

Instructional Design of Interactive Multimedia: A Cultural Critique

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Instructional design is socially and culturally constructed. The article explores the proposition that the selective traditions of instructional design consist of values, ideologies and images which act in the interests of particular cultural (class and gendered) groups. It examines this premise and argues for multiple cultural, rather than multicultural, contextualization of instructional design. It situates the multiple cultural model in an eclectic paradigm that appropriately combines elements from (a) behaviorist, constructivist, and critical theory paradigms and (b) weak and strong culturally contextualized design strategies. Cultural context is the very stuff, the scaffolding, of instructional design if users are to be positioned as active participants who are given and take responsibility in the learning-teaching paradigm.

□ The relationship between cultural context and instructional design has received little attention in the educational technology and instructional design literature, including that of interactive multimedia (IMM) instructional design. Yet IMM users in homes, schools, universities, and the workplace are increasingly more culturally diverse. The article suggests that instructional design appropriates the homogeneous "MacCultures" (Luke & Luke, 1995) of Microsoft, Nintendo, and CD-ROMs, to create educational microworlds that go beyond issues of access to those of participation for equitable outcomes in the learning, credentialing, and employment stakes. To this end, the centrality of cultural context in the instructional design of educational and recreational IMM materials is emphasized. A multiple cultural, rather than multicultural, instructional design model to cater for mainstream and minority groups is proposed. The journey to this conclusion involves the realization that instructional design and instructional designers do not exist in a vacuum; nor are they neutral. As part of their social and cultural fabric, they influence and are influenced by particular world views; their class, gender, culture, values, and ideologies; selected learning theories; and particular instructional design paradigms. The paradigm that seems to cater most effectively for a multiple cultural context is an eclectic paradigm that combines elements from the behaviorist, constructivist, and critical theory paradigms. How instructional design takes cognizance of multiple cultures is exemplified by focusing on the ways it includes and excludes issues of culture.

Theorizing cultural contextuality as a variable of consequence in IMM instructional

design is defensible. Instructional design cannot, and does not, exist outside of a consideration of culture. Broadly interpreted as a way of life of a people, culture is the manifestation of the patterns of thinking and behavior that result through a group's adaptation to its changing environment, which includes other cultural groups. People belong to more than one cultural group in society and they embody a subset rather than the totality of a culture's identifiable characteristics (Scheel & Branch, 1993). This view "understands culture not only as lived traditions and practices, but also as the meanings and values of social groups that derive from specific historical conditions" (Smith, 1994, p.299). Culture thus shapes and is shaped by language, ethnicity, religion, class, power, history, geography, ideology, aesthetics, gender, lifestyle, values, beliefs, traditions, and ways of thinking and doing (cf. Scheel & Branch, 1993).

Artifacts are another cultural shaping device. Advertisements, for instance, provide powerful artifacts that maintain, manipulate, and transform aspects of our culture. Culture can be divided into non-material and material products. Discussion concerning the instructional design of a topic on the semiotics of advertisements is a non-material or non-artifact product of culture. When instructional design translates the topic into a tangible object, such as IMM software, it becomes an artifact of the culture in which it is embedded. Thus, at the theoretical abstract level, instructional design is an intangible aspect of culture, but once it is transformed into a material object, it becomes (part of) that cultural artifact. Any artifact is a product of the selective paradigms of instructional design. These paradigms are influenced by such things as the instructional designer's (a) world view; (b) values, ideologies, culture, class, and gender; and (c) commitment to a particular design paradigm.

WORLD VIEWS AND INSTRUCTIONAL DESIGN

Jones (1993) explains how the relationship between instructional design and world views

has molded and is molded by contemporary symbolic and material cultural artifacts. She contends that computer generated artistic and scientific graphics reveal characteristics associated with three world views: the prediction-control model of modernism, the relativistic model of postmodernism, and a connectivity paradigm suggested by chaos theory and computer models of complex, dynamic self-organizing phenomena.

A prevalent characteristic of the modern world view is dependence on a conceptual view of information as hierarchical and time as linear and sequential. The purpose of knowledge is to describe, generalize, predict, and control a rational predictable world. Examples of computer graphics associated with this world view exist in the simple graphics of computer menus and organizational graphics that show visually the hierarchical storage of computer files. Some characteristics of postmodernism are randomization, an emphasis on context, uniqueness, individuality, and a natural tendency towards disorder and fragmentation. Examples of computer graphics centered in postmodernism are those incorporated in desktop publishing software. Initially, users did not heed conventions obeyed by graphic designers, with the result that many in-house memos and publications used multiple unrelated fonts, layouts, graphics, and shading patterns (Jones, 1993). However, the individualization of artistic expression was seen as producing a hotchpotch and conventions were quickly reimposed, returning the application of computer graphics in this area of public usage to the rationalist model of a universally recognized reality, that is, modernism. As the example reveals, differing world views coexist thus indicating that cultural change and continuity occur simultaneously. Hence, any new design emerges in the awareness that comes from breakdowns (which result in questioning the certainties of a particular world view) and the borders (which bound those world views) that the breakdowns reveal.

Another major breakdown and boundary appears with what Jones (1993) sees as the emergence of a third world view that is characterized by connectivity, that is, simultaneous

unity in diversity as a structure of knowledge, ordered unpredictability, and non-linearity. An example of computer graphics situated in this world view would be iconic metaphors to represent a conceptual organization of information. For instance, graphics depicting an office and its contents are used as the navigational, information-retrieval aids to select, among others, video, audio, glossaries, text, and main menu in a hypermedia IMM package. Some users fail to make conceptual sense of links between segments of data in complex hypermedia systems and complain that they cannot find their way around or get back to the beginning. This suggests a reliance on, and probably a belief in, a universal, linear, hierarchical structure of knowledge (a modernist view of reality). The computer graphics associated with "nets and webs that join in multiple harmonious dynamic patterns" could be seen as further appropriate examples characterizing the connectivity world view (Jones, 1993, p.29). There is "duality between local and global structure so that, [if we are discussing listservs and the World Wide Web], the global arises out of the local and, in turn, acts to condition the local" (Peat, 1995, p.366). As Jones (1993) concludes: the form of cultural artifacts, in this case computer graphics, expresses our symbolic relations with the world and influences how we are constantly (re)inventing ourselves.

INCLUSIONS AND EXCLUSIONS: VALUES, IDEOLOGIES, CULTURE, CLASS, AND GENDER

Approaches to instructional design not only reflect differing world views, but they consist of values, ideologies, and images that involve inclusions and exclusions that act in the interests of particular cultural, class, and gendered groups. Instructional design and the designer are inextricably tied to their societal context and thus infused with the cultural, class, and gendered influences resulting from the subtle and intricate interplay of these factors. For example, competition and violence are commonplace in many educational IMM games. Instructional software designers are covertly or

overtly implying that, first, competition is a societal and educational value to be promoted; second, the violence depicted in IMM CD-ROM games is acceptable; and, third, violence and competition appeal to predominantly male youth culture and will motivate them to learn the content. Another example further demonstrates that the use of computers and software are not culturally neutral. There is adequate research (see, for instance, Chambers & Clarke, 1987; DeVillar & Faltis, 1991) to show that girls and children from low-income minority groups have less access to computers and are directed to more drill and practice computer software than middle-class, white male students. As a final example, international, electronic dialogue software and its design and protocols are seen by Appadurai (1990) and Hannerz (1990) as promoting the development of a global culture, but one that is for those individuals and nations who are already information rich. The Internet is also proving to be a culture that condones verbal aggression, that is, "flaming." As a non-negotiable socialization strategy, flaming is justified on the grounds that, because it minimizes wastage of time, it provides a more effective way of keeping listservs manageable than the use of the gentler etiquette of reprimand usually found in face-to-face encounters. These instances indicate that, as cultural artifacts, computers, software, and instructional design influence the dynamic work of cultural reproduction and transformation.

