INTERNATIONAL HANDBOOK OF VIRTUAL LEARNING ENVIRONMENTS

Springer

THE INTERNATIONAL HANDBOOK OF VIRTUAL LEARNING ENVIRONMENTS

The International Handbook of Virtual Learning Environments

Volume I

Edited by

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Abstract

What is virtual reality and how do we conceptualize, create, use, and inquire into learning settings that capture the possibilities of virtual life? The International Handbook of Virtual Learning Environments was developed to explore Virtual Learning Environments (VLE's), and their relationships with digital, in real life and virtual worlds.

Three issues are explored and used as organizers for The Handbook. First, a distinction is made between virtual learning and learning virtually. Second, since the focus is on learning, an educational framework is developed as a means of bringing coherence to the available literature. Third, learning is defined broadly as a process of knowledge creation for transforming experience to reflect different facets of "the curriculum of life".

To reflect these issues The Handbook is divided into four sections: **Foundations of Virtual Learning Environments; Schooling, Professional Learning and Knowledge Management; Out-of-School Learning Environments; and Challenges for Virtual Learning Environments**. A variety of chapters representing different academic and professional fields are included. These chapters cover topics ranging from philosophical perspectives, historical, sociological, political and educational analyses, case studies from practical and research settings, as well as several provocative 'classics' originally published in other settings.

Biographies of the Editors and Contributors

EDITORS

Jeremy Hunsinger manages the Center for Digital Discourse and Culture at Virginia Tech where he is also completing his Ph.D. in Science and Technology Studies. He is an instructor of political science and teaches courses centered on political theory, political economy, and information/research/education policy. He is supposed to be writing his dissertation on the political economy of the Internet, but more often than not is working on a myriad of other projects related to his job, research, and teaching interests in online environments. He has also worked as Director of VTOnline, a university-wide e-learning project, and has worked on the award winning On-Line M.A. in Political Science.

Jason Nolan is an Assistant Professor with the School of Early Childhood Education at Ryerson University in Toronto. His research interests include the pedagogy of technology, critical and reflective practice, and learning technologies for very young children. He is co-editor of the journal *Learning Inquiry*, and serves in an editorial capacity with *Canadian Children's Literature*, *the Journal of Dracula Studies*, and *The Harrow*.

Peter Pericles Trifonas is a Professor of Education at OISE/UT. He has published extensively in the areas of philosophy, cultural studies, and media.

Joel Weiss is the first Senior Fellow at the Knowledge Media Design Institute (KMDI) of the University of Toronto (UT), and was a long-time faculty member at the Ontario Institute for Studies in Education (OISE/UT). His background in chemistry and social science research procedures, as well as his appreciation of curriculum and learning issues in formal, non-formal and informal situations, provides interesting vantage points for his recent conversion to the virtual world. He was the Founding Editor of *Curriculum Inquiry*, and held several positions in Division B (Curriculum Studies) of the American Educational Research Association (AERA). His publications include chapters in Building virtual communities: Learning and change in cyberspace and AERA's Second handbook of research on teaching, and it's Review of research in education. His next publishing venture will be serving as Editor-in-Chief of The encyclopedia of learning. As the Chair of the Educational Advisory Committee of The Toronto Zoo, Joel has facilitated the development of an International Learning Centre, and The City of Toronto's UN sponsored Regional Centre of Expertise for Education for Sustainable Development.

Annette Adler is a Research Manager at Agilent Labs. She manages the multidisciplinary Systems Biology Program which includes four projects: Proteomics, Metabolomics, Primary Data Analysis and Systems Informatics, with an interdisciplinary team of analytical chemists, biologists, and computer scientists. She is an anthropologist whose early experience was studying the historical development and current dynamics of social identities in the context of plantation economies and slavery. After leaving academics, she spent many years as a researcher looking at interactions between people and technologies, with a particular interest in technology-mediated collaboration, online communities and systems architecture designed to accommodate people as users. She has brought this interest to Agilent in how her project approaches understanding its end-users and develops its work accordingly.

Associate Professor Matthew Allen runs the Internet Studies program at Curtin University of Technology in Perth, Australia. Matthew had published 2 books and a dozen papers, and had a background in history, cultural theory and epistemology before turning to Internet Studies. He currently supervises several doctoral students in Internet Studies, is the in-coming President of the Association of Internet Researchers and is researching how broadband technologies are changing cultural and economic understandings of the Internet.

Melissa Altman is interested in critical understandings of meaning-making at the intersection of virtual and real environments. She is working on her Ph.D. in American Culture Studies at Bowling Green State University and is doing research on production of subjectivity, postcolonial feminisms, virtual learning environments, and other critical investigations of everyday meaning-making.

Christine Armatas is currently working as a researcher in the Human Factors group at Telstra Research Laboratories in Melbourne, Australia. Previously she was a Senior Lecturer in the School of Psychology, at Deakin University, Geelong. During her time there, she was involved in developing courses for delivery in fully online and mixed delivery modes. As part of this work, she has published a number of papers on how using computer-mediated technologies to deliver learning material affects the quality of the student learning experience. Her current research interests include the use of mobile technologies to enhance teaching and learning.

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Brandon Barr is an advertising copywriter who lives in Rochester, NY. He holds an M.A. in English Literature from the University of Rochester and remains interested in the poetics of new media—in the arts, in video games, in TV & radio, and in advertising. His current art projects and writing are available at his website, texturl.net.

Dr. Joanna Black is an Assistant Professor of Art Education in the Faculty of Education at the University of Manitoba in Manitoba, Canada. She teaches visual arts and new media education. Her research interests and published works are on the subjects of the virtual arts classroom, the relationship dynamics between teachers and students in digital arts classrooms, new media integration in arts curriculum and teacher training, and model digital visual arts schools. Dr. Black has worked as an art director, curator, museum art educator and K-12 teacher in public and alternative school settings.

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Nicholas Bowskill is an e-learning consultant currently working with The University of Sheffield, UK as an e-tutor in a self-employed role. In addition, he is also working with Lancaster University on the eChina Project. This has involved him in visits to Chinese Universities and online involvement across the eChina Project consortium. Nicholas is providing tutoring and technical support. His interests include informal learning in online environments and podcasting. He has a good research background and a record of research publications over the past 10 years of his involvement in e-learning.

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Robert S. Brown has been in the field of applied research for twenty years. Before joining the Toronto Board's research department in 1991, he worked as a media analyst at TVOntario and as a research consultant in private market research. He is currently a project coordinator in Research and Information Services of the Toronto District School Board and is a past president of AERO (the Association of Educational Researchers of Ontario). Publications include "Psychological needs of post-war children in Kosovo: A preliminary analysis," with Ester Cole (*School Psychology International*, 2002, Vol. 23, no. 2), and Telling tales over time: Constructing and deconstructing the school calendar" with Joel Weiss (*Teachers College Record*, 2003, Vol. 105, no. 9).

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Bryan Carter is an assistant professor of literature at Central Missouri State University, specializing in African American literature of the 20th Century with a primary focus on the Harlem Renaissance and a secondary emphasis on visual culture. He has published numerous articles on Virtual Harlem and has presented it at locations around the world. In the spring of 2004, he served as Professeur Invité at the University of Paris IV-Sorbonne where he taught Digital Communications and Cultural Studies. Dr. Carter has recently incorporated desktop videoconferencing, podcasting, Internet radio broadcasts and blogging into each of his courses.

Suzanne de Castell is a Professor of Education at Simon Fraser University specializing in multi-modal literacies, new media studies and educational technologies. Her research focuses on epistemic implications of representational tools. She is currently studying informal learning environments, and specifically the impacts of computer-supported play on the development of new 'economies' of attention.

Dr. Der-Thanq Chen is a Senior Lecturer in the University Centre for Teaching and Learning at the University of Canterbury. He currently leads various e-learning initiatives at the University and lectures in courses in instructional design and interactive multimedia design. His areas of research interest include online learning communities and the design of socio-technological architecture for learning.

Dr. Paul F. Conway is a College Lecturer in the Education Department, National University of Ireland (NUI), Cork and has also been a Visiting Professor in the College of Education, Michigan State University since 2000.

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Dr. Jackie Cook teaches new media in graduate programs at the University of South Australia's School of Communication, Information and New Media in Adelaide, and also in the University's off-shore graduate degrees in Hong Kong, Singapore and Kuala Lumpur. She has just completed a five-year secondment into the University's Journalism programs, and is moving to a new focus promoting publication and media promotion of doctoral student research. She is a regular broadcaster on Australian radio, specialising in analytical commentary on new media culture.

Jim Cummins received his Ph.D. in 1974 from the University of Alberta in the area of educational psychology. He is currently a professor in the Department of Curriculum, Teaching, Learning in the Ontario Institute for Studies in Education of the University of Toronto. His research has focused on the nature of language proficiency and second language acquisition with particular emphasis on the social and educational barriers that limit academic success for culturally diverse students. He has served as a consultant on language planning in education to numerous international agencies.

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Julia Dicum is a doctoral candidate in OISE/UT's Collaborative Program in Comparative International Development Education and a Research Associate at York University's Centre for Refugee Studies, where her work is funded by a Social Science Humanities Research Council doctoral fellowship. An experienced aid worker, her primary research interests in education are innovation in learning delivery for marginalised communities in war-torn countries, critical theory, and sustainable ICTs as community development tools in less developed countries.

Martin Dodge works at University College London as a researcher in the Centre for Advanced Spatial Analysis and lecturer in the Department of Geography. He has a degree in geography and computing, an M.Sc. in geographical information systems and is currently completing his Ph.D. His work has been primarily concerned with developing a new research area of the geography of cyberspace, focusing in large part on the ways to map and visualise the Internet and the Web. He is the curator of a web-based Atlas of cyberspace (www.cybergeography.org/atlas) and has co-authored two books, Mapping cyberspace (Routledge, 2000) and Atlas of cyberspace (Addison-Wesley 2001).

Jim Dwight is an assistant professor at Millersville University, specializing in the Cultural Foundations of Education, Philosophy of Education, and Instructional Technology. His particular interest resides in intersections of e-learning and the metaphysics of presence and this intersection's subsequent effects on educational policies. His interests have led him to formulate a theory of hyperpedagogy that seeks ways in which e-learning can deny traditional metaphysical theories and thereby better address the concerns of historically marginalized learners.

