Media Technologies, Cognition And Consciousness-Expansion

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Abstract

Our attitudes towards and relationship with technology is increasingly becoming a ground for debate as to the positive or negative effects upon society. The development of newer forms of media communication technologies are continually redefining the ways in which we interact and participate in symbolic systems.

This Honours Thesis examines the fields of philosophy, developmental psychology, neuropsychology, cognitive theory, semiotics and media theory to explore our human relationship with technology and provide an integrative approach for re-examining our attitudes towards technology.

An investigation into various cultures' relationships with technological tools as a means of seeking knowledge will reveal how various technological artefacts can be used to amplify cognition and lead us to internalise mental skills, expanding our consciousness. From the loom to the written word we shall see a relationship emerge between human cognition and self-conception and the development of technology.

Investigations in developmental cognitive theory will reveal criticisms of the current developmental model as proposed by Piaget which states there is an end-point to human cognitive development. Examining an alternative developmental theory, we focus on the developmental model as drawn from Vedic psychology and practiced in the technique of Transcendental Meditation (TM). This technique operates as a 'cultural amplifier' for cognitive development beyond language based conceptual levels of thought to post-conceptual higher stages of consciousness. Reflecting on the work of Walter Ong and his notion of writing as a technology as consciousness-expanding, we pose the question. Do new media technologies (such as video games, virtual reality and multimedia environments) hold the potentialities to act as a 'cultural amplifier' towards cognitive development and what is regarded as higher states of consciousness? A notion such as this blurs traditional lines between the mental and material, cognitive and non cognitive

and biology and culture and provides an understanding for re-examining our attitudes and interactions with technology.

Contents

Introduction

In our highly technologised world, through our daily lives we are constantly engaged with technology. The contemporary western focus on technology for improved effectiveness and efficiency almost demands us to continue our reach by learning to engage with new technologies. Faster communication capabilities and the increased power of the silicon chip have led to new communication and entertainment possibilities. Multiple fixed and wireless media forms have emerged: video games, virtual reality, multimedia installations and environments just to name a few. In the media our relationship with technology tends to frame its use as an immensely positive and empowering force extending and improving our lives. Indeed, it appears as this may well be true. Psychologists from the University of Sydney have been conducting research that indicates methods of treating people with ADHD disorders by using off-the-shelf video games[1]. Other perspectives cast a significantly different light on the impact of technology. Newer forms of computer mediated technologies appear to be accompanied by warning sirens over more traditional forms such as the television or writing. The work of scientist Susan Greenfield in her books *Tomorrows People (2003)* and *ID: The Quest for Identity in the 21st Century (2008)* call for serious examination of the impact these technologies are having upon our brains and the way we think.

It certainly can be difficult to discern where we stand with technology. The aim of this thesis is to examine such a relationship and its impact upon our understanding of the world, the way we think and the way we learn. Focusing on the media technology of the written word we shall examine its impact as a consciousness expanding technology. Chapter two will examine Thomas Kuhn's notion of paradigms and paradigmatic shifts as understood and discussed in the work of Stanislav Grof. He examines the structure of Newtonian-Cartesian paradigm and its implication upon our conception and systems of knowledge. Considering this as a subtext, we examine theories within cognitive

[1] *Computer Games to Help Kids with ADHD* from T*he Australian Newspaper.* Site: http://www.theaustralian.news.com.au/story/0,25197,23869261-5013404,00.html, by Wilson, Lauren. June 16th 2008, Accessed 1st September 2008.

psychology for the end-point of human cognitive development and contrast it with the hierarchical developmental model as formulated through Vedic Psychology. What will be illustrated here is the theory for higher stages of consciousness and cognitive development beyond traditional end-point for human cognitive development. Chapter three will then attempts to answer the question: Do new media products such as video games, virtual reality, multimedia environments and the internet have the potentiality to assist in consciousness expansion? Focusing on an ecological theory of perception and the study of presence and immersion in mediated environments it will be shown that there is considerable data to suggest a possible relation to the effects of cognitive development. This poses the possibility of future media technologies designed for the development of higher stages of consciousness.

Taking an integrative approach the thesis will draw from research and theory from a wide variety of disciplines mainly over the last 40-50 years to examine modern technology and modern consciousness. The fields of philosophy, phenomenology, developmental psychology, media theory, neuropsychology, cognitive theory, transpersonal psychology and Vedic psychology will assist in revealing the dynamic relationships we have between our technological tools, human development and our ecological self-knowledge.

Chapter 1

Technological Understanding

In an attempt to further understand our world, questions such as 'what is technology?' and 'how does technology fit as a part of our ecological environment?' are prominent to our modern existence in the western world. Through scientific development our world has become increasingly mediated and manipulated by the technologies which surround us. Take the example of the automobile, a technology which manipulates the physical properties of combustible liquids to access potential kinetic energy to traverse space in shorter periods of time. To correctly use technological artefacts such as an automobile we must be able to interpret and understand the various symbolic systems which make up the skills set required to capably drive the car. The driving mechanism (the steering wheel, indicators, accelerator, brakes and gear box) in combination with road rules, road signs and learned value-judgements (on speed, time, acceleration and deceleration) form the skills set required to drive. The task of driving a car may not appear to be all that difficult; indeed the automobile is a global technological phenomenon. It is a phenomenon of travel which alone has implications upon the way we live in our world. The roads, highways, suburban districts, business districts and industrial districts structure and organisation all have a connection to the development of the automobile. This is but one brief example of the interconnectedness between our world and the technological developments we use. Arguments exploring such relationships can be seen to fall towards polar arguments towards technological determinism or the social construction of technology. In an attempt to move beyond the dichotomy of a technological determinist and the social construction viewpoint as ways of interpreting our relationship with technology, this thesis draws on other perspectives from a variety of disciplines to analyse our relationship with technology.

Martin Heidegger's philosophical inquiry in the1954 publication *The Question Concerning Technology* is a regularly cited work for modern studies on technology. In

dissecting technology Heidegger discusses the traditional Greek philosophical causes of technology.

1) *Causa materialis*: the material, the matter out of which the artefact is made
2) *Causa formalis*: the form, the shape the material enters
3) *Causa finalis*: the end, the social use in relation to the artefacts required form and matter.
4) *Causa efficiens*: what brings about the finished artefact.

(Heidegger 1977:6)

This provides a solid place to begin to dissect a technology, but, as Heidegger points out, causality of unrepresented technology is veiled in darkness and uncertainty. Unknown causality renders this definition of technology as obscure and groundless (6-7). Heidegger moves on to suggest that technology instead is a mode of revealing and of enframing the world. Enframing places man into a position to reveal the real and place it in a standing-reserve. The standing-reserve or *bestand* consists of objects with no inherent value apart from their human use. For Heidegger the essence of technology is in the revealing and enframing a multiplicity of interpretations of reality. He suggests that to regard technology as neutral artefacts makes us utterly blind to the essence of technology (10-19). Heidegger's conception of technology is split in to traditional technology and modern technology. Modern technology exploits the earth in a new way allowing new forms of opening up, storage, transformation, distributing, switching and of revealing. It is their ability to unlock basic physical energies and to store and retrieve them in abstract, nonsensuous forms which provide new potentialities. Modern technology and its developments are accompanied with what is called *Ge-stell* framework. A 'technological attitude towards the world', constantly in a state of flux, *Ge-stell* reveals, sets up and challenges humans to reveal reality by mode of ordering, as B*estand'*. (50-53).

Reflections upon Heidegger's work help provide a better framework for understanding the position which Heidegger's work occupies. In *Thinking Through Technology,* Carl

Mitcham illustrates that Heidegger's work is from a Socratic tradition of raising more question rather than providing answers. But what Heidegger's work does is illustrate an understanding of our relationship with technology as a process of revealing or enframing a multiplicity of interpretation of reality. This implies a far more complex relationship we humans have with technology. But what does it mean that technology and our Ge-stell (technological attitude towards the world) reveal reality? How do we come to understand this technologised world as it enframes all we see?