Instructional design can de-emphasize or amplify factors and thereby shape symbolic and material culture. In turn, this molds the larger conceptual view of reality in a given culture and time. That is, "our way-of-being in the world shapes and is shaped by design" (Jones, 1993, p.31).

INSTRUCTIONAL DESIGN PARADIGMS

"Instructional design is that discipline whose aim is to promote learning" (Spector, 1996). Not surprisingly, there is no one paradigm although some instructional designers, "tired of the shifting sands of new paradigms and

realities . . . have drawn a line in the sand" and strongly argue the contrary (Merrill, Drake, Lacy, & Pratt, 1996). A current debate in educational technology focuses on objectivist versus constructivist theories of learning and teaching, and their relevance for instructional design in IMM and other electronic technology environments.

Objectivism

Objectivism and constructivism are often described as extremes on a continuum in order to contrast their assumptions, though many designers fall somewhere between the extreme views (Jonassen, 1996; Reeves, 1992). Jonassen, Wilson, Wang, and Grabinger (1993, p.87) succinctly describe the assumptions of objectivism: "Objectivist beliefs assume that the world is a real entity, that it is structured, and that its structure can be modeled for, and acquired by, the learner . . . [M]eaning reflects reality which is external to the understander." The purpose of the mind is to "mirror" the fact that the world is real and structured using thinking processes that are analyzable and decomposable (Jonassen, 1991). The goal of designers is to interpret the real world and learners are expected to replicate this in their thinking. The learner is situated in a rather passive role as the recipient of the information transmitted through a linear sequence of procedures (Jonassen & Reeves, in press). Interaction is normally designed as a stimulus activity that requires student input followed by some form of answer judging and feedback that were previously encoded within the IMM package. Depending on the number of correct answers, the learner is often automatically thrown into a feedback loop or placed at the next task level in the learning hierarchy.

In summary, objectivist instructional design structures the environment, provides accurate information, is sequential, direct, and rewards performance so that learning is cumulative, receptive, and involves practicing, performing, and giving accurate information on demand. Objectivist instructional design creates IMM environments reflecting a modernist world view.

Constructivism

On the other hand, at the heart of constructivism is the notion that knowledge is constructed and exists in the mind of the knower. Knowledge is personally constructed within a social context within a social community that accepts the assumptions underlying that perspective (Cunningham, 1991). Thus, although reality exists independent of the knower, what is known is individually and collectively constructed from "our experiences, mental structures, and beliefs . . . There is no single reality or any objective entity" (Jonassen, 1991, p.29). Instructional design based on constructivist theory aims to place learners in "mindful" learning situations (Salomon & Globerson, 1987) with some inbuilt scaffolding support so that they can construct their own interpretations of reality. The IMM program would contain educational activities that reflect the seven constructivist values of collaboration, personal autonomy, generativity, active engagement, reflectivity, personal relevance, and plurality of perspectives rather than the objectivist values of replicability, reliability, communication, and control (Lebow, 1993). For example, interaction would be designed as collaborative problem-solving activities linked to student interests that have some of the messy attributes of an authentic task or real-world problem. The design would include cognitive apprenticeship that involves modelling various problem-solving processes (Reeves, 1992) and coaching students in metacognitive skills (Henderson, Patching, & Putt, 1994b). Because errors are treated as opportunities for reflectivity and conceptual restructuring, feedback to the student's incorrect solutions involves models of self-questioning, self-directing processes (Lebow, 1993; Reeves, 1992). The constructivist design emphasis is on providing enabling experiences in authentic versus decontextualized contexts, and cultivating learning processes versus learning outcomes (Choi & Hannafin, 1995).

In summary, the constructivist model views instructional design as providing challenging contextualized tasks, creating dissonance, modelling strategies, supporting reflection, scaffolding cognitive performance, and provid-

ing evaluative self-monitoring so that learning is personal, individually constructed, interpretive, active, reflective, metacognitive, collaborative, and evaluative. Constructivist design creates IMM environments that combine elements from the postmodernist (such as the emphasis on context and multiple realities) and connectivity world views (such as non-linearity and ordered unpredictability) (cf. You, 1993).

Eclectic paradigm

This paper argues that instructional design of culturally appropriate IMM packages is more closely situated in what Reeves (1996) identifies as the "eclectic-mixed methods-pragmatic paradigm." He argues that ". . . it is the one approach most capable of handling the complexity that is the hallmark of contemporary society and technology" (Reeves, 1996; also see Casti, 1994; Sedgwick, 1993). Even though he does not use the label, Lebow (1993) advocates an eclectic stance when he asserts that instructional designers need not abandon the traditional objectivist design approach to accommodate constructivist values although significant modifications would be needed. The eclectic paradigm as proposed by Reeves (1996) openly caters for a combination of certain components found in objectivist and constructivist design models and, in addition, those from a critical theory design paradigm. The last model, described by Reeves (1996) as the "critical theory-neomaxist-postmodern-praxis paradigm," is concerned with issues of control, power, and epistemology as social constructions and how these function to exclude minority interests. It questions the neutrality of instructional design and the designer, and seeks to expose the "hidden curriculum" underlying the cultural, gender, and class assumptions inherent in the design process and the designed artifact. Adherents to the eclectic paradigm accept their subjective interconnectivity with the phenomena they seek to understand and change (Bruce & Rubin, 1992). Choosing from multiple paradigms allows triangulation of complex phenomena in order to design more effective IMM instruction and learning materials.

An eclectic paradigm also combines aspects of the three world views as and when appropriate in its design. Variability and flexibility are obvious instructional design features of an IMM package based on an eclectic paradigm that aims to provide students with interactive learning packages that (a) reflect society's multiple cultural realities, (b) incorporate various ways of learning and teaching and, hence, (c) promote equity of learning outcomes.

To this point, the paper has stressed that instructional design is socially and culturally determined. Instructional design, no matter its paradigm, is therefore about the maintenance and creation of cultural identity. But whose cultural identity? It is argued that instructional design of IMM artifacts generally ignores or dismisses issues of cultural diversity. However, there are exceptions, and the paper proceeds to examine these, beginning with the least potent versions of cultural inclusivity. Finally, a multiple cultural, as opposed to a multicultural, model is proposed as a viable instructional design paradigm that takes into account various cultural contexts. The multiple cultural model is centered within an eclectic (objectivist-constructivist-critical theory) instructional design paradigm.

DERACIALIZATION

Instructional design shows evidence of *deracialization* (Rattansi, 1992), that is, it is culturally unidimensional and exclusionary. Deracialization in IMM instructional design positions all users by constructing a world in which cultural minorities are invisible. Laurel (cited in Jones, 1993) and Scheel & Branch (1993) point out the difficulty of addressing cultural diversity in IMM design. There are a number of explanations for this.

Culture Blind

First, what often occurs with deracialization is an unintentional exclusion and silencing of issues of cultural contextualization because of a "culture blind" or unconscious culturally homogeneous approach to IMM instructional

design, whether it is driven by an instructivist or constructivist pedagogy. An outcome is the universalization of a dominant group's knowledge and culture as natural and, in effect, necessary and beyond criticism (Luke, Kale & Singh with Hill & Daliri, 1993).