Radhika Gajjala (Ph.D., University of Pittsburgh, 1998) is Associate Professor in Interpersonal Communication/Communication Studies at Bowling Green State University, Ohio. Her research interests include information communication technologies (ICTs) and globalization and production of race in cyberspace and virtual learning environments. Her work has appeared in journals such as *Feminist Media Studies*, *International and Intercultural Annual, Contemporary South Asia* and *Works and Days,* and in books such as Technospaces: Inside the new media (2001) and Domain errors! Cyberfeminist practices (2003). Her book Cyberselves: Feminist ethnographies of South Asian women was recently published by Altamira Press.

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Donna Haraway is a Professor in the History of Consciousness Department at the University of California at Santa Cruz, where she teaches feminist theory, science studies, and animal studies. She earned her Ph.D. in Biology at Yale in 1972 and has taught biology at the University of Hawaii and the history of science at The Johns Hopkins University. Haraway is the author of Crystals, fabrics, and fields: Metaphors that shape embryos (Berkeley: North Atlantic Books, 2004, originally Yale University Press, 1976); Primate visions: Gender, race, and nature in the world of modern science (New York: Routledge, 1989); Simians, cyborgs, and women: The reinvention of nature (Routledge, 1991); Modest_Witness@Second_Millennium.FemaleMan© Meets OncoMouse™ (New York: Routledge, 1997); and The companion species manifesto: Dogs, people, and significant otherness (Chicago: Prickly Paradigm Press, 2003).

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by the National Academy of Education in the USA for research on teacher development in schools in informal settlements in 1995.

Kathryn M. Hibbert, after teaching for sixteen years completed a doctoral dissertation, Examining 'enunciative space' in an online community of practice. The study looked at how practicing teachers in a virtual Reading course understood that their literacy practices, and subsequently their teaching, lives through online dialogue in a supportive community of professional practice. Her research interests include; teaching and learning in the virtual world, teacher professional development in a culture of standards and efficiency, and the power of online dialogue for developing a scholarship of teaching. She has presented at both national and international conferences, with recent publications in *The Reading Teacher, The Journal for Adult and Adolescent Literacy,* as well as conference proceedings of *IADIS: The International Conference e-Society* (Avila, Spain) and the *20th Annual Conference on Distance Teaching and Learning*, (Madison, Wisconsin). She recently participated as a guest researcher in Etienne Wenger's online forum, *CPSquare*. Currently, Kathy is the Distance Education Coordinator at the Faculty of Education, University of Western Ontario.

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Dr. (Ms.) Ahbul Zailani Begum Mohamed Ibrahim began her career as a Science Officer at the Science University of Malaysia (USM). She then migrated to teaching English as a Second Language (ESL) and served in the Northern University of Malaysia before joining the Mara University of Technology. Although teaching ESL is her forte, Begum has been watching the growth of online learning technologies closely; hence her participation in the World Association for Online Education (www.waoe.org). She is a firm believer in the importance of learner autonomy in language learning and finds that virtual learning provides an amazing avenue for capitalizing on this potential.

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Robert Luke, Ph.D., is the Manager of Educational Informatics, Department of Radiation Oncology, Princess Margaret Hospital at the University Health Network, University of Toronto. He studies community learning networks, with an emphasis on learning environments for health and education. This includes work on online interprofessional education for healthcare teams, as well as for patient learning. He is actively involved in the development of standards and technologies that assist people with various abilities and learning styles. This is explored through community informatics and the design of information and communications technology systems that enhance community health, social, economic, and political development.

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Steve Mann has written more than 200 research publications and has been the keynote speaker at more than 25 scholarly and industry symposia and conferences and has also been an invited speaker at more than 50 university Distinguished Lecture Series and Colloquia. He received his Ph.D. degree from MIT in 1997 for work including the invention of Humanistic Intelligence. He is also inventor of the Chirplet Transform, a new mathematical framework for signal processing, of Comparametric Equations, a new mathematical framework for computer mediated reality, and of the FUNtain fluid user interface. He is currently a tenured faculty member at the University of Toronto.

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Introduction: Virtual Learning and Learning Virtually[1]

JOEL WEISS

> . . . imagine for one full day what life would be like without access to current technologies such as computers, cell phones, handheld devices, DVD's, the internet, data systems, or e-mail. (Bromfield, 2005, 1)

This is a description of a recent internet-based school curriculum initiative for students, teachers and parents to imagine life without modern technologies. While the context is North American schooling, the implications are far-reaching for all. Regardless of our location on the planet, and the cultural and language spaces in which we work and live, computers and other technological innovations influence our lives to a greater extent all the time. As computers take on a more visible role in our lives, moving from government and research institutions into our communities, schools, and homes, we become more aware of how these are both mediators of, and in themselves, learning settings.

Created learning environments are as old as societies' first attempts at socializing its young, and these settings have taken a variety of forms ranging from the concrete literal to the creative imaginary. The relatively recent development of the digital age has spawned interest in what has come to be called 'virtual reality' and in delineating what this means for learning and the creation of 'virtual learning environments'. This Handbook was created to explore features of virtual worlds and the relationships with diverse learning settings. Since the concept of, and discourse surrounding, virtual learning environments are not well developed in the literature, a deliberate strategy has been to be expansive in choosing contributions. We sought out numerous contributors representing multiple discourses with the aim of creating some coherence in a complex field.

The resultant inclusion of sixty-three chapters requires creating some advanced organizers by which to view the project. First, what is meant by

[1] The International Handbook of Virtual Learning Environments has been quite the transformative experience. Jason Nolan has been his usual provocative self, pushing me in new directions throughout the various stages of the Handbook's development. Jeremy Hunsinger added some new directions when he joined us two years ago to replace Peter Trifonas who took on other professional responsibilities. Vera Nincic's skills in the virtual world enriched the project. From the beginning, Michel Lokhorst, a former Senior Editor at Springer, encouraged us to make this an enjoyable, worthwhile professional experience.

J. Weiss et al. (eds.), The International Handbook of Virtual Learning Environments, 1–33.

technology and does 'virtual' always, implicitly or explicitly, require modern technology ushered in by the 'computer age'? Second, what view of learning allows for the broad spectrum of possible situations that people interact with in their complicated lives? Third, since the editors are primarily educators, is there an educational framework that provides a useful form of coherence for the topic of virtual learning environments? What follows immediately are sections which discuss technology and its relationship with virtual learning, a delineation of views about learning and an educational framework that relies upon perspectives on curriculum. Following that is a section on The Curriculum of the Handbook, including a description of its structure and each of the included chapters, and some thoughts about future activities.

TECHNOLOGY AND THE VIRTUAL WORLD

Technology is a complex construction: "It includes activities as well as a body of knowledge, structures as well as the act of structuring." (Franklin, 1990, 14) Its complexity has been evident throughout the history of considering the so-called real world. When we turn to a consideration of cyberspace, this complexity is no less evident. Technology helps to create, and is also the site for, virtual learning environments. It's both part of the process and is also a product.

It has become commonplace to describe the learning environments mediated by computers and digital technologies as virtual learning environments (VLEs) in order to separate them from the real world learning environments that have been with us since individuals came together to form communities and societies at the dawn of our various cultures. However, as Burbules points out in the first chapter of this volume, virtual can be an illusory concept, one with multiple meanings. A learning environment doesn't necessarily have to involve digital technologies in order for it to be considered a virtual learning environment. People over the centuries, especially through the arts, have developed learning settings where individuals need to use their imagination, often including the realm of fantasy, thus creating VLE's.

I believe the confusing element in the virtual equation is the view that only computer technology is both the necessary and sufficient criterion for a virtual learning environment. It is a misunderstanding of technology that is clearly enunciated by Ursula Franklin in The Real World of Technology (1990). She describes technology: as 'a practice' and her description of what it is not is informative for this discussion. She writes: "Technology is not the sum of the artifacts, of the wheels and gears, of the rails and electronic transmitters. Technology is a *system*. . . . Technology involves organization, procedures, symbols, new words, equations, and most of all, a mindset." (12) It is the idea of mindset that suggests that the virtual is a concept of the

imagination, the power of constructing possible models of human experience (Fry, 1969).

There are a variety of media for imaginative learning environments including oral speech, writing, print, movement, photographic, electronic as well as digital. Educators of a variety of backgrounds from formal, informal and non- formal groups, including parents, media specialists and artists have used a variety of practices for stirring the imagination of learners. Who hasn't experienced, for example, literature, creative writing, music, role-playing as settings for learning? This presumes a more historically focused long-term perspective on technology, which includes such examples as the development of the printing press, the use of pen and ink, photographic process, film, radio, television and the like.

In order to indicate that there are many types of virtual experiences, I make a distinction between virtual learning and learning virtually. Virtual learning is reserved for digital/ computer-based learning environments. Learning virtually is a much broader term signifying any context that allows for imaginative possibilities. It includes environments utilizing a broad array of traditional media and contexts for meaning making. For example, the use of settings employing literature (in its various forms) engenders a process of interpretation by a learner, leading to the creation of virtual, different from actual, texts (Bruner, 1986). The process of creating a virtual text can be seen as initiating a learning journey that uses previous experiences and images as markers in, and of, the creation. Bruner suggests that features of discourse enable readers to create their own virtual worlds through making implicit interpretations, depicting reality through a lens of the consciousness of characters, and often filtering the world through multiple interpretive screens. He also presents concrete comparisons between a reader's created virtual, and the actual, text (Bruner, 1986, 161–171). Learning virtually is possible with other settings that enable learners to make imaginative interpretations. Interactions with other objects (paintings, prints, photographs, musical and dramatic presentations) and media (radio, movies, television, television) are but a few of the possibilities for creating virtual texts.

Where the two terms merge is where digital representations of learning environments use procedures that existed prior to the computer age. Examples of VLE's that are primarily complex transformations of activities that exist in the real world without computers include writing an essay or sending a message by e-mail, viewing a page of text or an image, perhaps reading an e-book, or undertaking some teaching or training activity. Other VLEs are more fully realized virtual experiences for which no analog exists outside of the computer; the ability to create new worlds, new topologies, new people, and experience them, embody them, transform them in collaboration with individuals from around the globe is truly a virtual experience. However, from an educational perspective, both types of learning environments are subject to similar criteria for success in whatever is supposed to be learned. Some

criteria may be more appropriate for some environments than for others, but it's not so clear as to whether virtual learning requires substantially different ones than other types of learning environments. Perhaps the imaginative use of technology creates differences of kind as opposed to type.