Technology and Human Self-Conception

A thesis by American philosopher and post-phenomenologist Don Ihde (1990) explores the questions of how we as humans come to interpret ourselves within a technological culture. Exploring traditional philosophical ground, Ihde reveals that the 'platonist' and 'ideal' forms tend to view technology as the outcome and result of ideas, creating the view of technology as an 'applied science' with science in the form of theory as a root foundation of technology. This view can be seen to tempt philosophers to overlook fundamental aspects and fundamental questions of technology.

Ihde uses a set of traditions within philosophy or what he calls praxis (process) philosophies to address technology at a fundamental level. Marxist theory, existentialism and phenomenology are shown to infer that some form of action precedes or grounds conception.

> [Karl] Marx argues human beings interact with their environment and with each other within some fundamental set of productive relations and actions. Humans are what they make….
>
> [Jean-Paul] Sartre argues humans project a project into the world and then seek to become that project. Humans are what they do….

> [John] Dewey argues humans are primarily problem orientated, and their very intelligence is a tool for solving problems posed by their environments. Humans are what they do in terms of problems….
>
> (1990:125)

Praxis (process) is what grounds the relationship between humans and their world. Yet this does not answer the question of how do humans interpret themselves within a technological culture? To answer this question he begins by contrasting the framework of Descartes' *Cogito ergo sum*, 'I think, therefore I am', Husserl's Suspension and the Phenomenological framework for self-conception. Emerging from the comparison is the contemporary phenomenological understanding of the self as tied to an understanding of the world. The interrogations into this mode of understanding reveals that "if I am always already in a world, and if it is by means of the world that I came to understand myself, then there is an essential sense in which self-understanding is always tied to an understanding of the world." (125)

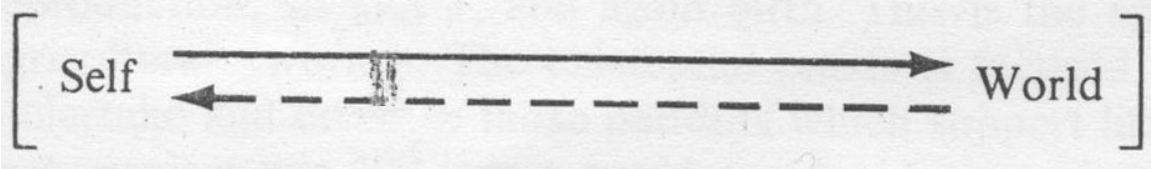

Figure 1.1 Diagrammatic representation of the Phenomenological understanding of the self (128)

Moving on, Ihde examines specific features of what may be called a 'technological world' and of self-understanding in that context. This is done through an investigation of three idealised examples of differing cultural human-world correlations. Of the three each has varying degrees of technological artefacts, a partly nomadic Amerindian society, an agricultural society and a contemporary technologised world. The partly nomadic Amerindian society is a hunting and gathering society, it embodies genuine knowledge about what food is good to eat, what products are good for shelter and clothing, migratory routes, animal behaviour and more. In The agricultural society animal and plant life have been domesticated and basic patterns of life revolve around sets of rhythms and relations

which follow the grain and animal production to support human life. The agricultural cycle is of planting, growth, maturation, harvest, dormancy and return to planting. The third society differs again being a technological world where the nomadic and agricultural projections have decayed in favour of mechanisation and applied scientific structures. In the technological world even our bodies are interpreted along mechanistic lines, muscle movement as leavers, thought as electrical signals and the heart as a pump. Ihde suggests that an *existential praxis* is a fundamental mode of human-world correlations, it illustrates a concrete pattern of actions which always include relations with things of a material sort. It is this that grounds the relationship between humans and their world, where our bodies are reflected along technological lines. Our bodies reflect a self-understanding of the human ecological environment as it becomes 'like' the 'world' which is projected. The Nomadic society embodies an understanding of their world through the rituals, processes and mysticism they participated. An agricultural society reflects the cyclical life pattern and embodies a life support and enhancement process and a modern technological world is interpreted along technological lines, mechanical metaphors and applied scientific structures. All of this knowledge occurs in a projective-reflexive process (127-135). If we understand our world along technological lines, how does such enframing occur?

Tools, Artefacts and Cognition

In an attempt to determine our relationship with technology and our cognitive development there is a large selection of works which elaborate on such patterns. Technological artefacts can amplify human capabilities whether they are motor, sensory or cognitive in nature. Tools that engage and affect our cognitive processes employ sets of symbolic systems for representing entities, quantities and relationships.

The basic impact of technology on cognition can be seen across any number of technological objects. They occupy certain processes such as:

- Extended sensory perception
- Extended motor and manipulation skills
- Memory Aids & Prospective Memory Aids
- Communication

- Collaboration and decision making
- Information finding: Agents functioning as alter-egos for users

What is illustrated here is that technological artefacts are functioning as information processors for humans where even the basic technological aids include a symbolic system which amplifies cognition. Considering our world is very much saturated with technological tools and artefacts it is obvious to see they enrich our cognitive understanding of the universe immeasurably (Nickerson 2005).

Ashley Maynard & Kaveri Subrahmanyam (2005) undertook an investigation into the use of technology across different cultures. By tracing technologies from different cultural worlds they illustrate ways in which a culture's technologies (tools inclusive) both influence and reflect the forms of intelligence that are developed and valued in that culture. They examined two tools very much separated by time and culture, the loom, a device for weaving thread and the computer. The authors illustrate that both tools reflect the social and cognitive development at a particular point in history. Cognitive skills associated with using a loom include representation and mental transformation skills while playing a computer game has strong visual attentional, spatial and iconic skills. The loom and computer forge dynamic relationships between cognitive skills and development (intelligence), cultural practices and ecological adaptation.

> [I]f we define intelligence as successful behavioural adaptation to an ecological niche; tools are an essential component of human adaptation to a variety of different niches. Just as tools adapt to ecological niches, cognitive skills adapt tools and to the social practices in which they are embedded. (29-30)

In addition, what is made evident is that as technologies develop they lead us to an internalisation of the mental skills required, skills that are required to operate and interpret the artefact. Skills are embedded in a cultures implicit definition of intelligence until such time when the skill is no longer required in its ecological niche. It is important to say at this point that tools and their ecological settings are not constants, even within a single cultural context – their interaction is permanently in flux. Interestingly this constant negotiation between tools for intelligence and their ecological environment can in ways reflect Heidegger's notion of Ge-stell or technological attitude towards the world. This attitude, always in flux, challenges humans to reveal reality by ordering,

Moving further into cognitive theory, Cole & Derry (2005) in a chapter called '*We Have Met Technology and it is Us*' pose the possibility that technology and intelligence are constitutive of human nature, a notion that blurs traditional lines between the mental and material, the cognitive and non cognitive and biology and culture. The work of Russian theorist Wartofsky (1979) and Donald Normans (1991 and 1993) present a definition of artefacts extended with the notion of cognitive artefacts, firstly noting that artefacts are ideal (conceptual) and material. Artefacts reflect the ideal of intention for human action and are created from material through goal directed actions.

Wartofsky's work examined the different types of artefacts:

- *Primary Artefacts*
    - Axes, bowls, clubs etc.
- *Secondary artefacts*
    - Social forms of organising action, relations of kinship – cultural schemes
- Tertiary Artefacts
    - Forms of representation themselves that come to constitute a 'world' or 'worlds' of imaginative praxis

David Norman extends this and defines *cognitive artefacts* as an "artificial device designed to maintain, display, or operate upon information in order to serve a

representation function" (1991:17). This essentially suggests that person is a system with it own active and internal representation that bridges the gap between the human and the artefact. Norman emphasises that *cognitive artefacts* are extrinsic from human thought and they are external complements to naturally occurring internal representations. Cognitive artefacts serve human cognition and are a means by which we perceive and interpret.