Controversy

Second, there are "so many contradictory stances that the very words [multiculturalism, cultural diversity, and cultural pluralism] themselves evoke images of general controversy" (Scheel & Branch, 1993, p.7), avoidance and, hence, deracialization. *Multiculturalism, cultural diversity, or cultural pluralism* is interpreted here as "the condition in which various cultural groups are able to maintain their collective identities and membership in a macro society" (Scheel & Branch, 1993, p.7). It recognizes that cultures have no inherent hierarchy of truthfulness and that each culture's world view and patterns of thinking and behavior are no more or less verifiable than the others. This does not imply a blanket acceptance of cultural relativism. Each culture, including that of the dominant group, can be justifiably critiqued within a multicultural society. It does imply that multiple perspectives and ways of thinking and doing provide a more complete knowledge base from which to construct an understanding of our environment than any one culture can provide.

Learning Theory

A third explanation for deracialization is that cultural context is relegated to a variable of insignificance in the learning theory which informs the instructional design. What can result is IMM courseware that is a self-contained, insulated entity where the user has no identity other than "the learner" and no other major concern than the replication of knowledge (if the IMM software favors an instructivist approach to design) or the construction of knowledge (a constructivist approach) (cf. Scheel and Branch, 1993). Yet, for example, Vygotskian learning theory main-

tains that knowledge acquisition is essentially and inescapably a socio-economic-historical-political-cultural process. The accumulated achievements (language, ways of thinking and doing, etc.) of particular cultural groups mold the intellectual development of the individual (Gallimore & Tharp, 1990). For instance, for Aborigines and Torres Strait Islanders, Australia's Indigenous peoples, social activity within their cultures ensures cognitive development in culturally appropriate ways. Asking questions, particularly why questions, is not condoned in their cultures as a teaching or learning strategy and is met with negative sanctions. Aboriginal and Torres Strait Islander learners are also allowed to demonstrate their understanding and abilities when, how, and in what setting they choose; adults do not have the right to demand any of these. But questioning strategies and performance of knowledge and skill acquisition on demand from the teacher are endemic to Western teaching and learning. Thus, when Aboriginal and Torres Strait Islander children attend school in Australia, their cultural ways of thinking are simultaneously mediated by the different accumulated achievements of Anglo-Australian schooling culture. This means that there is context-specificity of mental processes. Thinking has its basis in social activity that becomes internalized.

Political Correctness

A fourth reason for deracialization acknowledges that the calls for the incorporation of multiculturalism in educational software can be perceived as political correctness run rampant. This is a perspective held particularly by those who consider knowledge, especially the various discipline areas of mathematics, physics, geology, and chemistry, to be culturally neutral. For some objectivist instructional designers and content specialists, multiculturalism is trying to undermine the modernist world view by contesting the authority and autonomy of Western truth and Western reality seen to be inherent in the disciplines (another Western structuring of knowledge

boundaries). Hargreaves (1994) speaks of "dead certainties" to refer to the decline of Western scientific and ethical certainties that accompany postmodernism. Constructivists assert that all knowledge, including science, is open to criticism and differing interpretations, yet they usually unconsciously or conveniently ignore in their IMM materials the different realities and truths existing in cultures other than those of the West.

Naivete

Finally, accommodating multiculturalism in IMM design can be seen as naive. The question asked is: Whose ethnicity and learning styles should be included given the number of cultures in our multicultural societies? Multiculturalism can easily be dismissed as a cost-ineffectiveness design issue. This was (and is) a much-used argument for not incorporating cultural diversity in school curricula in general. Yet a great deal of expertise for addressing multiculturalism in schools is well established. Australia, for instance, has an international reputation for constructive intervention with State and Commonwealth education departments having social justice and equity policies in place. Interactive multimedia instructional design can build on this base.

Currently, although there is a paucity in the literature, there are appropriate instances where instructional designers have taken up the challenge of creating IMM educational packages that incorporate cultural diversity. This means that the cost of producing IMM products can cope with cultural contextualization. A number of major trends emerge as ways to avoid deracialization in the instructional design: an inclusive or perspectives approach, an inverted curriculum approach, and a multiple cultural paradigm.

INCLUSIVE OR PERSPECTIVES PARADIGM

A common instructional design solution implements an inclusive or, as it is also referred to, a perspectives paradigm that

acknowledges the multicultural realities of society. Inclusive instructional design includes the social, cultural, economic, and historical perspectives and contributions of minorities on a particular topic. *OZ iD: The Search for Australian Heritage and Identity* (Board of Studies NSW, 1994) is an appropriate IMM example as it includes the social, sporting, artistic, political, and economic contributions of representative Indigenous, Chinese, and other minority and mainstream groups. Attempts to make content more representative of diverse groups reflects the social, economic, political, and cultural struggles for equity that are taking place in the wider social context (Giroux & Trend, 1992). In an inclusive or perspectives paradigm, instructional design is driven by social justice and equity issues while instructional design solutions range from soft to hard multiculturalism or what Scheel and Branch (1993) term, "mild to strong interventions" (p.9).

Soft Multiculturalism

Culturally inclusive design can often be implemented within a narrow framework by adopting a reductionist approach. This soft multicultural approach diminishes the complex issues involved in cultural contextualization to one task: the inclusion of various elements of the minorities' cultures, particularly aspects that do not structurally impinge on those of the dominant group and challenge the status-quo. In this context, soft multiculturalism or mild intervention is interpreted as surface inclusivity. This is not to deny its legitimate place in culturally appropriate learning, teaching, and content. However, soft multiculturalism must be recognized by instructional designers for what it is, and for its limitations. Soft multicultural design is centered in the "feel good" area rather than in the hard multicultural area. Hard multiculturalism takes mild intervention strategies one step further. It is about examining issues of systemic inequality; producing culturally-just teaching and learning IMM materials; utilizing the cultural knowledge, perspectives, and cognitive practices that students bring to the learning sit-

uation; and providing equity of outcomes in the learning task to enable equitable participation in society's shared economic and social goals, and their outcomes. The following four examples help clarify issues of soft multiculturalism, and ways to develop the intervention into activities that are culturally and cognitively more robust.

Inclusion of the Exotic

One example of soft multiculturalism is the inclusion of the "exotic," such as arranged marriages, tombstone openings (or unveilings as it is now often described to avoid confusion among non-Torres Strait Islanders), and body scarring and body painting. To avoid aspects of soft multiculturalism being seen by learners as merely titillating, the customs, traditions, and values of particular ethnic groups need to be placed in their proper socio-political-economic and/or religious contexts and parallels made with those customs, traditions, and values of Anglo and other ethnic or minority cultures.

Myths and Legends

The inclusion of myths and legends from around the world is a popular mild interventionist activity in Australia. Students are often required to model the genre and devise their own myth or legend. In some Australian schools, students are using authoring software such as *Storybook Weaver* (MECC, 1992), *HyperStudio* (Roger Wagner, 1996), or *Digital Chisel* (Pierian Spring Software, 1995) to create their own IMM version. Jonassen (1996) would applaud the latter activity as an example of a constructivist approach that utilizes the IMM software as a cognitive tool or *mindtool*. However, the activity becomes culturally inappropriate if, as constantly happens in Australia, Aboriginal and Native American creation stories are put into the category of myths and legends. Such classification demonstrates an inexcusable lack of understanding about the spiritual significance of creation stories. (We would never consider asking students to devise their own Christian creation story to

model the genre used in the Bible.) However, activities involving creation stories could be reconceptualized to take them out of the realm of soft multiculturalism. For junior high and upper primary (or, in the United States, middle) school students, the focus could be the differences between myths/legends and creation stories, and why the latter should not be (re)written as a valid multicultural activity. In the last two years of high school, students could construct IMM projects that examine and debate links between contemporary chaos theory and creation stories and myths. Bütz, Duran and Tong (1995) point out the centrality of chaos in the ancient creation stories of Mayans (Tepeu, Cucumatz, and Huracan) and Egyptians (Atum and Nun), the healing traditions of most Native Americans (the Coyote's Howl), Greek mythology, and Asian Taoism. The Dreamtime also emphasizes that chaos lies at the core of Aboriginal creation stories.