Often, the rhetoric surrounding any important innovation can be fraught with hyperbole. With more and more changes in technology and applications associated with the technology becoming mainstream, there is the real concern that expectations for what virtual life means for learning and the creation of learning settings outstrips the capability. The existence of an application does not necessarily guarantee success as intended. Technology and associated applications start with potential, but there are many features that guide the direction of where and how that potential becomes realized. The application of technology cannot be considered in the abstract- it requires an understanding of the educational landscape in which it is considered. The next section provides the view of learning that helped to frame choices included in the Handbook. I also present an educational framework from a curricular perspective that has been useful in analyzing the rich complexities of VLE's.

LEARNING, CURRICULUM AND VIRTUAL LEARNING ENVIRONMENTS

The view of learning that informs our work is an amalgam of traditions best summarized by Kolb as ". . . learning is the process whereby knowledge is created through the transformation of experience' (1984, 41). The importance of learning in all facets of our lives, and our experience with the world around us, can be seen as the participation in an interconnected series of learning environments. Some we engage with as part of social, educational and economic interactions, and some as personal and spiritual experiences. In reality, these experiences are located in, and mediated through, learning environments. These environments should not be viewed as belonging exclusively to the formal educational sector. There are plentiful informal and non-formal contexts that are potential situations for 'learning moments'. Our encounters with the natural environment provided the impetus for the 'romantic 'view of learning espoused by Rousseau. For the most part, however, we usually consider creating settings for maximizing the possibilities of 'learning moments'. These settings may differ depending upon specific cultural arrangements that help to describe the practices of any particular society. However, there are situations common to all societies where learning is necessary. Such examples include childrearing, physical and emotional survival, work, spiritual activities, leisure time pursuits, and life ritual situations of birth, coming of age, procreation and dying. Later, I discuss the concept of the curriculum of life that includes these, and other potential learning settings.

In searching for a perspective for the Handbook, there's both an embarrassment of riches, as well as a paucity of material related to VLE's. There is

no shortage of writing about the virtual world. Beyond Marshall McLuhan, William Gibson, Bruce Sterling and other writers of science fiction and future worlds, there has been an explosion of both popular and academic material. Many fields of study and disciplines have important contributions to make about this world. Several come to mind- political science and politics; anthropology; history; sociology; cultural studies and media; literature and English studies; computer science; communication; feminist studies; medicine, law, architecture, engineering, design and other professional fields; geography; psychology and cognitive science. People trained in the field of education have made their own contributions, especially in computer studies, higher education, teacher education and learning networks. While all of these areas have contributed to our understanding of virtual worlds, I suggest that our knowledge of virtual learning environments is still somewhat opaque and requires more clarity. Because the editors of this Handbook have approached this project from an educational stance, it is incumbent upon us to further clarify how an educational stance is one perspective by which to develop discourse on virtual learning and virtual learning environments. This perspective assumes a broad reach on what education is and who is an educator. Although many of the contributors in this volume would not self-identify as trained in education, we have assumed that regardless of their background, they are educators in an important sense-interested in communicating and involved in the teaching/ learning process. Thus, from our perspective, they're all engaged in a curriculum-making activity.

I have chosen to use some of the discourses surrounding the concept of curriculum as an approach to elucidate aspects of virtual learning environments. This provides a metaphoric compass, enabling some boundaries to be placed on analyzing the multiple discourses that are found in the literature of virtual learning environments.

Curriculum Commonplaces

The term "curriculum" is deliberately used as something broader than its usual location as an aspect of schooling, because curriculum is something that provides scaffolding for learning in any setting. A conceptual tool for understanding this structure is a set of commonplace terms containing a minimum required for describing any curricular situation (Weiss, 1989). These include 'learner', teacher', 'subject matter', and 'milieu' in which these other concepts function. I view these commonplaces as a generative metaphor (Schon, 1979) representing a pervasive tacit image that influences actions, such as development and policy activities. Since curriculum is a value-laden concept, each of the commonplaces represents the potential for different points of view, and potential action. As an example, there are different perspectives on "the learner", ranging from an empty vessel receiving information, to a

stimulus-seeking, curiosity driven person constructing his/her own sense of the world. Notions of "the teacher" are representations of different approaches to pedagogy including people, machines and other forms of technology used to engage learners. Every curricular engagement deals with learning/teaching about content, the commonplace of "subject matter". This represents a wide spectrum of possibilities including school subject matter, information for our personal life, such as medical or travel possibilities, or even processes involved in exposure to that setting. "Milieu" refers to the variety of conditions under which the learner, teacher and subject matter interact. This includes the specific conditions, such as setting, materials used, time of day, and the like. It also includes the broader historical, political, social and economic factors that shape the context for any particular learning engagement. Any curriculum "moment" is a distillation of the complex interactions among the commonplaces.

Hidden and Null Curricula

The field of curriculum continually wrestles with the dilemma of what language to use in characterizing its structure. Jackson (1992) presents an extensive discussion of the various terminologies used over the years to describe what counts as "curriculum". Generally, it is defined in terms of the outcomes of a complex teaching-learning context. However, two contrasting sets of outcomes, characterized as positive or negative, frame the discussion so that two separate curricula have become the norm in curriculum discourse. One is explicitly endorsed, while the other is not. Labels attached to this dichotomy include: intended/unintended, accomplished/unaccomplished, written/unwritten, delivered/received or experienced. The most popular representation of the negative curriculum is the 'hidden curriculum'. The term was coined by Jackson in Life in Classrooms (1968) and has assumed mantra-like importance to critics of educational structures and institutions (Apple, 1980; Vallance, 1977). The concept has been useful in exposing the values, attitudes and structural mechanisms underlying curriculum decision-making and activities and may provide a way to look at what's transpiring in creating and maintaining VLE's.

A related aspect of the hidden curriculum is the notion of the 'null curriculum' (Eisner, 1979; Flinders, Noddings, and Thornton, 1986). This concept is based on the recognition that learning involves both opportunities and lost opportunities; that every choice may exclude other possibilities. The underlying issue of the null curriculum is the opportunity to learn, or more appropriately, lost learning opportunity. This is similar to what economists refer to as opportunity costs. In the context of formal learning environments, the null curriculum may be in operation when basic skills are chosen over the arts as an explicit indicator of setting priorities. But on a systemic level, the null

curriculum is more problematic. Content, language, and evaluative structures that privilege one culture, gender or language group over another represents the outcomes of a null curriculum that limits opportunities for some learners while providing advantages for others. At a deeper level, funding strategies that privilege different social groups or place restrictions on the scope and choice of available learning environments influence what kinds of things *can* be learned. These examples are not necessarily hidden, but they are often ignored for what they are, and are taken for granted as factors effecting the creation of learning environments by educators, parents, students and policy makers. For example, in the context of the internet, there are numerous examples of such lost opportunities, ones in which individuals make conscious choices of what to attend to, and those which are structured so that there is little or no choice in one's activities. The latter is where the hidden and null curricula intersect.

The hidden curriculum represents the barriers that cannot be easily identified and rendered problematic. What people think they are experiencing and participating in *is* the curriculum and often the hidden curriculum is what ensures the maintenance of the null curriculum. Encountering both involves unpacking these curricula by identifying the 'taken for granted' features and to suggest strategies for finding the complexities and values that are not explicit. This helps to direct what and how we can learn.

Just as there was a real person manipulating events behind the screen in "The Wizard of Oz", so there are people making curriculum decisions behind the technology in learning environments. Whoever is behind the screen, such as teacher or software developer, makes value choices from among competing perspectives about the various commonplaces. Choices made about obvious categories of the learner, such as age, gender, language competence, social background are grounded in images of these characteristics. These competing images can be represented as questions of choice. Are learners seen as being active or passive, flexible or rigid, knowledge constructor or empty vessel? How much experience have they acquired with settings that require imagination and fantasy? Is there a particular modality, or familiarity with media/technology favored within the setting? Is there interest in individual learners or with a community of learners? Questions related to choices made about the nature of knowledge might be: What kinds of previous knowledge and skills must be accounted for in creating a learning environment? Is it assumed that knowledge is personal or general? How valid is the information that is found on a particular website? Are there conflicts among various groups and/or individuals as to what is acceptable for people to know? How do you negotiate between process and substance considerations? Are the materials and/or settings novel or familiar to learners?

What views of teaching inform the structure of the learning engagement? Is it structured as an information provider solely, or as enabling a more constructivist approach? Does the use of sophisticated technology make a difference

to the underlying approach? To what extent do learners encounter in real life people (parents, teachers, friends, professionals) as well as those behind the screen?

How much of the learning encounter is framed by the technology so that learners interact in ways that differ from more traditional settings? Are materials readily available or does the setting encourage learners to shape the conditions for learning? What are the limits for technology to shape vicarious experiences? Is technology viewed as a neutral tool, a variable kept under control, or as a socially situated setting where technologies serve as mediators? How much does the reality of the digital divide influence the larger picture of access to resources? How do policies and programs from governments, the private sector and non-governmental organizations (NGO's) influence the conditions for learning virtually and virtual learning?

Curriculum of Virtual Community

Some of these features of curriculum discourse have facilitated an understanding of virtual learning environments. In a book devoted to an exploration of the concept of virtual community, Nolan and Weiss (2002) conceptualized a Curriculum of Virtual Community to explore some of their learning features. They posited three broad locations for learning: Initiation and Governance; Access; and Membership. There is the location associated with first initiating and then maintaining the locus of interaction, The Curriculum of Initiation and Governance is associated with the learning required for initiating and maintaining the site of a virtual community. Curriculum of Access is associated with accessing and becoming socialized to virtual community itself, which includes what is required to become a member: learning about the site, how to access it, and the rules that govern membership. Finally, there is the Curriculum of Membership that relates the actual engagements in the community, the purposes for which the site was constructed and the gains people expect from it.

Many features of virtual community may translate to the larger community of the internet. This meta-community comprises almost limitless numbers of communities, and information nodes and networks devoted to among other things: commerce, education, governance, and social life. The internet requires interactions among five key industries: telecommunication, software, internet service providers, search engine providers, and web content providers.