> The incorporation of tools into the activity creates a new structural relation in which the cultural (mediated) and natural (unmediated) routes operate synergistically; through active attempts to approximate their surroundings to their own goals, people incorporate means to their actions, giving rise to the distinctive triadic relationship of subject-medium-object.
>
> (Cole & Derry 2005:219)

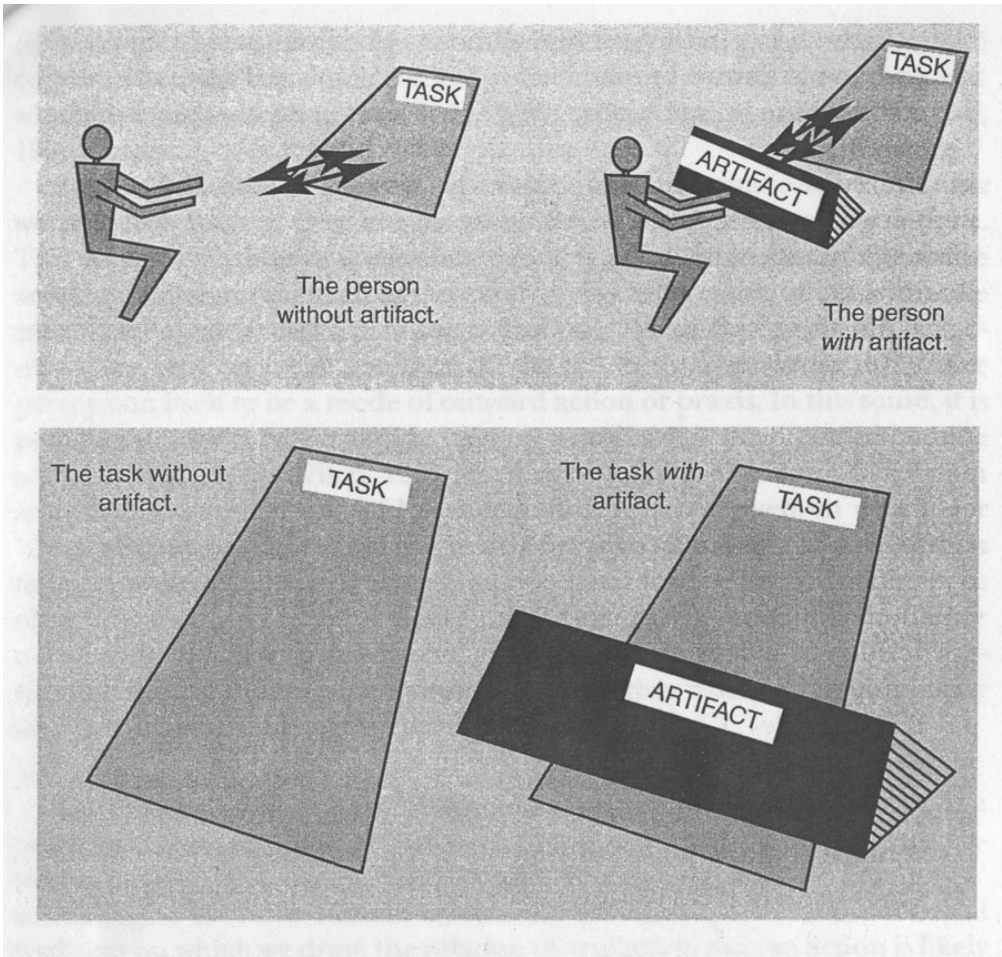

Figure 1.2 shows the difference between a system view and personal view when dealing with these cognitive artefacts. System view (Top Row) and personal view (second row) (216)

Examine the top row of Figure 1.2, the System view. The artefact appears to expand some functional capacity of the task performer. From the personal view, the artefact has replaced the original task with a different task, one that may have radically different cognitive requirements and use radically different cognitive capacities than the original task. The dual nature of a system of artefacts (conceptual – material) is the cultural medium for humanity and it provides a double world to live in. The world is simultaneously natural and artificial; cognitive artefacts from the environment bridge the gap between culture and technology. “In short the human brain evolved in an environment increasingly modified by human culture, such that interaction through culture/technology became an essential design feature of both biology and the human life

world" (223). Bruner (1972) suggests it is these technological tools and artefacts that occupy our culture which act as a devisor, a repository and a transmitter of amplification systems and of devices that fit such systems for our cognitive growth. Environmental developmental technologies which further the growth and development of our cognitive processes are known as *cultural amplifiers*.

Consciousness Expanding Technology: The Written Word

One such *cultural amplifier* is the technology of the written word as argued in the works of Walter Ong, *Orality and Literacy: the Technologizing of the World* (1982) and *Knowledge and the Future of Man*: *An International Symposium (1968)* tracing the development of the written word and the development of humanity. Using a symbolic system for communication which is transportable and permanent has the power to place the human mind into new and alternative environments whereby different thought processes are developed. Ong argues that the technology of writing has affected our mental processes and expanded our consciousness.

Oral communication which preceded written communication was temporal and natural to humans, writing is artificial. The written word as a tool is so effective that the development of writing has grown to become our method for the management of knowledge. Human society has kept records, ideas and events all using the technology of writing**.** Within literate societies it is evident that "Written words sharpen analysis, for the individual words are called on to do more" (Ong 1982:104). In a culture where the management of knowledge is through the visual word, Ong suggests that the authority, permanence and ability of the word to transcend affect future written works. Recorded culture calls on the next work to validate their claims within the structures preceding it; hence the execution of logical and linear analysis through written word unlike the aural word.

Literacy opens up the possibilities for the word and for human existence unimaginable without writing. The written word enables stronger, sharper and complex abstractions.

Through the process of writing and recording people are fictionalised and transported to an environment of the written word where the self, the environment and society is conceived of in different spaces, different abstractions and different constraints. The self (the reader, in any respect) can operate in more imaginative environments. Take, for example, the philosophical dialogues of Plato's Socrates. Characters and plot are the method by which the reader enters into a new imaginative space. James Joyce's work *Finnegans Wake* demands the reader not only to imagine / fictionalise the characters of the text, but to immerse themselves by fictionalising themselves (Ong, 1982:102-103).

Strong analysis, abstract and linear argument and narrative are all elements of the written word. They illustrate its potential to open up and separate concepts in our minds, from the external world of everyday to the internalised mental space. The written word allows the human more avenues for other thought; this has implications on our cognition and conception of ourselves.

> By separating the knower from the known writing makes possible increasingly articulate introspectivity, opening the psyche as never before not only to the external objective world quite distinct from itself but also to the interior self against whom the objective world is set. Writing makes possible the great introspective religious traditions such as Buddhism, Judaism, Christianity, and Islam. All these have sacred texts
>
> (Ong 1982:105)

What is being suggested here is that it is the interiorisation (internalisation of skill sets and development of cognitive artefacts) of the technology of writing has allowed our consciousness the ability for expansive introspection. For us writing is natural, yet it is artificial. We have interiorised it, our cognition and conception of self is altered. 'Writing is consciousness raising' (179). The work of Ong strongly illustrates the complex nature of our close interaction with technology and its connection with the way we humans express and conceive. As has been illustrated, is the invention, interiorisation and

application of a media technology has expanded consciousness. In *The Meta-physics of Virtual Reality*, Michael Heim draws on Ong's work to illustrate how virtual reality is a culmination of process already present in technology and western thought. Heim writes that:

> With more detail and coherence than McLuhan, Ong traced these shifts in writing technologies as they affected the human awareness and inturn influenced interactive epistemology (knowledge as it occurs in relation to tools and other persons). Unlike an absolute stance, the epistemological approach takes seriously the changes that mark the history of human knowledge.
>
> (Heim 1993: 68)

This base enables continued investigation into the effects and potential effects of future media communications. The multiple communication streams and symbolic system combinations used in multimedia products such as video games and virtual reality have elevated new forms of communication and as a result may yield effects upon its users. The recent work of Susan Greenfield stresses the potential cultural and cognitive dangers technology may have upon us and is important to be heard. This thesis instead will be focusing on positive cognitive development which may exist in new media forms to examine the possibility of consciousness expanding potentialities within virtual reality, video games and multimedia technologies. But before we investigate any technological affects for cognitive advancement, we are first required to explore how and by what means we develop our cognitive processes and if there is an end-point to human cognitive development.