Contentious Issues

Soft-multiculturalism also occurs when there is an avoidance of contentious questions of equity and justice. In Australia, for instance, there is an instructional design preference for focusing on traditional Aboriginal lifestyles rather than the more complex, contemporary issues affecting Aboriginal—and mainstream—society such as land rights, Indigenous deaths in custody, and recognition of Indigenous law and punishment.

Tokenism

Tokenism is another instructional design issue. We are all familiar with the token person of color or token female in TV programs, Nintendo games, and IMM educational and recreational CD-ROMs. Tokenism also occurs in IMM packages when the music, pictures, and first language of the students' cultures are incorporated as fill-ins or in ways that have nothing to do with the content being interrogated. Andrews (1995) warns that there are cultural perceptual issues that affect how people respond to what is on the screen and, hence, learning. In a study of first year biology

university students in South Africa, Amory, Watt and Mackenzie (1994) found that the Indian, White and Black students had little understanding of iconic information; for instance, the question mark icon to mean *help* or the hand pointing as meaning *go to*. In another study, Andrews (1995) noted that, first, learners failed to translate the arrow—a standard graphic icon—to mean “press the arrow to continue”; second, there was cultural specificity of cartoons and sequencing of pictures; and, third, graphics depicting body parts, such as the pointing hand or talking head, were perceived to be severed. Superficial changes, such as modifications to the coloring of characters, voice-overs, and music in an attempt to localize the courseware, “risk becoming one more example of cultural arrogance—apartheid in a glitzy plastic dress” (Andrews, 1995, p.8). However, the inclusion of music, still and moving pictures, colors, characters, voice-overs, and languages (with subtexts or user-choice of a language) of particular ethnic groups is not cosmetic or an act of tokenism when it (a) is embedded with those of the majority culture, (b) acknowledges the students’ identity in the learning task, (c) personalizes the IMM courseware, and (d) supports multiple cultural content and multiple cultural learning activities. This occurs in various IMM university subjects (which include science, physical education, mathematics, and an interdisciplinary study of contemporary Australian society) developed at James Cook University. According to Indigenous students, these attributes provide an atmosphere that is “familiar and relaxing”; “they lessen the tensions in learning”; and “make what is being presented real” (Henderson, 1993); and for non-Indigenous students, they provide “an induction to Aboriginality” that promotes motivation (Henderson, Putt, & Patching, in progress).

Minority ethnic groups or developing nations looking for technological solutions to their educational and training needs will not be well served by packages designed for a majority Western culture. Instructional design of IMM materials needs to empower, extend, and enrich the students’ culturally specific

knowledge and ways of thinking and achieve a nexus between these and the demands of the required academic culture.

INVERTED CURRICULUM APPROACH TO INSTRUCTIONAL DESIGN

Designed for all students, an inverted curriculum approach provides an effective way for IMM instructional designers to deal with cultural context. Implicit in this approach is the conceptualization of society as unequally structured and comprised of diverse groups that are positioned unequally in relation to structures of dominance (Smith, 1994, p.305). Inverting the curriculum means instructionally designing a topic from the minorities’ perspectives, that is, endowing it with a critical theory-postmodernist paradigm.

The following is an example of how a topic on health could be instructionally designed in three ways. First, as is usually the case, the focus would be the food groupings for healthy living. The much-acclaimed CD-ROM, *5 A Day Adventures* (Dole Food Company, 1994) is an excellent example. Students could also be asked to explore junk food and eating disorders and the effect society’s cultural artifacts, such as advertisements, have on incorrect eating habits and our images of beauty. Second, if an inclusive paradigm were adopted, the contemporary societal and religious importance of traditional foods for Indigenous and immigrant Australians would be an additional inclusion. A stronger interventionist inclusion would continue this examination to focus on the controversy concerning the cultural claims of Indigenous Australians who follow a fairly traditional lifestyle to hunt and fish protected species out-of-season so that dugong and turtle, for instance, can be eaten on important socio-religious occasions. Third, if an inverted curriculum approach were taken, the above issues would still be significant components in the IMM software. However, the topic would commence with Indigenous health statistics and ask: Why is the average life span at least 20 years less for Indigenous Australians compared with non-Indigenous Australians? Why

is Indigenous infant mortality three times higher than for non-Indigenous Australians? Answering these questions tells as much about the systemic structures of society as it does about the minority.

An inverted curriculum approach would also include other postmodernist activities that critique the IMM software design. The following sorts of questions (appropriately reworded to suit particular age groups) would be incorporated in the IMM product: What effect has the structure of the content and navigation system on meaning? What aspects of real life and whose knowledge has the software amplified, simplified, reduced, or ignored? Are multiple perspectives presented? Is each perspective as valid as the other? What values are embedded in the software? In what ways have you appropriated the IMM artifact to suit your learning style? In this way, students are provided with analytic tools to deconstruct the IMM "text" and question the way they use IMM as a learning tool.

MULTIPLE CULTURAL MODEL

This returns us to the issues of multiculturalism. A major weakness in the multicultural, inclusive and inverted paradigms is avoidance of the cognitive, epistemological, and philosophical aspects of cultural educational contexts. An alternative way to conceptualize the cultural contextualization of instructional design is a multiple cultural model. This model has been incorporated in the instructional design of various, one-semester, IMM, Bachelor of Education subjects offered by James Cook University through the Remote Area Teacher Education Program (RATEP). This offcampus degree is the same as the oncampus Bachelor of Education but it is studied through IMM computer courseware (with other electronic technology, texts, and on-site tutors) and culturally contextualized for its Indigenous university students. RATEP commenced in 1990 and has had an 82% graduation rate. Ecologically valid research into various aspects of the course commenced about the same time (see for example, Henderson, 1993; MacIndoe

& Henderson, 1991; Putt & Stillman, 1995; and, for a synthesis of some of the research corpus, Henderson, Patching, & Putt, 1996). As mentioned earlier in the paper, the multiple cultural model belongs in the eclectic paradigm as it incorporates particular elements from (a) the behaviorist-constructivist-critical theory paradigms, (b) both mainstream and minority cultures, and (c) the modernist, postmodernist, and interconnectivity world views. It is informed by Vygotskian learning theory and sees the zone of proximal development as particularly relevant.

The primary function of a multiple cultural model is to design a learning environment that promotes equity of outcomes for learners, particularly learners from disadvantaged minority groups. (Research by Henderson, Putt, and Patching (in progress) is revealing that non-Indigenous students are not disadvantaged by studying from the same IMM materials that were originally designed for RATEP students; in fact, many see numerous personal and, importantly, cognitive advantages.) A multiple cultural model strives for a coherent interplay among three cultural logics: those of the academic, mainstream, and minority cultures. Instructional design aims for a partnership of these in the IMM materials.

The following guidelines are based on RATEP's multiple cultural model. First, instructional design of a multiple cultural model needs overtly to incorporate the specific requirements of mainstream school and tertiary culture. These are expressed through the content to be taught, types of assessment, written and oral genres, research methodologies, and culturally-specific ways of promoting cognitive development within an academic environment. Second, as academic culture is embedded in society's dominant culture, aspects and values of the macro culture, including systemic issues to do with power, control, and disadvantage, need to be included in the overall instructional design of any IMM package. Third, it is also necessary that instructional design incorporate the minority's culture, knowledge, and preferred ways of thinking and doing in a manner that goes beyond tokenism. In this way, the multiple

cultural model does not merely encourage, but stipulates, the integration of shared value systems.