Much of what transpires *on* the internet is largely opaque, often seen as value neutral. Weiss and Nolan (2001) expanded their conception of the Curriculum of Virtual Community to discuss some of the learning features of the internet. Using the concepts of curriculum commonplaces, null curriculum and hidden curriculum, they analyzed some of the taken for granted structural

features of the internet. Since that time, there have been a number of developments that have impacted our knowledge base of the internet, rendering it as a more transparent structure. For example, while its early development had been dominated by contributions of white Western males, now much of the technology and use has become more widespread, witness the contributions from India, China, other Asian countries, as well as those from the Spanish-speaking world. Clearly, there are now many more contributions being made by females. Perhaps the most visible sign of the changes is the creation of the World Summit on the Information Society, and the very open process being conducted by the Working Group on Internet Governance (WGIG) whose tasks were to: "develop a working definition of Internet Governance; identify the public policy issues that are relevant to Internet Governance". The results of this activity have been disseminated for worldwide discussion by making information available in numerous languages and in several formats (http://www.wgig.org/).

Other examples of changes in the internet can be found in the ways that individuals and groups have become involved in more open-ended, empowering formats. The process of blogging has become an important, often creative, activity in many peoples' lives, touching upon the personal, political, social and the aesthetic. It has had serious impact upon the conduct of the media, governments and the political process. Another prominent example of the empowering nature of the internet is the development of Wikipedia, a web-based, multi-language, free content encyclopedia (en.wikipedia.org). It is written by volunteers and sponsored by a not-for profit foundation, Wikimedia Foundation. It has been created and distributed as a free encyclopedia in over two hundred languages, and has become one of the most popular internet reference sites. It differs from the conventional encyclopedia first developed by Diderot because anyone can contribute, regardless of any claim to authority on a subject. It is interactive since readers can edit an entry and have it instantaneously recorded online. Editorial policies are derived through consensus and occasional vote. Wikipedia has served as a model set of procedures for other groups to create their own communities of use. There are any number of curricular issues highlighted by this endeavor, especially ones related to views on the nature of knowledge, characteristics of learners, and issues of power and control.

These are but a few examples of many more complex issues and situations in which a curricular perspective might allow useful analyses. My purpose has been to provide a brief elucidation of some of the concepts that have helped me to unpack some of the features of a virtual learning environment. A number of the issues represented here are part of the stories told, in their own terms, by many of the authors in this Handbook. With this in mind, I now turn to a more focused description of this Handbook.

THE CURRICULUM OF THE HANDBOOK

Any text should be seen as a set of curriculum materials, developed by some individuals for the use of others. This requires a set of intentions by the developers, in this case the Editors, through choices dictated by their views on the curriculum commonplaces around the topic of virtual learning environments. The Editors' backgrounds have driven the choices made of the framework, the medium, and the various represented topics. This translated into decisions about authors and genres. At one level, the Editors and authors provide the *teacher* aspect of the commonplaces. These decisions were determined with a view of the audience, the potential *learners*.

The *subject matter* of this project has been to describe the wide landscape of possibilities for discussing, conceptualizing, creating and inquiring into, virtual learning environments. The approach has been to consider a spectrum of discourses and the choice of authors and chapters attests to that accomplishment. This broad framework includes locating some of the historical narratives of various features and milestones of VLE development; exploring the differing conceptions of what VLEs were, are and might be; discussing issues surrounding the construction and governance of VLEs, including curricular and pedagogical features; describing case studies of created virtual learning environments in a variety of formal and informal parts of our everyday lives; and inquiring into the conceptions and forms of educational research that shed light on the development and application of VLEs in various social contexts and cultures.

Part of the story is told by recounting important parts of the past as well as the present scene. We have viewed learning in a diversity of environments to which people are exposed. Consistent with our framework, a curriculum of life was a useful organizer for the types of settings discussed by many of the contributors. We divided this curriculum into two broad categories: one concerned with more traditional aspects of schooling, professional learning and knowledge management; and the other with many of the other important learning settings in people's lives.

The content is divided into four sections: 1. Foundations of Virtual Learning Environments; 2. Schooling, Professional Learning and Knowledge Management; 3. Out-of-School Virtual Learning Environments; and 4. Challenges for Virtual Learning Environments.

Given its topicality, there is potential interest in this subject matter for a variety of audiences (*learners*). Most of the contributors are academics deliberately chosen for their expertise and often, their provocative views on their topic. Since so many different disciplines and fields are represented, we hope that readers will not only seek out material from their own areas, but will benefit from an understanding presented from other perspectives. Any piece of curricular material should have the potential for a learner creating

new knowledge through transforming experiences. We also hope that a wide spectrum of practitioners in a variety of educational settings, such as schools, libraries, museums, health care, leisure industries, communities and others will find some of the material appropriate for their practices.

In considerations of *milieu*, our choice of a two-dimensional text medium is admittedly traditional for investigating virtual worlds. In part, this reflects the political economy of publishing in spite of the rise of e-books and possibilities for the Net. However, we like to think that many of the contributions provide the possibility for learning virtually, that is, they stimulate the imagination and suggest a sense of fantasy. This point is elegantly made by Burbules in our first chapter: "... an academic article can also be a virtual environment-one that you complement through your own interest, involvement, imagination and interaction.". We also decided to reprint several provocative pieces originally published for audiences different in many ways from the present context. This includes Donna Haraway's classic "Cyborg manifesto"; Slavoj Zizek's "The Matrix, or, the two sides of perversion", an analysis of the influential film to develop important theoretical formulations; and Jeff Noon's "Chromosoft mirrors", a pithy description of the dark side of virtual worlds. While a few in our audience may be familiar with one or more of these imaginative pieces, we believe that the wider audience should be exposed to their ideas. We especially wanted educators to visit, and in some cases, re-visit Haraway's ideas through the prism of relevance to classroom teaching/learning. Another contribution that should engage the reader with concrete manifestations of the fantasy world of cyberspace is found in Steve Mann's intriguing description of this engineer's life as a virtual learning environment.

Any presentation of the story of an important topic needs not only content from past and present, but also a sense of future issues. This requires a rendering of ideas developed out of relevant inquiry and of considered thought on potential possibilities/constraints. No less than other areas, virtual learning environments require a strong basis for inquiry to investigate the myriad claims made for education in cyberspace. How salient will exciting technological innovations be for changing the learning equation?

Section One: Foundations of Virtual Learning

The opening section of the Handbook, **Foundations of Virtual Learning Environments**, provides a number of perspectives for an understanding of the virtual world and learning. The idea of the virtual is laid bare in the introductory chapter by Burbules. He questions the several different interpretations placed on the concept and sets the stage by suggesting that virtual learning is closely linked with learning virtually through the "as if" experience. Digital technology is not viewed as necessary and sufficient criteria for learning in a virtual way.

However, the topic of technology can be seen as leitmotif for several of the other contributions in this section. Harasim's extensive history of e-learning traces the role of technology and discusses its impact on a shift in the calculus of learning. For her, this shift represents an optimistic future for the digital world to be influential in creating more relevant learning environments. Other contributors take a more nuanced view of the role of technology in learning. Peters believes that our philosophical knowledge base about technology is not well formed and suggests that a theoretical discussion on technologies would equip us to better understand the issues at hand. He analyzes several approaches to technology for their implications for a knowledge economy. Such a mapping strategy is an attempt to move beyond economic theories and technological innovations in order to shape public policy and create new fields of knowledge and research. Haraway's original contribution, "The Cyborg Manifesto", was a demonstration of political activism in using the concept of the cyborg to show how humans are implicated in technological systems. Working from feminist and socially conscious frameworks, she opened up the discourse about classroom technology issues and pedagogy in computer-mediated settings. She discussed a number of signifying practices in efforts at meaning making, cultural coding and social system construction, and has had great impact on academics in a number of areas, but especially those teaching composition and feminist studies. Selfe and Smith provide a discussion of the impact of "The Cyborg Manifesto" on both academics and practitioners and suggest that this work permanently joined class, race, sexuality and gender to technology discourse. An important part of the Selfe and Smith contribution is a global history of the importance of technology from a political economy perspective.

Hunsinger also addresses technology through issues of power relationships as embedded in informational capitalism. He suggests that there is a need to understand underlying biases, values and ideological positions embedded in the milieu as part of the responsibility toward technology's usages. By rejecting conformation to the business model, and treating education as a public good, he suggests that VLE's can be transformative regarding learning and the world. (This is in direct contrast to the argument made earlier by Davis and Botkin (1994) that schools have become irrelevant in the learning society.) Issues of resistance and transformation are also topics discussed by Nolan and by Kellner. The former looks at what is happening in the Net as a means of engaging "... the deep structure of hegemony of digital technology revolution". Nolan goes well beyond my earlier remarks on the curriculum of the internet, by providing a history of its foundation and genesis and by suggesting several technologies of resistance, such as consumers acting as prosumers, for learning to be a transformative experience. Kellner challenges educators to make changes in order to cultivate the multiple literacies required for technological and multicultural societies. Like John Dewey and Ivan Illich, he believes that education is a necessary ingredient in bringing about true democracy. Whereas

he believes that Dewey failed in that objective, he suggests that pragmatic experimentation regarding technology and multiculturalism should lead to a re-visioning of education. Carmen Luke also wants to transform education in the fluid and mobile 'wired society' that has reconfigured our notions of time and space. She believes that the current challenge is to ". . . devise flexible, innovative, analytical tools with which to track the fluidity and mobility of 'travel' across the semioscape of links, knowledge fields, web pages, chat rooms, e-mail routes, inter-subjective and intercultural relationships".

Ito goes beyond the screen to investigate the human-machine interface. She looked at how young children interact with the software of games and determined that whatever the intentions of the software developers, learners can have a sense of agency in what they do and how they engage in the setting. By calling attention to the sociality of the interactions, she suggests that we have to question our prior understandings of social structures co-constituted by people and machines encountering one another across an increasingly complex set of interface conventions, as well as the relations of production and consumption that bring these actors together. The final contribution in this section by Maxwell addresses the important concept of constructionism, which has been featured in the discourse and practice of the digital age, for discussions about the nature of learning. He traces the pioneering work by Papert, Turkle and others in the Epistemology and Learning Group at MIT's Media Lab that articulated that 'learning happens best when children are engaged in creating personally meaningful objects and sharing them with their peers'. Maxwell re-examines the concept in terms of other ideas from situated learning, media theory and science and technology studies (STS), and suggests a new approach, "distributed constructionism'. His work should stimulate reflection on past ideas as well as provide a provocative way to introduce an ecological perspective on the topic.