Chapter 2

Paradigms

Stanislav Grof's work in the early chapters of *Beyond the Brain: Birth, Death and Transcendence in Psychotherapy*, attempts to legitimise thirty years of data researching non-ordinary states of consciousness induced by psychedelic drugs and nonpharmacological methods. With data that challenges various traditional scientific structures Grof begins his case to examine the history and the philosophy of science. Citing several philosophers and historians of science, Grof focuses on the central theory of paradigms and paradigmatic shifts as Thomas Kuhn outlines in *The Structure of Scientific Revolutions*, 1962.

The scientific institutions willingness to adhere to materialistic and mechanistic science has over the years yielded significant technological advances and avenues for inquiry. The value of these previous triumphs gave authority to science in determining the basic strategies of life and it is not until recently that people have begun to question the authority of science. A detailed analysis of the history and philosophy of science reveals a distorted and romanticised image of the course of events. The development of science is far from a gradual accumulation of data and formulation of ever more accurate theories. A paradigm can be understood as a "constellation of beliefs, values and techniques shared by the members of a given scientific community" (Grof 1985:3). Such paradigms can exhibit basic philosophical stances and encompass particular values and techniques, other paradigms operate in a more circumscribed field of research. Paradigms of varying scope and stance will have varying implications upon the work done. A scientist works by reducing the problem to a workable scale where their selection is guided by the leading paradigm. A scientist cannot be objective; they are forever bringing a definite belief system into the area of study. Some paradigms can be mandatory and encompass all natural sciences while other fields such as astronomy, physics, biochemistry and

molecular biology may operate under a different one. Paradigms are essential for science to reduce the problem field and focus on particular variables for the explanation of the phenomenon. Paradigms exert their influence through the acceptance by the majority in the scientific community as it becomes the mandatory way of approaching the problem. Paradigms have played and will continue to play a crucial, complex and ambiguous role in the history of science. Grof suggests any paradigm, should not be confused with the truth of reality (1-12). For Grof operating within the field of psychology, Kuhn's theory of the paradigm shift sought to explain how change, reformation and alternative theories developed in the history of science. The mechanistic and materialistic approach of the dominant paradigm is the reason for continued resistance. Grof uses Kuhn's concept of the paradigm to demonstrate the limits of conventional scientific thought.

Newtonian-Cartesian Science

The Newtonian-Cartesian physics model has allowed for substantial progress and reputation amongst other scientific disciplines. The use of mathematics and problem solving delivered answers to problems of everyday life. Isaac Newton's work reduced all physical processes to movements of material points in space that results from the force of gravity acting upon them and causing their mutual attraction. This results in an image of the universe as an entirely deterministic clock, where the smallest particles behaviour operates according to unchangeable laws. In principle it should be possible to reconstruct or predict any situation in the universe with absolute certainty. The reality is that practically, this is never actually possible. This is regarded as the 'founding myth of classical science' (17-20).

The ability to draw relationships between basic concepts and findings to a mechanistic model of the universe developed by Newtonian physics became an important criterion of scientific legitimacy in more complex and developing fields such as biology, medicine, psychology, psychiatry, anthropology and sociology. Initially, adherence to the mechanistic world view has enabled the growth and development of such disciplines.

Yet, as development continues the conceptual framework from the Newtonian-Cartesian model becomes an obstacle for scientific research and progress. In the twentieth century physics underwent significant changes transcending the mechanistic world and all the basic assumptions of the Newtonian-Cartesian paradigm.

Since the beginning of the twentieth century the field of physics underwent radical alterations transcending the mechanistic world view of Newtonian-Cartesian paradigm. Albert Einstein's *General Theory of Relativity* is the simplest such theory that is consistent with the experimental data. Einstein's theory unifies Newtown's law of universal gravitation and describes gravity as a property of spacetime geometry. Its battle for legitimacy as a dominant paradigm came through empirical data as well as rhetorical and philosophical arguments. In the physics world unanswered questions still remain. General relativity and its relation to other laws and theories of quantum mechanics are still being researched (17, 19). This transformation is complex and incomprehensible for most scientists outside the realm of physics.

Grof suggests firm adherence to the mechanistic world view in disciplines such as medicine, psychology, and psychiatry has lead to conceptual schisms. "The world view long outdated in modern physics continues to be considered scientific in other fields, to the detriment of future progress." (17) He continues to suggest that their failure to adjust their conceptual frameworks understood as a kind of *paradigm paralysis* whereby what lies beyond the dominant field of the paradigm is reduced and sidelined while other investigations which operate under the paradigm are given legitimacy. Paradigms are self-legitimising. According to Kuhn, sooner or later the everyday practice of normal science will necessarily lead to the discovery of anomalies not anticipated by the paradigm. The new candidate for a paradigm must offer the solution to some crucial problems in areas where the old paradigm has failed and must have a promise of addition problem solving (Kuhn 1962).

One particular avenue of weakness of the current paradigm identified is in explaining the important sociocultural and anthropological phenomena such as shamanism, religion,

mysticism and rites of passage. Mechanistic science paradigm has over the years reduced departures from the Newtonian-Cartesian model as 'psychosis' and its data to 'bad science'. Many researchers feel that the inception of a new paradigm(s) should make it possible to bridge the gap separating our traditional psychology and psychiatry from the profound wisdom of the ancient and oriental systems of thought (Grof:17-29). The power of scientific disciplines and the scientific method as a gate-keeper role is discussed in Anne Cranny-Francis' reflection on Donna Haraway's notion of the scientist as a 'modest witness' and Kuhn paradigm shifts. Examining science's attempt to rationalise the non-rational, Anne Cranny-Francis reveals that the view of science as rational is a compromised engendered field of science and technology which uses mechanisms of exclusion and validation (Cranny-Francis, 2006:64-77).

It is not the aim of this thesis to argue the case for paradigmatic shifts within scientific disciplines, nor is it to argue the legitimacy of psychotherapy. What can be taken from our discussion of Kuhn's theory and its implication on our scientific understanding is that the tendency to sideline certain studies and label them misguided can be counter productive. This thesis will examine Vedic psychology and the technique of transcendental meditation as formulated by Maharishi Mahesh Yogi. Vedic psychology's theory of cognitive development leading towards higher stages of consciousness will be discussed and contrasted with western notions of cognitive development.

> Paradigms not only have a cognitive and normative influence; in addition to being statements about nature and reality they also define the permissible problem field, determine acceptable methods of approaching it and set the standards of solution.
>
> (Grof 1985:5)

While discussion topics can be reduced with the label of *eastern mysticism* this thesis hopes to introduce some insightful research for our investigations into consciousness and consciousness expansion.