Instructional designers need to be aware of possible mismatches between the academic and minority cultures and implement IMM design strategies that do not blame and disadvantage the student. For instance, questioning and justifying the validity of statements and analysis are endemic to academic discourse but are generally unacceptable in Australian Indigenous current-traditional ways of learning and teaching. Thus in one academic context, evaluation of Indigenous learners who are having difficulty with justification questions embedded in IMM courseware can identify the learners as deficient and, at best, remedial, and design feedback loops for content mastery. In a multiple cultural academic context, it is understood that Indigenous acceptance of the rationale for questioning and interrogating the knower (the White lecturer) and providing evidence based on objective research (rather than tradition and the authority of the elders) will need a cognitive apprenticeship approach (Henderson, Patching, & Putt, 1994a, 1994b). Thus scaffolding support would be embedded in the IMM materials to develop enthusiasm for replication of cognitive activities appropriate to a particular socio-cultural learning environment.

Because a multiple cultural model stresses the valid combination of the academic, mainstream, and minority cultures, it acknowledges that ethnic/racial minorities have little choice but to become bicultural if they are to succeed academically. In Australia for instance, Indigenous peoples admit the tension concerning their desires for Western education. On the one hand, their children and adults need to succeed at school and university in order to prevent their continued disenfranchisement in a modern technological society. On the other hand, they resist Western education because it jeopardizes their cultural knowledge and methodologies of teaching and learning. Their solution argues that cultural appropriateness for empowerment and ownership includes both Western and Indigenous knowledge and ways and conventions of learning and doing

(Aboriginal and Torres Strait Islander Education Division, Department of Employment, Education and Training, 1989; Torres Strait Islander Regional Education Consultative Committee, 1992). The multiple cultural model attempts to put this solution into practice.

(A multiple cultural model has validity for cultures other than those based on ethnicity. For example, the cultures could be the corporate culture of the company, the wider, economic-political culture which includes global influences, and the shop-floor culture of the factory worker; or they could be the school culture, the wider culture of society, and popular youth culture.)

Pedagogic Dimensions in the Multiple Cultural Model

In an attempt to get instructional designers to think holistically and specifically about their instructional design parameters, principles, and practices, Reeves (1992) identified 14 pedagogic dimensions of interactive learning; after a critique by Henderson (1994) a 15th, cultural context, was added. Each dimension is represented as a continuum with a graduated range of values between the two extremes that, in effect, represent the behaviorist school of instructional design and the constructivist school (see Figure 1). The dimensions do not provide an inventory of dos and don'ts; rather, they give a valuable framework for judging the pedagogic worth of the instructional design of IMM materials. Reeves' model provides a worthwhile framework in which to clarify the multiple cultural model of instructional design.

Multiple (academic, mainstream, and minority) cultural contextuality affects all dimensions and all points along the continuum of each dimension (Figure 1). Reeves' pedagogic model of continuums is therefore more logically represented as a field with the multiple cultural contextuality dimension forming an axis to each existing dimension. Leaving cultural context as a separate dimension, that is, as one more item, would allow it to be "ghettoized" and, all too easily, be implemented as a weak inclusive approach.

Figure 1 □ Multiple cultural pedagogic model of IMM instructional design (Adapted from Henderson's 1994 adaptation of Reeves, 1992).

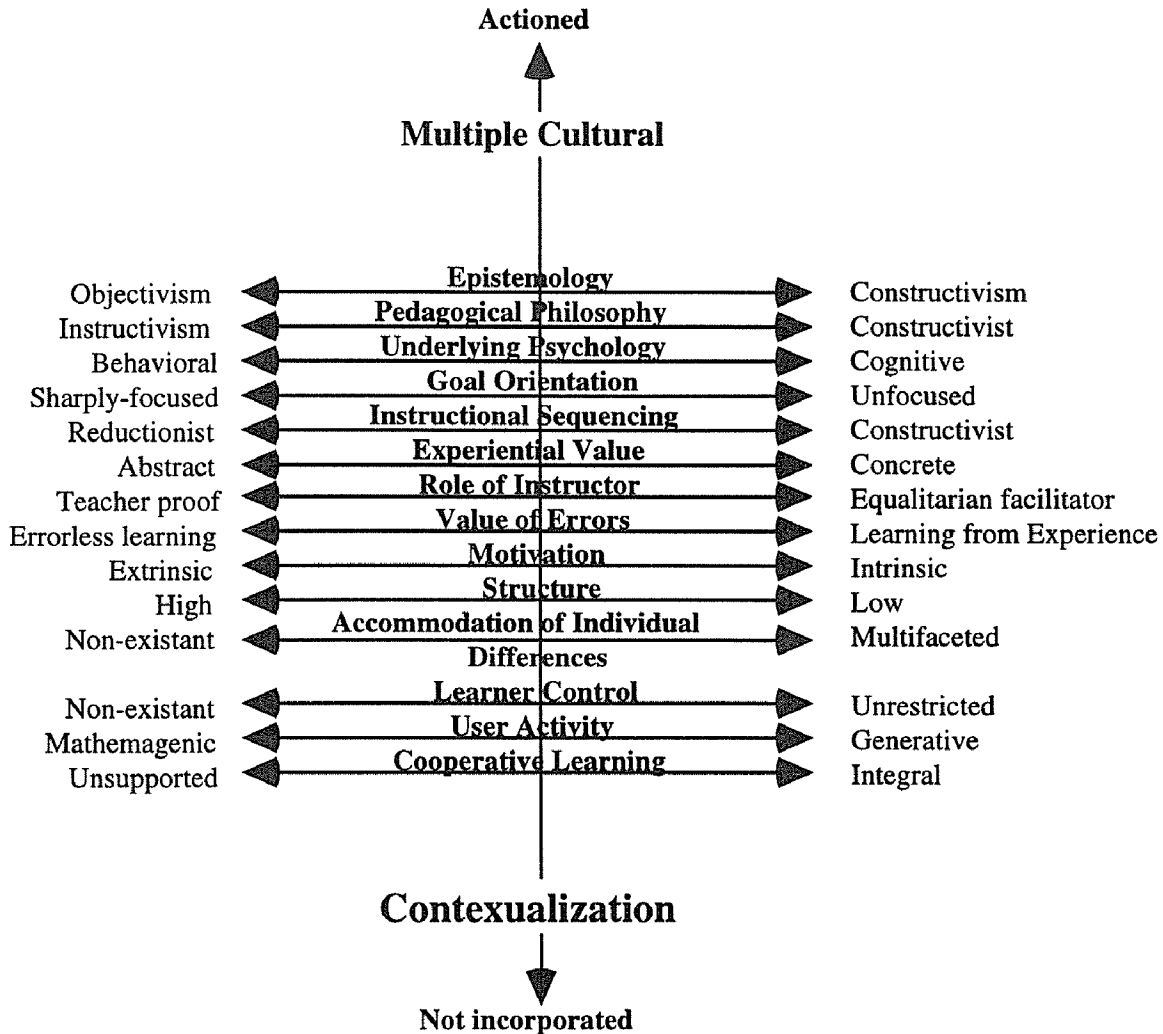


Figure 1 depicts a collated overview of the fields of all the dimensions. The multiple cultural contextuality dimension ranges from *not incorporated* to *actioned* (Figure 1).