Section Two: Schooling, Professional Learning and Knowledge Management

The second section of the Handbook, **Schooling, Professional Learning and Knowledge Management** represents more traditional settings for VLE's. However, the authors develop their ideas in important ways, and in some cases explore unmarked terrain. This includes chapters that discuss various aspects of schooling including issues related to school culture and organization, learner considerations, specific classroom related practices in language development, inclusive learning, and applications of virtual environments. Discussion about schooling and virtual learning requires attention to the teacher in this learning equation. It comes as no surprise that teachers are required to be learners in an environment where many have little background. Three chapters provide material on different aspects: student/teacher interaction in the virtual learning setting; narrative inquiry about how rural African teachers engage

the digital world with few resources; how teachers create virtual communities of practice; and VLE's in teacher education. There is probably no formal educational location that is changing more rapidly in the digital age than is Higher Education. Several chapters address the history as well as personal observations about this important site. Much has been written about the global effects of the digital age on education systems and educators. Contributions on this topic include viewing national educational technology plans, VLE's in the Asia-Pacific region, and global online education and organizations for online educator activities. Academic publishing is an area that has been greatly influenced by the digital revolution, and we present a chapter that provides a fascinating case study of the conversion of a mainstream journal into an online professional learning environment. The last contribution discusses the interface of forms of professional development and knowledge management strategies in the virtual environment.

This section starts with a realistic appraisal of the use of the internet in the school setting. While no one questions the internet as an important innovation, Schofield's research indicates that its existence alone doesn't guarantee success. The culture of schooling contains many complex processes and activities and this contribution analyzes four factors inhibiting the use of the internet. The optimism for virtual learning in schools has lead to some believing that a school can be transformed into a virtual school. Russell explores some of the important issues surrounding background, features of online school environments, how they compare with traditional schooling, research possibilities and musings on the future of this concept. Brown and Weiss question the rhetoric surrounding the claims made for virtual schools. They discuss the concept relative to time and space issues surrounding the organizational arrangement of the school calendar, and the bricks and mortar components of most so-called virtual schools.

Ainley and Armatas provide an extensive overview of issues related to learners, and learning in the virtual environment. They discuss useful information about the impact of both situational and individual factors in the learning setting, introduce research evidence from comparisons between traditional and virtual settings, and suggest that our knowledge base about learning is enhanced by studying the virtual environment. Kinshuk and colleagues offer some ideas from cognitive science to issues about user adaptation in virtual learning environments. They describe the development of learner modeling techniques for monitoring and measuring various attributes, such as working memory capacity, inductive reasoning skill, domain experiences as well as setting complexity. They suggest that such information would be useful for curriculum developers of virtual learning environments. Underlying their approach is a view of technology as a neutral set of practices in the learning context.

From the use of pens and chalkboards to more current innovations, the application of technology in school settings is potentially limitless. Numerous

examples of technology usage has indicated mixed results, not a surprising result given the complexities of curricular work. We have included several contributions that illustrate either an important application, setting or subject matter area. Sponaas-Robbins and Nolan present a topic that might be included almost anyplace in the Handbook because of its widespread history and application to different parts of life. However, because MOO's represent polychronous collaborative virtual environments and have had applications in the classroom setting, it seemed appropriate for this section. The application derives from Multi-User Domain (MUD) that is Object Oriented, hence the term MOO. It is a text-based online setting that allows users to be creative in developing representations of people, places and things (the objects) to be shared with one another. This is a good example of a convergence between virtual learning and learning virtually, and the authors have addressed the topic with a critical eye. Since language text is usually the edifice upon which learning is built, it made sense to include a contribution about virtual learning environments for this area. Skourtu, Kourtis-Kazoullis and Cummins discuss their experiences in designing VLE's for academic language development. They discuss the use of Instructional Technology (IT) within a Habermasian framework of three different pedagogical approaches: transmission-oriented, social-constructionist and transformative. The important message from their work is that IT may be more meaningfully employed with certain forms of pedagogy than with others. Their findings suggest that more progressive approaches than the transmission model are more efficacious in learning academic language, problem-solving, thinking and imaginative skills, and affirmation of self-identity. The important concepts of disability and inclusive E-learning are extensively discussed in the chapter by Trevarinus and Roberts. Their approach turns disability from just considering the commonplace of a learner's personal characteristic into the relationship between the learner and the broader educational environment. This suggests a truly inclusive perspective about learning that defines accessibility as the need for educational systems and personnel to adjust to all learners, and is in keeping with the Handbook's orientation which defines learning as the transformation of experience for the creation of new knowledge. These authors present material that indicates that computer-mediated learning can benefit marginalized students or those who do poorly in more traditional learning environments.

The role of teaching in any setting is complex, and especially in the virtual learning environment. Black provides a fascinating account of the topsy-turvy situation where teachers and their students reverse roles. Because so many students are often highly skilled with technology and many teachers lack their students' skills in virtual settings, students become the expert in the classroom. How teachers cope with the role of learner to their student's role as expert presents an unusual, but increasingly familiar setting for understanding issues of power in the classroom. Henning presents a very different setting for teachers in her country of South Africa. In addition to a recognition of

how the digital divide operates in nonprivileged settings where even access to phones, let alone computers, is difficult she provides a narrative inquiry of six teachers' experiences in the wired world. It's an excellent illustration of how the use of technology education necessitated the development of spontaneously developed informal learning groups. In the much more privileged environment of a major Canadian university, Hibbert and Rich explore the purposes of VLE's in professional development. They contrast two types of environments, one that prepares teachers as disseminators, and the other as knowledge constructors. They suggest that the latter leads to virtual communities of practice as the preferred setting for creating articulated space for participants to learn and grow and re-energize. Otherwise, technological saturation and fatigue may result. A related aspect of virtual life in professional development is the issue of how teachers and researchers communicate with each other using web tools. Korteweg and Mitchell discuss the interface between teachers and teacher educators through their use of technology. They look at how researchers and teachers communicate through the use of web tools, and their research suggests, once again, that the efficacious use of a virtual learning environment depends more on non-technological events and social situations than on technology itself.

One level of education that has been much influenced by the digital age is Higher Education. There are some who are suggesting that the traditional university will become obsolete in favour of the "virtual university", and there's no question that universities are in a change state. We present two views on the impact of technology on this institution: one from a small country, New Zealand, and the other from an American perspective. Both view the events in Higher Education through the lens of increasing globalization in the knowledge business through corporations and media institutions. Pauling provides an extensive background history of developments in New Zealand and some of the ways that technology is impacting its' system. He opines as to whether trends in competition, globalization and media concentration are threatening to the indigenous nature of his country's Higher Education system, or the possibility that a newer socially positive institution will emerge. Luke provides some critical observations on a decade of digital impact on distance learning. He provides an extensive case study of his own university's efforts, including resistance to these efforts, and discusses the realities of unintended outcomes and aspects of a hidden curriculum. He too sees two possible outcomes of these efforts, and suggests that both positions have to be more clearly articulated and understood.

The world-wide situation of embracing the concept of global competition in the digital age has influenced the rhetoric and some of the practices of national education systems. But what do we actually know about the policies and practices of different countries related to the provision of virtual learning environments, especially given the bias in the literature toward information from North America? Zhao, Lei and Conway complement their past research by

providing information from a variety of countries on their national technology plans.

Information on virtual learning environments in the Asia-Pacific region (Hong Kong, Taiwan, China, Korea, Japan, Singapore, Australia and New Zealand) is contributed by Hung, Der-Thanq and Wong. In addition to descriptive detail about activities in each country, they raise important issues, such as the influence of Western culture on Eastern culture, especially around views on the curriculum commonplaces; the dominance of the English language; how flexibility and accessibility may contribute to a furthering of the digital divide (ironically, flexibility may enhance the null curriculum); and confusion over adopting standards for learning objects and web pages.

The importance of virtual learning environments providing opportunities for professional development and networking in a non-institutional context is the subject of the last chapters in this section. This includes contributions that discuss how academics have developed and use a global online network, how electronic journals enhance the possibilities for more interactive learning for professionals, and issues surrounding professional development and knowledge management in virtual spaces.

A group of educators from around the world have demonstrated how the internet is transforming ways in which academics can network both for research and professional development. It was not long ago that academics of like interests created "invisible colleges" that were limited to a small number of individuals, and communication about this work was generally tightly controlled (Price, 1961). The World Association for Online Education (WAOE) is an academic guild, or network, that was developed to go beyond governments and individual institutions so that educators from around the world could work co-operatively. We have included two examples of the activities of WAOE. McCarty and several colleagues, representing the diverse geographic regions of Japan, Malaysia, Russia and India, report on a multidimensional investigation of the educational impact of the internet. This includes the framing of some of the issues through the use of a Global Online Education Questionnaire, conceptualizing important issues about online education for developing countries, and presenting in-depth case studies. Although each author spoke the language of their region which was useful for their case study activity, all of the other communications were in English. Their results highlight important issues surrounding the intersection of context with the other curriculum commonplaces. From a process perspective, their work is an interesting example of online international collaborative projects and their intercultural significance. Another example of those involved with WAOE is the chapter by Bowskill and colleagues who, like Hibbert and Rich in the previous section, specifically frame their work in terms of communities of practice. Two themes permeate their work: online informal learning as an approach to professional development, and the concept of transfer into self as a process for empowering participants.They believe that such a community of practice can

function in a distributed environment to support learning about learning, and learning about learning online. Their approach to the process of transfer into self relates directly to transfer into practice in a context supporting diversity of culture in a global environment.

A very different milieu for online professional development is described by Natriello and Rennick. They discuss the case study of the recent conversion of a major established education journal of over one hundred years, **Teachers College Record**, from print to online format. The creation of online journals is but one important aspect of the impact of the digital age on the field of publishing. This impact is felt in the various processes of solicitation of manuscripts, to their development and production, as well as marketing and distribution. In addition to the creation of e-books and electronic versions of reference works, publishers now produce hundreds of online journals and sell bundles of them to tailor the needs of specific libraries in the academy and other institutional settings. This case study details the process of original resistance from the editorial board to their subsequent conversion to the exciting learning possibilities provided by the online format. This format provides an interactive professional development environment for teachers and other educators that has lead to increased readership and with more flexibility in how the journal is organized and what supplementary "curriculum materials" readers can access.