Consciousness Studies

Consciousness can be elusive, there is noticeable confusion surrounding what consciousness entails and what disciplines and approaches are best equipped to study it. In an article by John Horgan titled the "Consciousness Conundrum*"* he illustrates how wide and narrow the scope of research can be for a conclusive statement about consciousness. As Horgan visits the 1994 conference titled 'Toward a scientific basis of consciousness', the list of scientific and pseudo-scientific disciplines he encounters is expansive. Psychology, psychiatry, neurology, neuroscience, artificial intelligence, mathematics, chaos theory, physics and philosophy each have their own interpretation upon the nature of consciousness. As Horgan navigates his way through numerous interpretation of consciousness he arrives at what is known as the mysterian position. The mysterian position entails the notion that conventional scientific inquiry may never completely address the issue of consciousness where the ancient philosophical mind-body conundrum is unresolved. Yet whichever path of inquiry is navigated all add to our conception of consciousness. Continued studies reveal interpretations and theories of consciousness as derived from quantifiable methods but we are considerable distance from accepting a true encompassing theory of consciousness. Susan Greenfield helps frame this conundrum suggesting

> 'The quintessential subjectivity of consciousness that prevents it from being lined up with other properties of the brain. There are simply no terms of reference, no framework for capturing an objective description of the subjective"
>
> (Greenfield 1995:3)

As research into consciousness continues, the study of cognition, perception, memory and the sense of self are considered to be essential to our understanding of consciousness. Is there potential for further cognitive and consciousness expansion? It can be hard to say,

would the Egyptians and Greeks in the middle bronze age have imagined that the creation of an alphabet, writing in scripts change the nature of their consciousness? It was only as the technology became interiorised over time did our cognitive development lead to consciousness expansion. In this consumer age where multimedia technologies have only been available for 20 years, could it be possible that they play a role in the cognitive development and the expansion of consciousness for humankind?

Cognitive Development & Higher Stages of Consciousness

The cognitive development of a human has been of considerable interest and the focus of psychologists for quite some time. Developed in the late 1950's, cognitive psychology examines our internal mental processes and attempts to understand our cognitive developments between stimulus and response. Cognitive development is a theory which maps human cognitive potentialities and the stages of their development into a theory. Cognitive psychology favours scientific method and acknowledges the existence of internal mental states such as desire, motivation and beliefs. Attempting to understand the processes of our cognitive development is essential in determining not only how we learn and adapt to our environment. It also answers fundamental questions about human intelligence such as, is there an end-point to human cognitive development?

Alexander and Langer in *Higher Stages of Human Development: perspectives on adult growth* begin their investigation by focusing on scientist Jean Piaget and his theory of cognitive development. At the centre of Piaget's theory which was developed and refined across several works including *Biology and Knowledge* from 1971, was the view that human cognitive development attained its highest point in the late adolescent period. This was a distinct endpoint for cognitive development. Distinct developmental stages are said to culminate by late adolescence to form the character of a unified whole – whereby there is stable organisation of the various cognitive actions and operations. For Piaget the distinct developmental stages are:

1. **Sensori-motor stage**: birth to age 2.
   Cognitive processes are schemes of sensation (touch, sight, smell, see, taste) and action.

2. **Preoperational stage**: from ages 2 to 7.
   Action schemes from the sensorimotor stage are mentally interiorised with the development of motor skills, yet experience is largely rooted in their direct perceptual experiences.

3. **Concrete operational stage:** from age 7 to 11.
   Internal actions and operations can be performed on mental representations of concrete objects and events.

4. **Formal operations stage:** after age 11.
   Development of abstract reasoning

Piaget's cognitive developmental stages are hierarchical and progressively integrate the cognitive schemes from previous stages. Developmental schemes serve the necessary condition for continued development, schemes from one stage is reorganised and transformed towards a unified character. The unified character stems from an underlying structure – a stable organisation and pattern of cognitive actions or operations. Such structures are global in operation. A given stage of an individual's development consistently processes information and solves problems according to a general set of rules or logical strategies across all domains. The physiological structures alone are not a sufficient mechanism for cognitive development. The structures are not inherent in the mind; they are the result of constant interaction of the physiological structures and the features of the environment. Given the appropriate environmental experience, Piaget regards the formal operations stages as attainable as a pre-adult developmental stage even though full facility in that way of thinking may not develop until adulthood or ever. Organisation of cognitive structures is seen as a process of assimilating features of the

external world into existing structures and accommodation whereby cognitive structures adjust to a more stable equilibrium (Alexander, Druker and Langer 1990:3 - 7).

Criticism of Piaget's theory is well documented and reveals some important points about the theory for cognitive development. Questions have been raised about the formal operations period and to what degree the endpoint is related to specific cultural or sub-cultural technological societies. Studies have indicated that less than half can solve formal operations problems, results which suggest that development towards a formal operations period may be specific to cultures that value and promote scientific thinking. Other studies have claimed the theory is too focused on deductive, syllogistic reasoning because of its lack of inclusion of mature intelligence which includes contextual thinking (7 – 10). Alexander et al. illustrates that the theory can be interpreted, accepted and rejected in numerous ways due to its lack of appropriateness and completeness. The authors suggest the possibility exists for development beyond the formal operations stages. The authors add that for this to be possible alterations to the theory would be required in the equilibrium process and the addition or reduction of the role of various mechanisms of the physiological structures (7).

Given such inadequacies of Piaget theory, the authors frame cognitive developmental theory as a central theme towards an understanding of consciousness and begin to explore other developmental theories. A theory of the development of consciousness would embrace a holistic approach incorporating an understanding of process of knowing (cognitive and moral reasoning), objects known (physical world and social relations) and the knower (self). The theory would also investigate the knower as a 'reasoner' and information processor (epistemic self) as well as knower of the locus of human consciousness and identity (ontological self). Alexander et al. highlights three other general theories for hierarchical stages of self-development/ consciousness which connect not only the cognitive and affective (emotional) developmental domains but address the moral developmental domain. We shall be focusing on one of the three theories, Vedic Psychology.

Vedic Psychology

Maharishi's Vedic Psychology describes higher stages of consciousness in which an inherent (i.e. not constructed) underlying self can be directly experienced. It proposes the natural continuation (and culmination) of the developmental process with a new post-representational tier of development. This new post-representational stage differs as much from the representation tier (which includes post-formal representational processes) as the latter does from the pre-representational tier.

Vedic psychology proposes a life-span developmental model that describes the 1) mental structures underlying commonly observed periods of development as well as the higher stages of consciousness and 2) the mechanism underlying this developmental sequence. This hierarchically structured and layered model incorporates faculties of action and sensation, desire, thinking mind (associative faculty), intellect (discriminative faculty), feelings and intuition, and experiencing ego. All mental levels operate to some degree throughout development through the process of psychophysiological growth; Conscious awareness becomes predominantly centred at each deeper level of mind. Unfolding periods of cognitive development are said to be sequential shifts in functional awareness through each subtle mental level (21).

Unlike the Vedas in Ancient India, in the west consciousness studies have certainly taken some time to lead to a notion of what has been understood as Higher States of consciousness (HSC). In 1969, Psychiatrist Richard Bucke republished his book originally printed in 1901, *Cosmic Consciousness,* examining cultural experiences from around the world. In this work he suggests his theory of the three levels of consciousness. Simple consciousness – the awareness experienced by animals. Self consciousness – the awareness experienced by humans, and Cosmic consciousness, identified as a heightened perceptual experience. Further defined:

> [T]he prime characteristic of cosmic consciousness, as its name implies, consciousness of the cosmos, this is, of the life and order of the universe…

> There are many elements belonging to the cosmic sense besides the central fact just alluded to... Along with the consciousness of the cosmos there occurs an intellectual enlightenment or illumination which alone would place the individual on a new plane of existence …To this added a state of moral exaltation, and indescribable feel of elevation, elation, and joyousness and a quickening of the moral sense.
>
> (Bucke 1969:2-3)

Bucke's research on cosmic consciousness led to further inquiry in meditation and its effects.

Transcendental Meditation (TM) & Higher Stages of Consciousness (HSC)

Development beyond the traditional representational stages of development as a part of Vedic psychology has been described as a process where the relationship between the knower, known and the process of knowing navigates from a representational stage towards a post-representational stage. As all three processes are integrated into one, the mind becomes self-referential, the division between subject and object is no longer and an understanding of the self provides what is known as *subject permanence* – a stable experience of the self (Alexander et al. 1990:290 – 319). Within the post-representational stage there are multiple levels in a hierarchy leading to *Unity Consciousness* which is the end goal of *subject permanence* across all level of the mind. Prior to unity consciousness is what is called *Cosmic Consciousness* where mind and self are engaged on various levels of abstract thinking activities.