Far from having to bring it into the matrix, cultural contextuality is always a variable. Cultural context is the very stuff, the scaffolding, of any instructional design paradigm. All the dimensions and continuums in Figure 1 are social constructs and have meaning because of the selective, academic traditions in which they are situated. This is further refined when different ethnic/racial subjectivities, ideologies, and pedagogies are considered. Figure 1 makes the centrality of multiple cultural con-

text obvious. Educational IMM is thereby centered such that the instructional design positions cultural groups and individuals not as objects or passive recipients but as subjects, that is, as active participants who are given and take responsibility as agents, transmitters, receivers, and actors in the learning paradigm.

Although the cultural contextualized-pedagogic model of IMM instructional design contains 14 dimensions, the dimensions delineated in Figure 1 are not comprehensive. As Reeves (1992) points out, there may be others that still need to be defined. Two dimensions, epistemology and pedagogic philosophy, are discussed because they are the starting points

from which to examine the other dimensions (see Figure 1). Indeed, epistemology and pedagogic philosophy are foundational to practice.

Epistemology

The values embraced in Dimension 1, *epistemology* (Figure 1), as delineated by Reeves (1992), are Western notions of theories about the nature of knowledge. They do not encompass Asian or Australian Aboriginal epistemologies, for instance. Dimension 1 (Figure 1) ranges from an objectivist theory of knowledge to a constructivist one. Advocates of objectivist epistemology would design IMM courseware that structured domain knowledge according to the most recognized experts in the field and have faith in the inbuilt testing instruments to test accurately the learner's understanding of the content. The aim for the learner is to assimilate the knowledge of the teacher or expert. Constructivist instructional designers present a wide range of views of a given domain with which learners interact, interpret, and relate to their prior knowledge and from which learners construct their own knowledge with some scaffolding to help them in their discovery. Regardless of the wide differences in these theories, they both encompass the notion that knowledge is the birthright of every individual. This value is not negated by the fact that it is not followed in practice where power, privilege, and the law limit an individual's right and ability to access information.

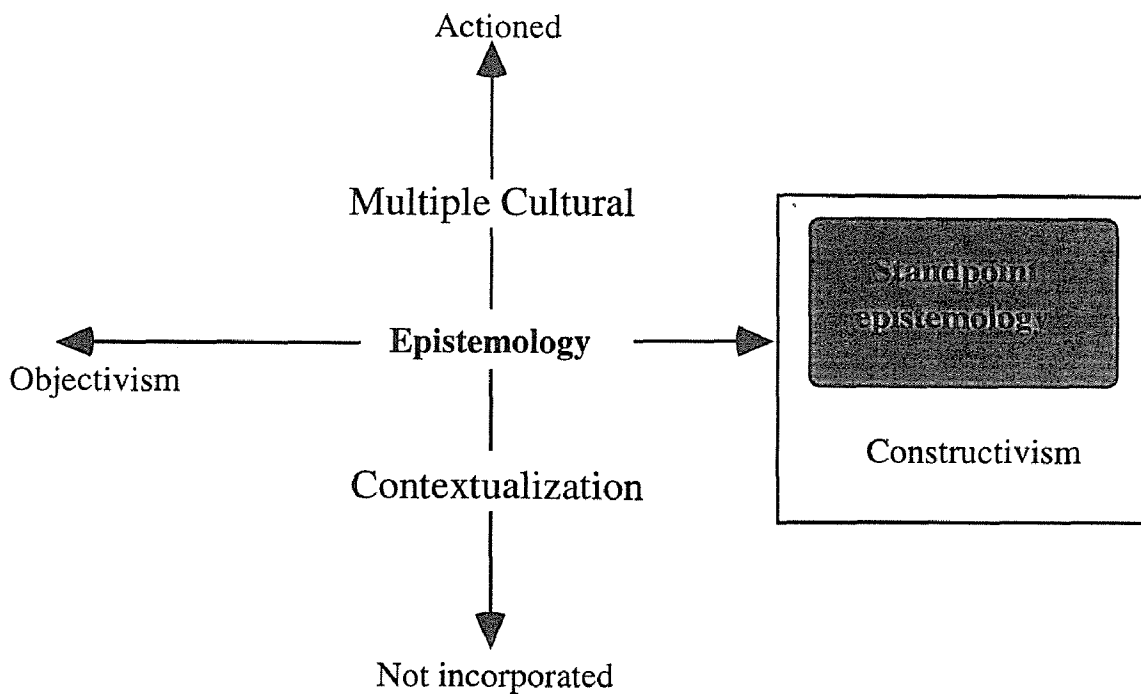
Aboriginal epistemology incorporates the notion that all knowledge is owned but some knowledge is owned, private, and non-negotiable while other knowledge is owned and negotiable. Thus, gaining knowledge is a privilege, not a right. For instance, the effects of colonization and the repressive legislation of the twentieth century have resulted in the refusal by some Aboriginal elders to pass knowledge (languages, ceremonies, religious practices, etc.) to their young men and women whom the elders consider unworthy of becoming caretakers of that knowledge because of the youths' attitudes, behavior, and seeming

"whitealization." Aboriginal people individually own different and joint knowledge. That knowledge belongs to or "owns" the people without the "owner" having to be personally responsible for the origin of that knowledge (West, 1993; referencing this information highlights the fact that, in Western epistemologies, the source has to be acknowledged).

McDonald (1992) provides a clarifying example of the issue of ownership of knowledge. Non-Aborigines and non-Torres Strait Islanders have been socialized in a tradition where artistic freedom privileges the artist's rights to take inspiration from anywhere. Aboriginal and Torres Strait Islander artists do not have the authority to appropriate the traditional symbols and stories of another's country and totem without permission to share those traditions. Thus Aborigines who have been brought up in an urban environment may utilize traditional Aboriginal dot or x-ray painting techniques, but the dots and lines are positioned and colored to reflect or critique their urban reality. For example, Les Grigg's painting, *Dreaming in the Wrong Place*, depicts a platypus using stylized Aboriginal symbols juxtaposed in a landscape of freeways with "wrong way" signs (Isaacs, 1989). It critiques contemporary urban society while simultaneously affirming the artist's identity and right to use modified traditional techniques (x-ray design) and concepts (*Dreaming*) to tell his, not another's, story.

An appropriate solution is to see the epistemology dimension ranging from objectivist to constructivist with standpoint epistemology embedded as a subset of constructivist epistemology (see Figure 2). Based on the work of Harding (1986), standpoint epistemology grounds knowledge in a theory of subjugated activity and social experience. It privileges minorities epistemologically. At the same time, it challenges the potency of scientific methodology and norms that, since the Enlightenment, have valued rationalism and objectivism and ignored or denied the social construction of knowledge and scientific study. Standpoint epistemology questions the assumption that "the social identity of the observer is irrelevant to the 'goodness' of the research asserting that

Figure 2 □ Epistemology—Multiple cultural contextualization field of IMM instructional design (Adapted from Henderson 1994).