The last contribution about professional development expands our horizons about the broader applications of its role in knowledge management through virtual spaces. Norika Hara and the late Rob Kling discuss the various discourses about professional development and knowledge management through applications of IT. They provide case study data from four different contexts and determine that knowledge management through solely technical means is too narrow to support the view of learning we're using in this Handbook, the creation of new knowledge. This contribution reinforces one of the themes that emerges from many of the chapters: to be effective, virtual learning must seriously include the milieu of the social system.

Section Three: Out-of-School Learning Environments

Section Three of The Handbook, **Out-of-School Learning Environments**, moves to a consideration of other environments for virtual learning. This addresses the broader representation of the curriculum of life, diverse settings which often define our relationships with institutions and others, as well as our sense of ourselves. Because virtual life has infused so much of society we don't presume to cover all possible settings. However, we have included a number of life's areas in order to provide some of its diversity. The first contribution represents interesting observations about initiation to the virtual world by novices, seniors who represent a population usually considered

uncomfortable in the networked society. We then discuss how some of the important traditional societal institutions (libraries, museums, and healthcare) adapt to the digital age. One of the hallmarks of contemporary society is how much of our lives are spent in leisure activities. The impact on some aspects of leisure time is discussed for hobby genealogy, gaming, and the virtual leisure industries related to sports and sex. The intertwining of political and social aspects of our lives has been impacted by the virtual world. We have included chapters that touch on issues in e-democracy, virtual memorialization, diaspora in virtual spaces, and how virtual environments may be implicated in producing racial identity. Another area that touches upon both virtual learning and learning virtually is the realm of popular culture. Several chapters analyze the political economies associated with two of our cherished icons, Disney and Anne of Green Gables. Additionally, we've included chapters that discuss the importance of virtual life in the development of the genre of slash fiction, an increasingly influenial aspect of popular culture.

In "Cemetaries, oak trees, and black and white cows: Newcomers' understandings of the networked world", O'Day and colleagues address important issues about novice learners to the wired world. They chose to study seniors' introduction to the internet, since they are a group most likely to be unsophisticated about modern technologies and the associated complex social practices. This interactive study of the questions generated by the learners about their online experiences provided useful information about often assumed views about identity on the internet, the boundaries and scope of both personal computers and the internet, and about how the networked world is organized.

The digital age has had important effects upon a number of societal institutions that have served as learning contexts. Brophy discusses the development of e-libraries, the response of this field to utilize technology for facilitating learners' engagements with the global information universe. While libraries are usually known as places to learn content, whether it be reference material or reading for pleasure, they are also social contexts where people socialize and engage with techniques for finding materials. Computer classes are popular with those who may not otherwise have wired accessibility, such as seniors and students, and thus have become places for reducing the digital divide. In spite of the importance of technology, librarians act as facilitators for a wide range of learning styles within a range of pedagogical frameworks. Brophy sees future libraries as making incremental changes, with the e-library coexisting along with more traditional features.

Sumption presents interesting observations about the impact of the digital age on the traditional, artefactually-oriented learning environment of museums. He presents some interesting historical developments about learning in the museum setting and the possibilities of developing interactive, multimedia, computer-based learning environments. The challenges are formidable for an institution where learners have been immersed one on one with objects in the 'sacred grove", and which relies upon in-real-life attendance figures for

justifying their existence. Sumption provides useful illustrative information from his own museum in Australia as to how the World Wide Web can be instrumental in helping learners move beyond collections, and at the same time, alleviate some of the political economic pressures on the institution.

There is probably no aspect of the "curriculum of life" that has been more influenced by modern technology than that of healthcare. It is an environment which includes important sites where learners may work together to support the use of a variety of tools and information resources to pursue critical learning goals and problem-solving activities. Internet-mediated learning environments provide possibilities for overcoming traditional boundaries characterizing learning experiences regarding medical education and the profession itself. It provides opportunities to help educate patients and those seeking health-related content. Just as Black has suggested that computer technologies have provided the basis for topsy- turvy learning relationships between teachers and students in the formal school setting, so the internet enables those seeking medical information to engage with health professionals far more knowledgeably than ever before. In some cases, patients may have more information than the professionals because of their ability to search for information that otherwise might have been difficult to obtain. Of course, part of the problem may be that novices may have difficulty determining the validity of information available through the internet.

The digital age has certainly impacted upon how we spend our time away from work. The concept of leisure time has had an interesting history in its linkage to changes in the workplace setting, the development of the weekend (Rybczynski, 1991), the advent of new technologies, and medical advances lengthening life expectancies. With more supposed "free time" available, people have turned to a variety of activities to occupy their time. Computer technology has made accessible a number of opportunities for amusement and for learning new information and to develop new skills in political, social, economic and personal areas of people's lives.

As people have more time available, they often turn to activities that relate to their family and other personal interests. One of the fascinating uses of the internet has been the increasing interest in amateur genealogy, the practice of studying family origins, in order to create family trees and pedigree charts.Veale presents a chapter in which she discusses the various ways in which the internet is an environment for learning genealogical methods. As part of her inquiry, she obtained fifteen million websites in response to her Google exploration of the topic. Her survey disclosed three emerging themes in the employment of the internet for genealogical purposes. The *scholarly* theme is represented by formal courses run by various groups-for example, the University of Toronto, in conjunction with National Institute of Genealogical Studies, offers the oldest web-based certificate program. The *topical* theme is represented by companies and individuals offering less scholarly, often more topical stand-alone web pages. This material may include libraries of articles

or webpages and tutorials for novices to the area. The *ad hoc* theme includes mailing lists, online forums, newsgroups, and presentations of personal situations and advice asking appear with little pre-planned structure. Veale believes that too much of the online curriculum in this area uses pre-internet traditional instructional methods and she suggests a variety of approaches that would more readily take advantage of the Internet's possibilities, especially to teach problem-solving.

De Castell and Jensen present observations about the importance of the learner's attention in any learning context, and focus on its relevance to the digital milieu. They discuss the significance of childrens' frames of perception in the conjunction of the entertainment and education settings by concentrating on the important area of gaming. They believe that the ability of video games to capture and hold attention has theoretical implications for the impact of newer technologies on structures and forms of knowledge. The tasks, puzzles and questions associated with games has both commercial and intellectual merits. The educational implications are to look to play to influence pleasure, choice and immersion, speed and efficiency of learning, meaningfulness of topics, subject matter and the learners' experiences.

Cook suggests that even though there has been an enormous impact of the digital world on leisure life, there hasn't been commensurate inquiry about virtual leisure industries. Although her chapter discusses issues in teaching about leisure industries at the university level (potentially suggesting placement in the previous section dealing with schooling) she incorporates an incredible array of information about their importance to self expression, popular culture and social life. Some of these areas involve sport participation and fan activity, organized travel and tourism, gambling, sex, shopping, fashion and design, food and hospitality, and computer games. She includes two in-depth examples of sport and online sex-pornography and the sex industries-from her online curriculum, In the process, she raises some interesting curricular value issues around contradictory themes of public acceptance/censorship (based on moral or legal criteria), public knowledge/ private information, production/consumption. An important observation is the suggestion that the internet (and the social order producing it) is a space for contestations, re-articulations and convergences.

Digital technology offers possibilities for creating intriguing learning settings for shaping political and social identities. Balnaves and his colleagues suggest that the decline in traditional civic participation can be countered by using participatory technologies in the form of interactive media as part of an e-democracy movement. They see media as a liminal space for encouraging both individual and collaborative learning and for mobilizing digital resources. For example, internet and interactive TV are being used for citizen polling, electronic town meetings and televoting for mass decision-making. These authors raise an interesting contradiction, one that suggests a disconnect between the explicit and hidden curricula around e-democracy. How can the

digital world reduce differences between representational government structures and the voter-citizen when the internet is controlled by political forces? The curriculum of these new learning environments is seen as a complex triangulation among medium, the learning environments in which people learn to use the medium, and the reality of how a medium is used. One result could be a more independent citizenship learner who participates in civil disobedience through hacktivism. This is in keeping with seeing it as a very positive activity, a very different view than one ordinarily associated with hacktivism, as enunciated in a later chapter by Levesque.

An activity practiced by all societies is memorialization, the process of formulating and reformulating images of valued cultural practices and icons. This generally conjures up images of statues and other time and space related memorial settings. One recent event that has shaken the world was the destruction of The World Trade Center in NYC, and there have been many attempts at trying to memorialize this horrific event. Shepard's chapter on the Sonic Memorial provides an opportunity to re-think conventions of memorial-making that are locked into concrete time/space/place considerations and to suggest the efficacy of creating three-dimensional virtual learning environments for nuanced, meditative, non-linear learning moments.He describes the process of developing a site which used incredibly diverse material contributed by individuals from around the world to create sound artifacts, where this sense becomes the learner's compass. The site has three purposes; to continue building an archive through online web interface; to create a catalogue (curriculum materials) for future use; and create a place of remembrance recreating before, during and after 9/11. This virtual learning site is the creation of a distinct space/place, it allows learners to drive the curriculum, offers multiple points of entry, engages the learner as a participant and fosters social collaboration.

Another potential social collaborative environment is the development of diasporic web communities as learning spaces. Over the centuries, individuals and whole groups of people have been forced or have voluntarily migrated to other locations, potentially creating difficulties in the new setting and at the same time with potential loss of features of the homeland. Virtual learning sites have been developed for individuals to learn and possibly re-learn what it means to be an immigrant, how to understand and interpret immigrant experience, and to imagine a relationship between homeland and host-land. Nincic's chapter questions the subject matter of what diaspora is, and suggests the investigation of discourses around cyberspace, diaspora-related themes and their particular configurations. She dispels the myth, a form of the hidden curriculum, of the homogeneity of the image of diaspora. In questioning the romantic notion of the memory of homeland, she posits the view of a complex community that is influenced by local economic, social and political conditions in both the homeland and the host-land.