The work of Alexander et al. (1990) explores claims made by Vedic psychology of attainable Higher Stages of Consciousness (HSC) beyond traditional 'formal operations stage' of human development. What was identified about the development into higher stages of human development was that it "is hypothetic-deductive in nature – these higher stages do not require further growth of the nervous system beyond late adolescence or

early adulthood. Rather, the development seems based on optimising use of available biological and corresponding cognitive resources" (287).

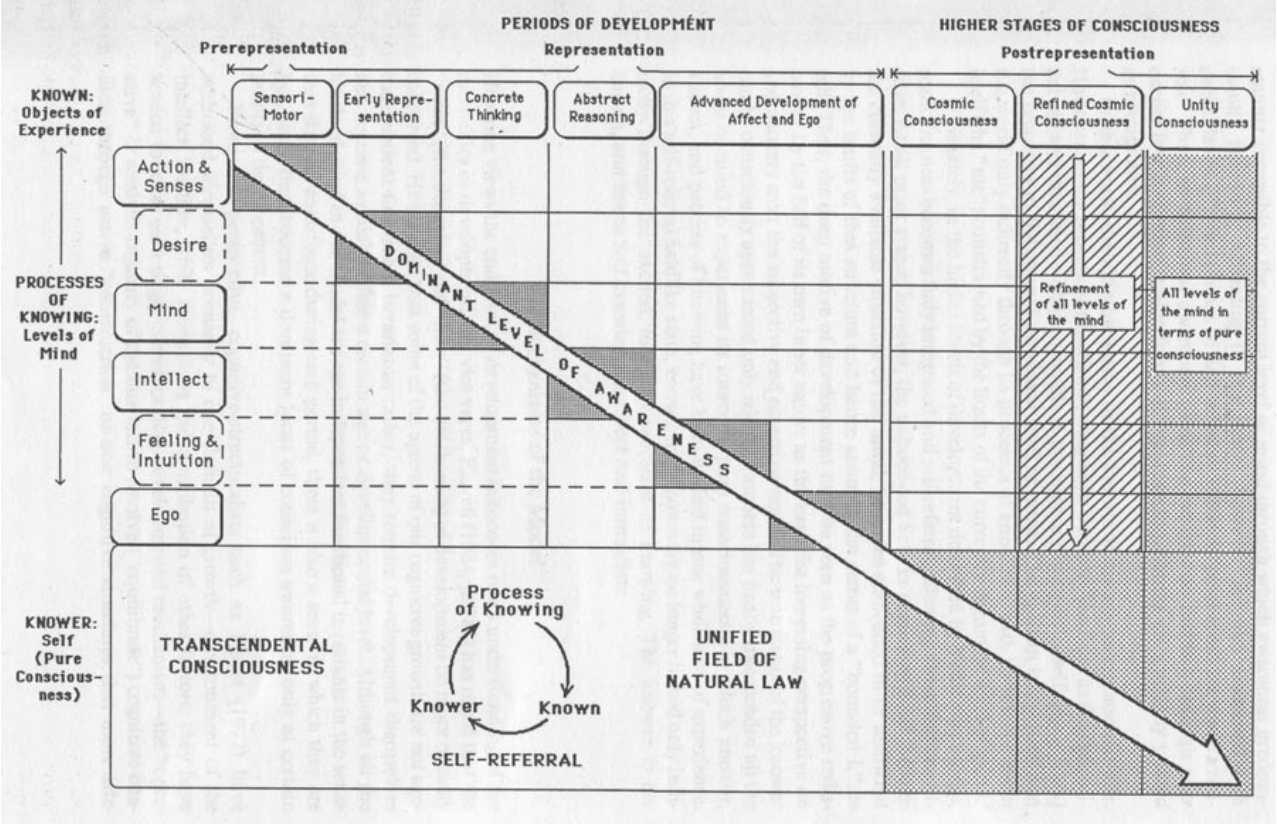

Figure 2.1 Vedic Development Model which describes the process of developmental growth across all levels of the mind.

Alexander et al. emphasises the brain's tendency towards psychophysiological growth and that higher stages of consciousness represent the natural continuation of development in adulthood. Alexander then goes on to proposed that these stages are no less inevitable than earlier periods, but both depend on exposure to appropriate environmental support systems (297). What is evident here is that without an ideal environment the potential developments may not achieve a functional and organisational change within the mind. As discussed earlier in chapter 1, 'Tools, Artefacts and Cognition', Bruner refers to the appropriate environmental developmental technologies as 'cultural amplifiers' as essential in the continued development of cognition. The program of Transcendental Meditations (TM) as developed by Maharishi Mahesh Yogi outlines a process of

mediation as a developmental technique for obtaining post-representational stages of development. The TM program is nonconceptual; it is not mediated by the meaning of words. A non-semantic or non-language based system. During TM a 'mantra', a specific sound, is used without reference to any meaning to free the attention from the control of language and the semantically conditioned thinking process. Alexander actually proposes that exposure to the post-language developmental environments (such as that of TM) may be fundamental in facilitating beyond language based conceptual levels of thought to post-representational higher stages of consciousness (298-299). There are several studies that use the TM program in developing HSC within Alexander et al. which lend credible weight to their position.

One study assessed whether the TM program enhances the rate of development from early representational period (exhibiting the immediate representations of desire) to the concrete thinking period (exhibiting cognitive dominance of the active thinking mind). The results showed that the practice promoted the shifting of a young child's awareness from centring on immediate desires to association with the deeper levels of the thinking mind. Other notable effects were expansion of awareness which resulted in expanded information-processing capacity, increased intelligence and cognitive reflexivity (341-342). Another study examined the ability for the TM program to simulate cognitive growth in prisoners. The object of the study was to see if the program would 'unfreeze' human growth and promote the development beyond concrete thinking. Results showed a significant decline in street-related pathological symptoms and an increase in subjective experiences of higher states of consciousness in regular meditators. These internal changes translated into long-term behaviour consequences as indicated by a one third lower prisoner return rate as compare to the other test subjects (342-343). The State of Consciousness Inventory (SCI) study was designed to quantitatively assess the frequency of higher state of consciousness experiences. Separate scales were used to measure pathological experiences, normal waking state, transcendental consciousness and each stage from cosmic to unity consciousness. A misleading SCI scale was also used to help identify those who endorse misleading or grandiose statements. The study monitored the experiences of meditators and non-meditators over a one year period with no negative

findings about the validity of the meditators experiences (336). Alexander et al concludes that the TM program through the mechanism of transcending was capable of promoting cognitive growth across all major developmental transitions.

> These findings challenge a widely held tenet that quality of direct interaction with the external physical world or social environment – from a learning theory, information processing or Piagetian view – is necessarily the critical factor for influencing cognitive growth (339).

The latter steps in the post-representational stages of the Vedic developmental model, those related with *unity consciousness* are interpreted as mystical experiences particularly in the scientific and academic disciplines lines of experience. Psychologist David Lukoff identifies characteristics of mystical experiences:

1. Ecstatic mood
2. Sense of newely gained knowledge
3. Perceptual alterations
4. Delusions
5. No conceptual disorganisation, no disruption of language and speech.

(Gackenbach & Karpen 2007: 343).

We have illustrated that writing as a technology has led to consciousness expansion and so has the technique of meditation. Taking Bruner's notion of the appropriate environmental and developmental *cultural amplifiers* we pose the question. Is there potential within new multimedia form to act as developmental tool beyond language based conceptual levels towards post-representational stages of consciousness? To answer such a question we need to examine what happens when we perceive new media products and their potential for cognitive development.