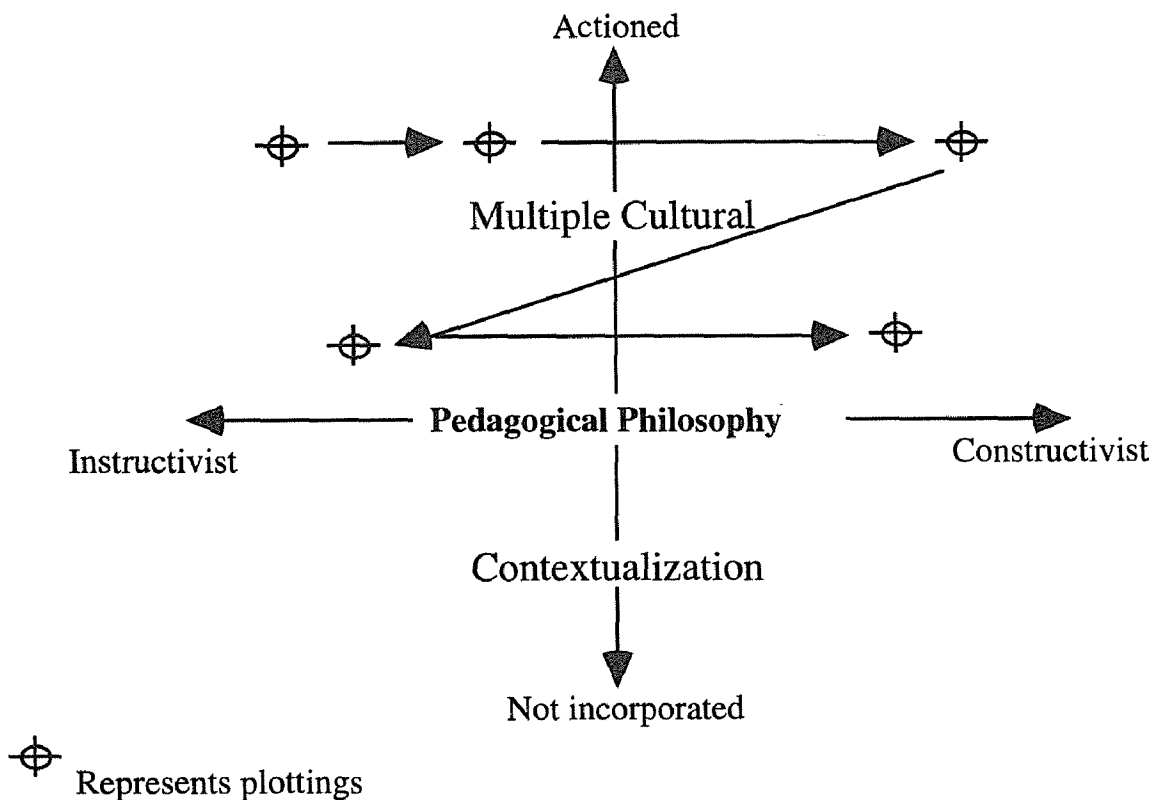
the racism and sexism of western knowledge is both highly visible and damaging; . . . that [scientific] norms themselves appear to be biased in so far as they have been incapable of detecting ethnocentrism and androcentrism" (McDonald, 1992, p.4). Standpoint epistemology also challenges the belief that knowledge and politics can be divorced. It is argued that emancipatory politics can increase the objectivity of research and knowledge (Connell, 1989; Harding, 1986).

Constructivist epistemology argues for a multiplicity of perspectives. Standpoint epistemology ensures that the politics inherent in theories about the nature of knowledge are important foci. In so doing, it brings into question the notion of *perspective*, particularly when applied to ethnic/racial minorities. For example, inclusion of an Aboriginal perspective situates an Aboriginal world-view within Western knowledge and apports it the value of merely a perspective. Standpoint epistemology assigns the Aboriginal's (minority's) perspective as epistemology.

While constructivist and standpoint epis-

temologies recognize that knowledge is socially constructed, this is often ignored in discussion concerning the implementation of a constructivist approach to IMM instructional design (see Reeves, 1992). When it is acknowledged by instructional designers, the notion that the knowledge being examined is socially constructed is usually omitted from the IMM package; it is not included as one of the facets of knowledge or perspectives from which students can construct their understanding of whatever it is they are exploring. However, the view that knowledge is socially and culturally determined is integral to standpoint epistemology. In the context of the epistemology-multiple cultural contextuality field (Figure 2), standpoint epistemology takes us one step further in that it does not assume one epistemology as immutable but provides *epistemological pluralism* (Harel & Papert, 1991) in which multiple ways of constructing knowledge and understanding are valued, and prompts learners to interrogate those epistemologies in the construction of their own knowledge. Instructional design advocates of standpoint episte-

Figure 3 □ Pedagogical philosophy—Multiple cultural contextualization field of IMM instructional design.



mology embedded in constructivist epistemology in IMM would challenge learners to consider: Whose knowledge is privileged? How is this particular epistemology socially constructed and for what purposes? Do standpoint epistemologies provide greater emancipatory, social, and educational validity than merely a range of perspectives and theories? Do they present better intellectual interpretations of society, as Connell (1989) argues? How do various epistemologies or world views (for example, Western, Aboriginal, Native American, or Asian), reveal themselves, for example, in mathematical, medical, technical, or social theories and solutions? Questions and activities centered on these sorts of queries would be an integral component of any eclectic (constructivist-critical theory) design of IMM from upper primary through tertiary. In this way, the multiple cultural contexts are made visible and debateable.

Pedagogical philosophy-multiple cultural contextuality field

The epistemology-multiple cultural contextuality field (Figure 2) naturally affects the *pedagogical philosophy-multiple cultural contextuality* IMM dimensions (Figure 3). For instance, Aboriginal and Torres Strait Islander pedagogic philosophies favor the instructionist end of the continuum. Current-traditional ways of learning and teaching follow an approach to knowledge acquisition where age as well as custom are advanced as rationales to avoid challenges to established authority. Goals, objectives, and content are sharply defined and instructional activities focus directly on this content. Instructional design of IMM that caters for Aboriginal and Torres Strait Islander pedagogical philosophy is plotted in the *actioned-instructionist* quadrant (see Figure 3).

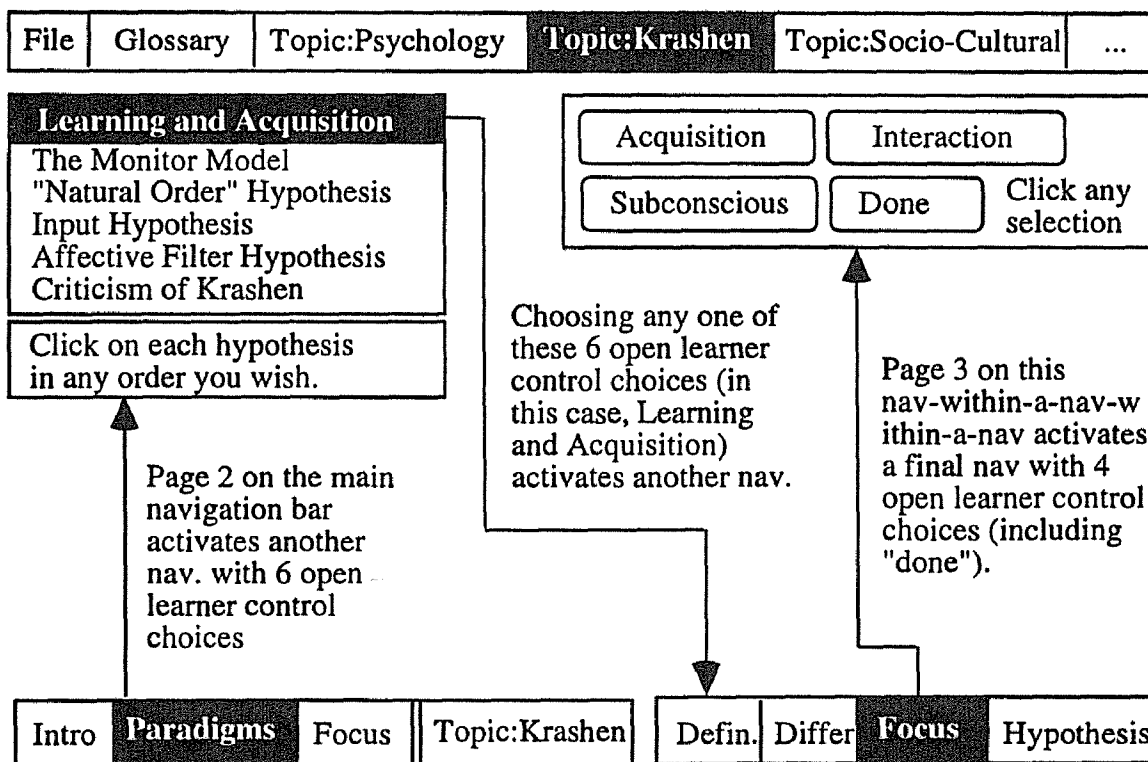
However, this is not sufficient. A multiple cultural model demands inclusion of other

