and ingenuity as designers:

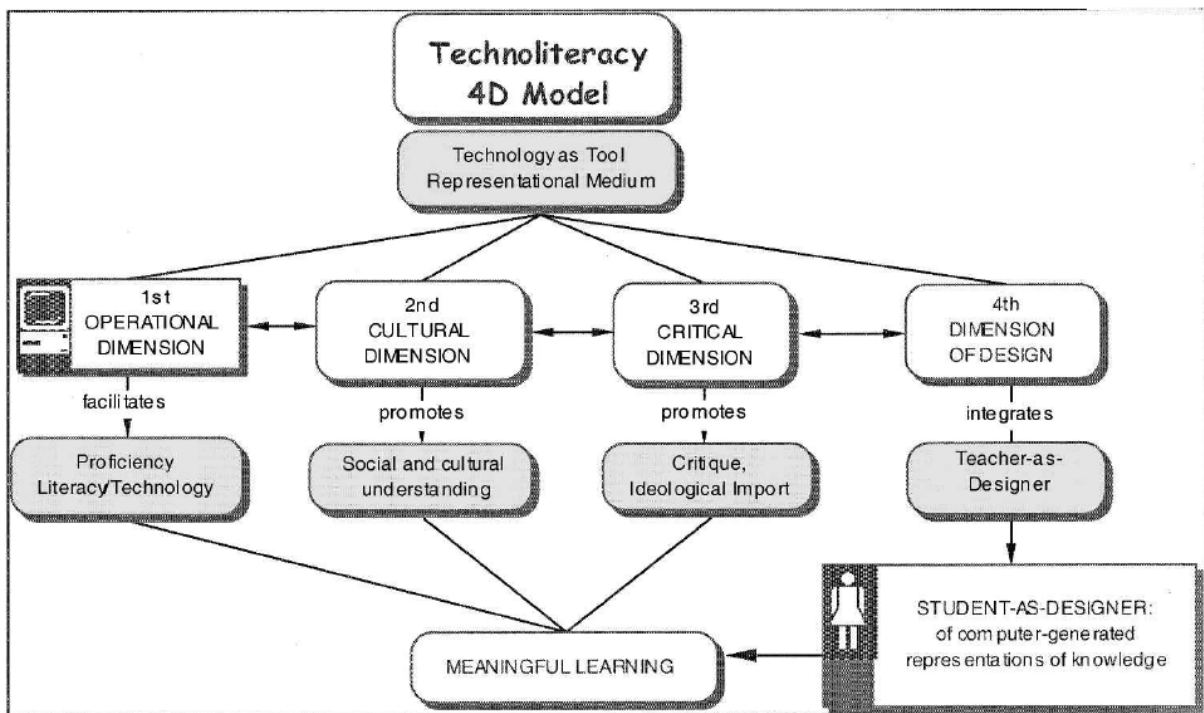


Figure 1. The Techno-literacy Model.

The computer-mediated writing classroom can be one in which not only the students are active learners, but also one in which teachers function as curriculum creators or innovators in their own classrooms (Snyder, 1994, p. 166).

Thus the notion of design should be extended to cover the whole process of knowledge construction, representation and assessment as an integral part of teachers' professional practice. It should give focus to purposeful student activity, redefine teacher identity, and help reaffirm teacher agency in the student-centred digital environment.

Conclusion

In a time where social justice issues dominate the press and school mission statements advocate equity of treatment for all students, there should not be pockets of technologically disadvantaged students. Issues of access should not curtail or limit efforts to investigate ways of ensuring full, creative, multimodal learning experiences in techno-literate practices by teachers. When teacher attitudes are framed in 'computer-friendly' terms, then greater opportunity arises for exploring new teaching paradigms suited to the digital world. In a climate of mutual support and collegial sharing, educators should be able to engage in philosophical, educational debate, devise means to ensure that participation is inclusive and pleasurable, and reflect on strategies that promote critical and creative uses of technology. Adopting the fourth dimension of design in teaching practice reclaims the significant role of teachers in the teaching/learning process. Professional development programs in computer literacy should expand to include designing effective teaching/learning environments, tasks and assessment as centrally integrated, rather than the technology per se. When teachers-as-designers integrate techno-literacy approaches in devising rich learning experiences for students, and when the mode and range of assessment items equally match our rich tasks, then we can truly say that our approach to computer-mediated learning has been illuminated and teacher agency reclaimed.

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