Another identity issue is how VLE's provide a setting for the production of racial identity. Altman and Gajjala see this as part of the larger platform

of the online production of self, a curriculum of the interaction of the production of cultural experiences and the materiality of virtuality. They point out that meaning-making is made through doing, the acts of coding, programming, typing oneself into existence and building objects of self. Their research suggests that in order to understand this curriculum of meaning-making, researchers have to be engaged in production of culture and subjectivity. In particular, it is important to understand how features of the technological milieu of VLE's engage with IRL environments, and to focus on learners' cultural competencies and literacies.

What we choose to identify with is a function of exposure to various forms of popular culture. Our fantasy lives are products of cultural production and reproduction brought about through a combination of what we choose or not choose to engage with (null curriculum) and the curriculum (mostly hidden) of corporations and other entities engaged in the manufacture of popular cultural images. Perhaps the most well known icons are associated with the Disney world, a land that uses fantasy to create virtual learning environments without necessarily using digital technology. In his chapter, Trifonas reprises his review of Giroux's *The Mouse That Roared* (1999) and believes that corporations use media as a pedagogical device for engaging the public in real moments of miseducative teaching/learning of cultural reproduction. In his view, Disney represents possible worlds with ideology, which appeals to common sense while actually shaping political policies and programs that serve corporate interests. It is important to reclaim the space of public memory by determining how to read the text and to understand the significance of the signs of the 'squeaky clean image, false happiness and cartoonish social imagery'. Another cultural icon that has had world-wide appeal is the imagined community of Avonlea in Canada developed by Lucy Maud Montgomery who wrote about Anne of Green Gables in books and short stories. Lefebvre describes the Avonlea site as constructed from the real and imagined in Montgomery's life, controlled by heirs and trademarks, so that she has become a cultural ideological commodity separate from the individual. Like Disney, this icon has been constructed as fiction, representing a copy of an original that didn't exist. This chapter discusses the simulated online communities that have formed that represent a "regional idyll", a genre of that time which provided sentimental relief from increasing urbanization and industrialization. Internet users of these virtual sites engage in, and with, replicas that are free of context, history, nation, religion and culture. These virtual learning environments allow other peoples to populate this milieu, and in borrowing from the Disney construction, Lefebvre suggests that this helps to conflate Montgomery's world into 'a small world after all'.

If the Disney and Montgomery examples suggest popular culture virtual learning environments where learners are in milieus manipulated by external forces, fan fiction and slash fiction represent milieus created by and contributed to, learners themselves. Mazur discusses how the internet is a rich

environment for fan fiction, which is virtual unauthorized writing of stories with bootlegged characters and settings from a variety of media. For example, Fanfiction.net is a site containing hundreds of categories with thousands of stories mostly written by women for the love of: the story, the process of writing, particular characters, and community. It represents one big writing workshop allowing for interactive feedback, and is a contradictory learning environment born from plagiarism but with built-in detectors for standards of writing. This site suggests useful examples of how learners can engage with the various Curricula of the internet (Initiation, Governance, Access, Membership). Slash fiction represents a subset of fan fiction using same sex romantic pairings. Bury's chapter discusses the complex process of making meanings and pleasures within this virtual genre, best understood as 'queer romance'. There are parallels with virtual learning environments, since a learner's cultural and linguistic resources are literally on the line, there is engagement with canonical text and issues of legitimate interpretation, and there is the tension of keeping standards, especially for groups often seen as outsiders. The chapter devotes space mapping out the performance of gender, sexuality and class on an e-mailing list of fans of a Canadian TV series, Due South, where action takes place in Canada and the U.S. She suggests that pleasures of those engaged with this virtual site go beyond 'queer desire' but to issues of high standards of writing and adherence to the canon of the primary text. Slash fiction represents just one of many ways in which gender issues get played out in the virtual world (Turkle, 1995).

Section Four: Challenges for Virtual Learning Environments

The previous material represented contributions suggesting a range of discourses about virtual learning environments. The last part of the Handbook, **Section Four**, **Challenges for Virtual Learning Environments**, looks at a variety of issues generated by ways of engaging with the internet, innovative forms and technical advances, new roles and settings, and research about virtual learning environments. The expectation is that this will stimulate an expansion of perspectives and highlight challenges for the future. In orienting these challenges and issues, I take editorial license with Gadamer's view that "... all understanding is a fusion of horizons" (Gadamer, 1960, 302). Since he suggested that this fusion includes all that can be seen from a particular perspective, I choose to define horizon as that which fuses past, present and future. The preconceptions of the past are constantly helping to shape the present which together form predispositions to future understandings and actions. Although previous entries have touched upon material from the past, the present and even the future, this section of the Handbook deliberately contains chapters that bring in perspectives from all three considerations in taking up some of the challenges and possibilities for VLE's.

Fantasy provides the leitmotif for the beginning and penultimate contributions to this section. The contributions by Noon and Zizek represent two pieces that illustrate the importance of past images in the fusion of horizons. Noon's brief literary gem provocatively illustrates what many have considered to be the dark side of the world of virtual reality; an image that often influences feelings of mistrust in what technology may have wrought. The development of a thought recognition system coupled with a usable feedback loop created an imaginary about dreams that leads to the most extreme mis-educative experience, the destruction of mind. This science fiction image of virtual life has implications for how we view the roles of business and government in shaping future virtual learning settings. Zizek's contribution serves as the introduction to the final chapter.

Previous material in the Handbook discussed several features of the structure of the internet. However, these discussions are at a conceptual level suggesting an outline for a Curriculum of the internet. More concrete procedures are needed for users to realistically understand its politics and implications. Dodge and Kitchin describe a geographic guide for internet exploration and mapping. They see it as a set of techniques and tools for people to cope with several features of the internet, including dealing with worms and viruses and developments in search engine capabilities. They also point to potential difficulties that may lie ahead in the expansion of internet technologies. NET: GEOGRAPHY FAQ provides a useful set of virtual learning tools for interrogating the media that supports virtual learning itself.

Another example of providing curriculum material about the internet is found in Levesque's chapter on hacktivism. Discussion about hacking and hackers has been an important part of the story of the internet, and she clarifies the distinction between crackers, those who break in for destructive ends, and hackers who use their skills to invent, modify and refine systems. Often, hacker activity brings about unintended consequences from the original aims for a system. The origins of hacktivism derive from the blending of this work with those who believe that people should have free access to this virtual learning environment. Hacktivists believe that the internet is a site of contestation, and their efforts are an attempt to flush out the hidden curriculum as a reaction to perceived oppressive use of laws and technologies by private corporations and governments for monitor and control issues. Levesque provides useful content about issues and techniques associated with censorship and surveillance. One of the interesting contradictions is that some of this effort may be illegal, but seen to be supportive of broader principles of human rights.

There have been several recent innovative developments in ways that the internet is used for web publishing purposes. Central to this work is the development of weblogs and wikis, which allow for flexible opportunities for individuals and groups. These opportunities potentially enable much more control of the internet through personal expression and by making the technology openly available to all interested parties. Halavais discusses web-based logs,

or blogs, and wikis as important learning environments in student-centered education. He discusses his personal experiences in determining that students should not only learn about the technology but the social practices that are so much a part of these sites. Weblogs present challenges to educators because they should be used in a milieu emphasizing a constructionist view of learning where different discourses and perspectives interact with one another, in a spirit of co-learning. Halevais suggests that each of the curriculum commonplaces need to be addressed in re-formulating traditional views of educational environments. A very different milieu for blog application is how digital media are helping to re-shape both text and professional life in the academic world. Barr discusses how weblogs have potential for changing procedures in academic publishing that have relied upon gatekeeper, blind peer-reviewed publications as the currency for evaluating performance. He suggests that the procedural organization of blogs may more readily accomplish the goal of evaluating a researcher's professional success. This potential change in the milieu of the academy has vast implications for the curriculum associated with becoming an academic researcher.

Another fully editable website is the wiki, previously discussed in the description of Wikipedia. Augar and her colleagues present a description of wikis, how they work, how their features make them highly suitable as virtual learning environments, and present examples of practical application and research situations. What makes them desirable as useful collaborative sites is their flexibility for different purposes: they can support a simple edit style that uses an editing toolbar, or for more sophisticated purposes, knowledge of wiki syntax. For teaching and learning online, more complex features such as authentication and tracking are necessary for tracing edits back to an author that allows for an assessment process, and also securing content against possible misuse. Wiki sites offer useful information for novices in the Curricula of Initiation and Membership.

Peer-to-peer networking represents an important use for virtual learning environments. Logie presents a fascinating account of the Napster music story weaving past, present and future themes about a site that became in 1999 the most popular file-transfer service on the internet at the time and many users' initiation into virtual learning environments. The story demonstrates the importance of larger social, political and economic influences on the Curriculum of the Net. A history of legal and political events moved this concept from free to pay-for-play, peer-to-peer networking, and the story became a two-dimensional characterization of a battle between 'pirates" and "property-holders". It has led to a free site, Kazaa Media Desktop, which has become one of the most downloaded software in internet history. Additionally, it has led to the "napsterization" of other cultural artifacts (film, video, photographic files). Logie believes that 'partying like it's still 1999", that is, downloading without compunction, can't be sustained and that the academy has to provide useful procedures and examples of virtual learning environments.

An important activity in any knowledge-oriented endeavor is the ability to incorporate inquiry into its landscape. With all the activities associated with developments in virtual learning environments it is appropriate that research should assume an important role in looking at challenges and future considerations. Several chapters have been included to represent some recent research work that provides a sense of the diversity in the application of technologies to collaborative learning settings. Sosnoski and colleagues present a fascinating description of the development of "Virtual Harlem", a collaborative learning environment that models the subject of life in the Harlem, NY of the 1920's and 1930's. It represents an achievement of a variety of scholars in the sciences and arts that has salience for both teaching and research purposes. Its importance lies in the development of a networked environment whose ongoing research utilizes video, audio and database technologies to provide collaborative learning environments for design, interactive art and data visualization. It's an excellent example of a curriculum in action, one that brings together an integration of the curriculum commonplaces. Pea's work specifically concentrates on the development of a digital video collaboration for research communities. He describes some of the theoretical and technological considerations in creating the Diver Project, a unique software system for capturing, annotating and sharing perspectives (which he labels as dives) on activities video-recorded IRL. In the world of virtual learning environments, this represents a movement away from a broadcast-centric and asymmetric use of video and has important implications for elaborating knowledge building in the life sciences from application of video sources and for practical consumer video communication applications. Both possibilities address a constructivist vision of future learners moving from the role of consumer to one of active participation.