pedagogic philosophies, such as constructivism, if various minorities are to succeed academically. This means that multiple cultural contextualization of pedagogic philosophy (and practice) take account of both the end philosophies on the continuum: instructivist and constructivist. Plotting IMM courseware within the field of pedagogic philosophy-multiple cultural contextuality for Torres Strait Islander and Aboriginal tertiary students, for instance, would show a number of points within both top quadrants: instructivist-multiple cultural contextuality and constructivist-multiple cultural contextuality (Figure 3). These plottings would not occur in a linear progression from instructivist to constructivist. If multiple cultural contextuality is taken seriously, the IMM courseware would favor the top left quadrant initially in order to begin where the students feel comfortable as learners. Subsequent strategies within the courseware would be plotted within the constructivist-multiple cultural contextuality quad-

rant in Figure 3. When particularly complex concepts and theories are presented, the approach again would be initially instructivist followed by a constructivist one (Henderson, 1994). This supports Jonassen's (1991) contention that objectivist approaches are more suitable to introductory knowledge acquisition when learners have little directly transferable prior knowledge about a skill or content area. This introductory knowledge acquisition stage "represents the initial stages of schema assembly and integration . . . [and is followed by] a transition to constructivist approaches that require advanced knowledge to solve complex, domain- or context-dependent problems" (Jonassen, 1991, pp. 30-31).

Figure 4 provides an example of instructional design based on an eclectic paradigm. It reveals a combination of instructionist, constructivist, and Freirian (Freire, 1970) pedagogical philosophy. Freirian pedagogic philosophy is situated in the critical theory-neomarxist-postmodernist paradigm (Reeves, 1996). Heed-

Figure 4 □ Interface graphics depicting topic linkages for visual understanding of expository genre (Adapted from Henderson & Arger, 1995).



ing Delpit's (1992) warning, the "Secret English" and "highly valued" genres of academia are made accessible through modelling, a constructivist strategy within the learner's zone of proximal development. Figure 4 is a screen dump of a topic in one of the Bachelor of Education IMM subjects devised for Indigenous RATEP students. The topic is instructionally designed to highlight visually a certain conceptualization of how Western academic knowledge can be structured (see Henderson & Arger, 1995)

If students follow the default navigation pathways, the design supports an instructivist pedagogy to show the cultural logic of an expository genre (that is, elements of the behaviorist and critical theory paradigms are combined). Figure 4 portrays a rather ambiguous interface design and begs the question whether it is too complicated for effective student usage. However, the complexity is mainly a feature imposed by the nature of static text. Because each navigation access system appears in time and space (location on the screen) as the students are progressing through the IMM topic, they have no problem with the fact that page two on the main nav bar (bottom left) activates another nav, the six open-access learner control choices depicted on the top left of the screen. Choosing the first layer, *Learning and Acquisition*, activates another nav-within-a-nav (bottom right). Page three on this navigation access system activates the last nav (top right) consisting of four pathway layers. Students understand how the various navs, which do not all look the same graphically, work. Students can opt out of any of these navs-within-navs by clicking on the done button or choosing *4. Input Hypothesis* (top left) or choosing another totally different topic or segment of a topic. In this way, the instructional design interweaves a constructivist, idiosyncratic decision process within a seemingly prescriptive navigation structure so that the learners can make their own knowledge links. It also utilizes a modernist world view in terms of the graphics of the pull-down menu and some attributes the interconnectivity world view with respect to the hypertext non-linear menu options. A nav-

within-a-nav is a useful way of demonstrating to naive students, particularly in a cross-cultural context, that some thesis, analysis, content is best grouped around a common axis. If such schema were included along with other information to be interrogated in the typical way, as separate pages on the main navigation bar or in a data bank-type repository, this would not give an overt visual representation of the interconnections. Navs-within-navs visually depict the depth needed in academic genre for a satisfactory exploration of various aspects of a particular topic.

Using both of the top quadrants in the pedagogical philosophy-multiple cultural contextualization field flags to students that current-traditional pedagogies are legitimate and relevant in contemporary education. Research confirms that students appreciate that their current-traditional pedagogies have been incorporated in the IMM design of their learning materials so that they can be used as places from which to branch into mastering academic genres and valuing other pedagogic philosophical approaches to learning (Fleer, 1990; Henderson, 1993; Henderson & Arger, 1995; Henderson, Patching, & Putt, 1994b).

EVALUATION FOR MULTIPLE CULTURAL CONTEXTUALIZATION

As this is the subject of another paper, it is adequate to briefly mention possible evaluation strategies that instructional designers (and students/users) can utilize in critiquing IMM software for multiple cultural contextualization. First, a member of a particular (or various) minority group would be part of the instructional design, reference, and/or trialing groups when the IMM material was being developed. Second, members of the instructional design team would need to know about the various learners for whom the product is intended. Third, a checklist that contains all the relevant issues would be necessary. The checklist would focus on the elements of a multiple cultural model and look for instances of: tokenism, the exotic, stereotyping, deracialization, soft multicultural inclusivity, hard

multicultural inclusions and activities, inverted curriculum strategies, instructivist and constructivist strategies, critical theory-post-modernist activities, the effect that the structure of the data and the navigation system have on meaning making, a flexible navigation system that supports differing learning styles, construction and deconstruction of academic genres, and so on. Fourth, the multiple cultural contextualization of the dimensions listed in Figure 1, with any relevant dimension added, would also be a crucial part of the evaluation. Examination of the material according to these dimension-fields would ensure that the above items in the checklist are included (or excluded in the case of tokenism, etc.) where and when appropriate. Fifth, ecologically-valid and other appropriate research would be crucial for reediting.

CONCLUSION

IMM instructional design is anchored in culture through various world views, selective instructional design paradigms, and learning theories. As such, it is culturally contextualized, whether this is acknowledged or not. As process and product, instructional design amplifies, de-emphasizes, or hides factors that shape, and are shaped by, our way-of-being in the world. The central importance of the multiple cultural model and the multiple cultural contextualization axis is to ensure that the instructional designer is fully cognizant of the role culture plays in learning and teaching, and acts on that awareness. Having proactive instructional design is particularly significant for learners who belong to cultures that are situated in an unequal relationship with the dominant group(s) and consequently have a history of educational failure. IMM instructional design would therefore reflect the multiple realities of society. This means that the experiences, knowledge, and ways of thinking and doing of particular minority groups would be as evident as those of mainstream learners. Placing cultural context as an element of educational centrality means that variability and flexibility will be obvious features of IMM

instructional design so that learners are positioned as active participants in the learning-teaching paradigm. □

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