Chapter 3

The development of technology over the last 20 years has given the consumer a continued access to increased processing power. Integrated circuits continue to be developed according to Moore's law from 1965 which states that the number of components per integrated chip doubles every eighteen months. As the next generation of new media technologies take their place on the shelves of retail outlets the world over people have never before had so much processing power at their fingertips. More processing power and better communication technologies have enabled more users to engage new media products. Video games (VG), virtual reality (VR) and multimedia environments when used with the networking possibilities have opened up a new realm of interactions with representational and symbolic systems.

Like the automobile, the popularity of communication tools like the computer has made a significant impact world wide. Our skills in creating computer software programs have allowed the creation of complex tools for media manipulation and generation. The ability to create more engaging representations and environments with new media has further expanded the types of mediated experiences one user can engage with. Over the last eight years, internet usage world wide has increased by 305%. Most notable is the Middle East and Africa with usage growth over 1000%[2]. Newspapers, Books, films, music and magazines are all media that can have become apart of computer based media domain. The internet, video games, virtual reality and multimedia environments all employ various strategies of representations and symbolic systems to create a unique set of characters, creatures, actions, information, events and places. The popularity of such products suggests the importance in examining the mediated environment and exploring its potentialities in the future.

[2] Miniwatts Marketing Group, 2008. *World Internet Usage Statistics*, site: www.internetworldstats.com/stats.htm, accessed: September 20, 2008.

Mediated Environments & Ecological Theory of Perception

Considering the work of Don Ihde and his notion of human self-conception as tied to understanding through action in our world, we shall now focus on psychologist James Gibson's ecological theory of perception. In his book *The Ecological Approach to Visual Perception* (1979), Gibson attempts to examine how we perceive visuals and our natural environment. There are two central points which make up Gibson's theory, perceptual flow and presence. He argues that visual information resides in optical arrays of the visual environment and perception is based on detecting information from the optical arrays. Gibson used the term perceptual flow to describe when one perceives optical information as the gradients of the optical arrays change due to movement in the environment.

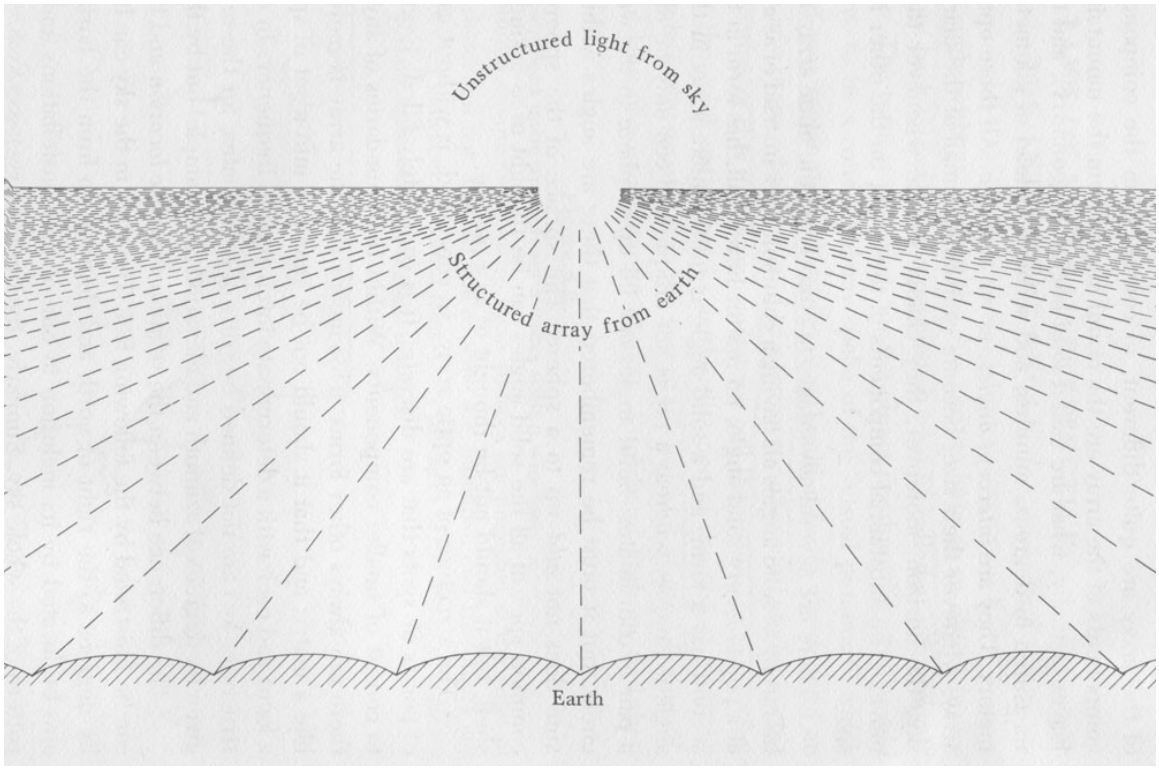

Figure 3.1 Representation of optical arrays present in observation of earth outdoors under the sky. From (Gibson 1979: 67)

Ihde's self-conception is informed through a process of action in our environment and we visually perceive our environment through action or perceptual flow. Therefore the optical data we perceive not only communicates information about objects and events in our environments but it also informs the location of the self. Gibson says perception is based on directly detecting information available in ambient light and the functional properties of the objects, space and events we see are known as *affordances*. Affordances are not possibilities but real external facts. Objects may yield different affordances to different people because affordances are related to both the person and the environment. "Because we perceive affordances of things for behaviour and action, perception is always simultaneously of the self and the environment" (Preston 2007: 283).

But what if the environment was not natural, it was a mediated environment? In a mediated perception there are two separate environments simultaneously available, the mediated (such as virtual reality) and non-mediated (reality). Gibson states that "if the artificial array is the same as the natural array, it will yield the same perception. There will arise an illusion of reality without a genuine reality" (281).

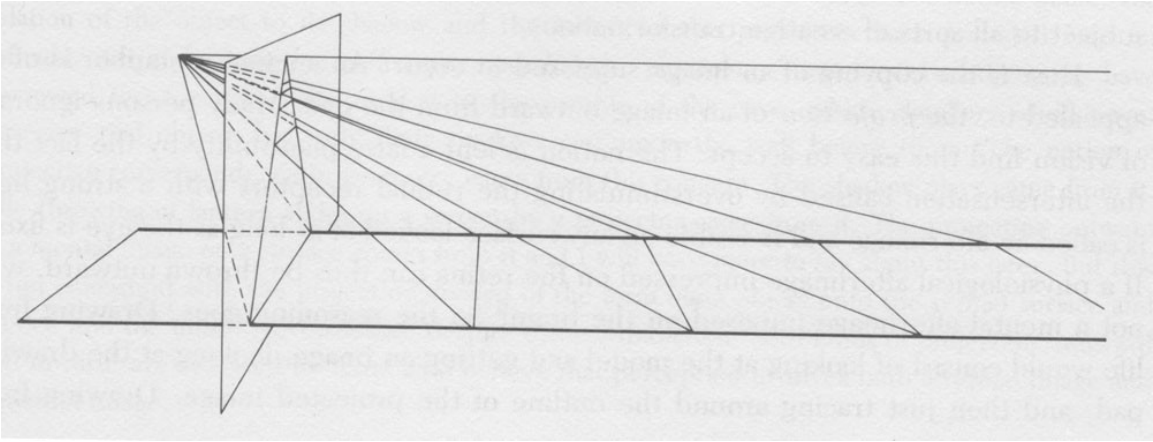

Figure 3.2.The perspective projection on a plane of visual arrays from ground out to the horizon. Projection of visual arrays as represented on a mediated environment on to a plane such as a TV or monitor (Gibson 1979: 277).

Preston (2007) notes Gibson's theory provides a framework for understanding how we not only perceive the natural environments but also still and moving media.