A different example of the integration of technology with social activity is the development of ePresence Interactive Media System, a virtual learning environment created through application of webcasting. Zijdemans and her colleagues describe an early example of its use in supporting live interactions of experts and others in an early childhood education forum. ePresence demonstrates how knowledge media differs from traditional media in the ability to make major modifications in the medium through reasonably non-complicated software changes. Several changes in the technology have made its use as a VLE much more user and research friendly. Among these characteristics is ability for attendees at an event to participate with remote viewers, using Voice Over Internet Protocol (VOIP) that allows for voice contributions from remote viewers, sophisticated archive searching after the event, and linking online course settings with the live events and archives, an invaluable teaching-learning tool.

Previous mention was made of the concept of the "invisible college", a limited community of scholars, and how the digital age has been transforming the communication patterns of academia. Wellman and his colleagues provide

useful information about previous research of networked scholarship in academic communities. They discuss how the application of social network analysis procedures to computer-supported networks: determine how different kinds of relationships interrelate, detect structural patterns, and analyze the implications of these structural patterns for behaviors of network members. They include a research analysis of TechNet, a scholarly network that has developed into a community of practice for academics from the humanities, sciences and social sciences. An important future implication of this work is that curriculum designers of online educational communities and other forms of virtual learning environments should consider the social networks of community members, and how various media usage and network structures impact upon mutual peer-to-peer learning.

Bruckman offers a very different example of research into the behaviors of users in online communities. What is special about her work is that she collected physical data on the actual activities that users engaged in while online. The virtual learning environment she studied, MOOSE Crossing, a text-based MUD, offered the opportunity to collect log file data, a comprehensive record of all commands typed by users. This raises the question of the kinds of data and methods of data collection that are most compatible with trying to inquire into the digital world. Much of the previous research has been similar to that conducted using procedures from real-life settings, such as the use of face-to face interviews. Are there features of the digital world which require different types of data and data collection procedures in order to learn as much about life "in the screen" as life "on the screen"? Bruckman's research offers data procedures collected on the interaction between the user and the computer screen. She blends both quantitative and qualitative techniques, uses both manual and automated methods of analysis, and recognizes the importance of ethical considerations in recording and analyzing log file data. Issues of potential invasion of privacy and rights of human subjects research is an important curriculum area that needs to be more fully developed for researchers investigating virtual learning environments.

The issue of the digital divide, disparities in who has access to the virtual world, is a refrain that cuts across past, present and future moments. Each of the next three chapters presents diverse approaches to discussing and inquiring into aspects of this divide. Very different classes of learners are discussed: women, those from developing countries, and ordinary citizens in a democracy. Dwight, Boler and Sears contribute an imaginative piece looking at the visual images that shape our interpretations leading to myths about the ways in which women are perceived to be disadvantaged in the digital world. They inquire into the ways that the popular discourses generated by advertising and Hollywood shape the public imaginary of cultural stereotypes around gender and power in education and technology. Rather than accepting these 'taken-for-granted' stereotypes, their work demonstrates alternative possibilities for how women inhabit and re-define cyberspace through

the development of creative spaces. This has very important implications for the curriculum about virtual learning for educators, and how representations of alternative imaginaries should be infused into the curriculum of their students.

Dicum offers an important discussion of the expectations for the developed world's digital technology as an ingredient in ameliorating the digital divide represented in less and least developed areas of the world. Using information from several examples of the use of such technology in community development projects in these areas, she reports that not enough attention has been paid to local ecological issues. The centralizing tendency of globalization efforts in the use of the internet needs to consider discourses about the important theories, principles and knowledge gleaned from the "development" field. If the internet and other technologies are to have a positive influence on these areas, respect must be given to the needs, resources and other factors that help to define a local community's reality. This requires that assumptions from the developed world be questioned, and that consideration be given to complex curriculum interactions of learner, milieu, type of pedagogy and the nature of the required content in less and least developed communities.

A different issue about the digital divide is discussed in Allen's chapter. It concerns the potential impact of the development of broadband technology on Australian citizens. The issue is how the audience for this technology is being shaped, often well before the technology is either developed or available. This addresses the possible creation of a digital divide between those who may, and those who may not, have access to this technology. Allen looks beneath the proposed claims for a broadband future that allows for distributed, audio-visually enhanced rich virtual learning environments and demonstrates the importance of understanding the setting for such developments. He illustrates the influence of political, economic and social forces to create an "imaginary' about a technology and its perceived future usefulness. This raises important questions about how forces in a setting may help to shape images of the learner.

Zizek's "The Matrix, or, the two sides of perversion" is deliberately placed as the penultimate contribution to this section, and indeed, The Handbook. His exploration of the real and the virtual juxtaposes the complexities of the mind/body relationship. This provides a dramatic introduction to the final contribution, Mann's description of the reality of the individual as cyborg. He describes his experiences of constructing himself as a computer-based learning environment over a thirty-year period as an inventor, builder and user of several wearable computing and personal technological systems. The importance of this life's work is in a conception of "being" at one with technology, developing an epistemology of choice, "existemology", and constructing an in-real-life curriculum for students to transform themselves into virtual learning environments. In addition to the imagery offered by Zizek, readers may also interpret this extreme view of virtual learning environments through the prisms offered by other authors in this Handbook. We have come full circle in

The Handbook: from Burbules who questions the concept of virtual learning to Mann who has become a VLE.

It also makes one wonder about how much we have traveled since the Allegory of the Cave:

> Will he not fancy that the shadows which he formerly saw are truer than the objects which are now shown to him? (Plato, 1963, 547)

SOME FINAL THOUGHTS BEFORE BEGINNING

This volume represents a kaleidoscope of ideas, topics, points of view- brought together as one way of providing coherence to the evolving concept of virtual learning environments. My brief introduction is but a mere sketch compared with the richness of the words and worlds of the authors, both individually and collectively that the reader will engage with in the following chapters. Although many perspectives are included, The Handbook has been created through a particular prism of interpretation, one that emanates from educational and curriculum discourses. However, any prism offers a narrow range, one subject to the concept of the null curriculum. By including this set of material, we obviously have excluded other worthy possibilities for expanding our elucidation of this area. Our expectation is that the current project will stimulate others to contribute their voices in that quest.

To that end, I will offer a few suggestions that emanate from a consideration of both the actual, and the null curricula, of The Handbook. First, if there is merit in using a learning and curriculum prism, perhaps others will re-work it to include ideas and perspectives not necessarily included in my current vision. Other prisms could be used to explore other facets of the kaleidoscope of virtual learning environments. This may require a transciplinary approach, one that honors eclecticism in bringing together viewpoints regarding knowledge, media, design from the arts, humanities, social sciences and sciences. (A good example already exists in pioneering work by Turkle (1984, 1995) on looking at issues of the self and identity in the computer age.) There should be recognition that issues of learning require dialogue involving the theoretical and practical arts.

A second consideration is that the examples and references to technology included in this project are but a tip of the iceberg of past and present developments, let alone a future imaginary of what may be possible. Developments in the wired and wireless worlds, and the ways that different technologies can and may be integrated only hint at the possibilities for learning environments. Thus, some of this present and future technology should be creatively developed within the concept of the VLE. However, if there is one theme that emerges as a constant refrain from our authors, and represents a third , and crucial, suggestion, is that the technical is inextricably integrated with

the social milieu. Since technology doesn't operate in a vacuum, the social context in all its complexity is an essential ingredient in any technological considerations in the virtual learning environment equation.

As a fourth consideration, the curriculum commonplaces suggest that this VLE equation represents a set of complex interactions among images of the learner, content, teaching strategy, and the milieu. The importance of the learner and its' interactions with the others should be highlighted in future work, and might include a more detailed delineation from a constructivist perspective of the many roles possible for learners (student, teacher, developer, researcher, citizen) in all facets of virtual learning. This is especially so if the digital age is to bring about a sense of agency in dealing with issues arising from hidden curricula. Finding innovative ways for learners to participate in the various curricula of virtual learning environments might be a useful strategy for bridging the many digital divides.

A fifth suggestion is the exploration of the implications of the conceptual distinction between virtual learning and learning virtually for an understanding of the roles of fantasy, imagination and creativity in developing learning environments. What can we learn from the best practices of learning virtually that provides examples for how the digital environment should go beyond the fairly traditional, indeed pedestrian, applications that just mimic rote learning models? Equally as well, can exemplary forms of newer technology enhance the more successful visions of learning virtually?

Progress in any field is enriched and transformed by the appropriate application of procedures of inquiry. A sixth consideration is how research in, and about, virtual learning environments can be transformative. How can research guide the determination of appropriate questions to formulate, especially for the different locations of IRL, digital and virtual? Does the virtual world require methods of inquiry different from in-real-life situations? Although there is excellent material available about research in this setting (for example, Jones, 1998) most of the studies have been conducted IRL, typically using face-to-face procedures. How can we develop and use procedures for looking at the digital location of computer-mediated interactions between the user and the computer screen? Even more ambitious would be the development and use of procedures for VLE's in virtual locations, such as MOO's and Massive Role-Playing Games (MRPG), where life is constructed in the screen itself. In addition to the important issues about techniques and their applications, attention must be paid to the daunting ethical challenges that arise in creating and studying VLE's in both digital and virtual locations.

A final suggestion (but by no means exhaustive of many more possible) relates to the larger milieu of how our many worlds will continue to change as a result of the virtual environment. What previously had been relatively impermeable, socially constructed boundaries in our lives (work, home, school, play) has radically been altered in many cultures so that the screens surrounding role, space, place and activity have become quite porous. This has important

implications for how the various, previously segmented learning environments which we inhabit have shifted to a more holistic, larger unit of 'the curriculum of life'. This potentially alters how we conceive of, construct and re-construct learning environments for personal, family, institutional, local community, national and global levels. What possibilities hold for developing VLE's for crafting public and personal imaginaries for all facets of life, that are just and fair, and enable learners to create diverse forms of knowledge through the transformation of their experiences?

> . . . transcendence, the conscious experience of hierarchic integration where what was before our whole world is transformed into but one of a multidimensional array of worlds to experience. (Kolb, 1984, 222)

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