Presence in Mediated Environments

Common experiences with various communication mediums have indicated that at times people report a feeling of presence, involvement and absorption in media. Other descriptors for such experiences are immersion, suspension of disbelief or total attention in the text. Presence can be understood as the 'being-there' experience in relation with the ecological environment and perceptual flow from the visual-spatial array which, when interpreted, informs our ecological self. Hunt (1995: 42) refers to this absorption as a "felt reality and clarity, concomitant sense of exhilaration, freedom and release". A more general term for such can be understood as a feeling of non-mediation in a mediated environment or telepresence. Such meditated environments may contain the properties to create awareness of the self in an artificial environment and transcendence of the self into artificial environments. There are various academic conceptualisations of 'presence' in both mediated and non mediate environments.

Psychologist Hunt (1995) argues that the notion of presence is central to consciousness literature. His work divides the role of immediate awareness in two fundamental forms of symbolic cognition, referential and presentational symbolism. Awareness is the composition of the inseparable presentational and referential forms of symbolism. For presentational symbolism "meaning emerges as a result of an experiential immersion in the expressive patterns of the symbolic medium." Various texts may contain referential intentionality and shared codes in the form of styles but "meaning emerges more intuitively and spontaneously from an ongoing absorption in the expressive medium itself as the 'surface' of conscious awareness"(42). As we continue to develop and understand the various referential intentions and symbolic abstractions we develop our own abstract self-referential capacity. Our self-referential capacity when engaging the visual-spatial array of the environment can function with spatial metaphors detached from the array. These detachments are said to be the existence of feeling states. Enhanced self-reference allows the experiences of 'being as presence – a realized state, not a concept' (Hunt,

1995). That is, our experience of Self is ultimately based in ecological information and existence or presence is 'real'. Gibson's theory of ecological perception views awareness or presence as a direct resonance with the flow of the world. This could be interpreted as our ability to recognise and engage with the representation and symbolic systems at work. Hunt goes on to argue that if self-reflective symbolic cognition is based on the reorganisation and recombination or perceptual processes, then we might expect Gibson's flow dynamics to have a relation with the organising template for higher mental processes (Preston: 297).

> Consciousness is a capacity involving direction, choice and synthesis of nonconscious processes, exemplifying the deep structure of a kind of intelligence that directly reuses and reorganises the structures of perception. Spatial abilities are the framework needed for its full development
>
> Hunt (1995)

Ecological perception can be seen as linked to the development of consciousness. Gibson's theory of perceptual flow and presence has since been widely adopted by virtual reality and video games designers and developers due to its attention to the interaction between the perceiver and the environment. While this notion of immersion or intuitive absorption in the medium itself is well researched experience, there is currently little academic agreement on the conceptualisations of 'presence' in both mediated and non mediate environments. The computer based technologies of VR and VGs have been noted to hold the capacity for strong immersion or absorption for the user (Preston 2007). The question remains, do new media technologies have the ability to elicit a perceptual response and reorganisation within the mind of the user to generate a marked expansion in cognitive and consciousness development?

Research into New Media Technologies, Presence and Consciousness

The study conducted by Mou et al. (2004) illustrates the existence of our basic orientation systems at work. Using what is called an augmented reality (AR) environment; participants were given tasks in two versions of the environment. The AR system creates its environments through a blend of computer generated virtual objects or environments with real environments. The two versions differed by its stabilized frame of reference. One version used the environment-stabilised frame (ESF), when your body moves the objects remain in place like the natural environment. The other used the body-stabilised frame (BSF), where object maintained their position relative to the participant. The test required participants to perform their spatial tasks upon objects by rotating their body across both versions, measuring their how effective they were in adjusting to the environmental changes. The results showed that users who began with ESF become orientated in the BSF within two minutes. Our basic perceptual orientation systems incorporate our perceptual and action systems to reorient ourselves into the environment. Based on Gibson's ecological theory of perception, artist Char Davies developed an immersive virtual space called *Osmose*. Designed to allow an embodied experience of space, one that would dissolve the habitual boundaries we have between the self and world. The *Osmose* art work assisted in the expanding our understanding of the immersion and relationship with mediated environments. In 2004 Davies reported that in the six years after 1995 more than 20,000 people have claimed to experience a self-presence in these environments. This former study and art work help illustrate that perceptual orientation, disorientation and reorientation is possible in virtual mediated environments.

Technological augmentation and its effect on mental functions can be seen in the relationship and follow-on experiences with virtual reality & video game play. The felt sense of the virtual reality's perceived reality is termed in the VR literature as telepresence. The notion of telepresence offers the user the ability to manoeuvre through and around artificial/alternative realities. Witmer and Singer (1998) found that high presence in VR occurred with increases in involvement, control, selective attention, perceptual fidelity, and mimicking real world experiences. All are increasingly present in video games. Gackenbach & Karpen (2007) suggest that such VR and VG practice would

translate into more accurate state recognition in dreams and other consciousness experiences (347). In fact, a study into habitual game players reported 'better attentional skills than less skilled players' (Green and Baveller 2003). This begs the question; in mediated environments is the ability to navigate through representational space a factor for improved cognition?

The measure of absorption can also be interpreted as a broader measure of capacity for attentional involvement in an environment. Psychological absorption, the equivalent of VR presence has been studied with some interesting results. Positive relationships of absorption to alternative experiences of consciousness such as hallucinatory and semi-hallucinatory experiences have been found in a study by Glicksohn & Barrett (2003). Psychological absorption during video game play as studied by Glicksohn & Avnon (1997) indicated that subjects reported experiences during video game play that are indicative of altered states of consciousness. Even those subjects that did not experience altered states such as experiences of drifting, flying or changes in visual/auditory perception experienced improved absorption associated with game play (Gackenbach & Karpen 2007:346-348). The authors suggest the altered states of consciousness mentioned should be not be considered equivalent but rather related to the higher stages of consciousness. One such experience that is considered related to higher stages of consciousness is lucid dreaming. Lucid dreaming is the experience of awareness of dreaming while still in the dream state and is considered is one of many preliminary indicators of the development of higher states of consciousness. Lucid dreaming, like the artificial VR environments are a construction but with a different set of input variables. Gackenbach (1991) argues that lucid dreaming is a naturally occurring virtual reality, and an area that requires further attention.

In the field of neuropsychology, various authors have undertaken multiple investigations since the 1990's with mixed results. Studies have measured video game play with several factors of immersion, presence, absorption, mystical experiences, lucid dreaming, religious experiences and certain types of illness. The studies of Travis (2002), Gackenbach (1991), Gackenbach & Bosveld (1989), Stickgold et al. (2000) provide only

partial conclusions towards a notion of mediated absorption and the development of higher stages of consciousness.

Preliminary research conducted by Gackenbach[3] supports the view of a relationship between video game play and some experiences indicative of the development of consciousness. The study was calculated on various video game variables and consciousness experiences "i.e., dream recalled per month; experience with and interest in prayer and meditation; importance of religion/spirituality; and frequency of each of the seven sleep and waking experiences, lucid dreaming, nightmares, night terrors, archetypal dreams, out-of-body experiences, mystical experiences, and precognitive experiences." Specific focus groups showed that video game playing was associated with certain types of consciousness experiences and not with attitudes or experiences more typically associated with attaining these states of being.

Gackenbach's (2005) study reveals that the development of cognitive skills associated with video game play have being rather well documented, yet they have not largely considered the implication with the development of consciousness. From this study it was shown that high frequency video game players were more likely to report lucid dreams, observer dreams, and dream control when dream recall frequency and motion disorientation during play were controlled. As it has been illustrated above there is some rather mixed and partial conclusions to be drawn from the research examined. One issue with the research conducted so far can be highlighted by Subrahmanyam et al. (2001). The authors' note that computer hardware and software have evolved so quickly that early published research into the cognitive impact of game playing has been done with the older generation of arcade games. Older generations of games had less processing power available to create such highly immersive game environments. The research by Gackenbach & Preston (2007) into empirical evidence for expanded consciousness experiences is covered substantially more in depth than this thesis. Video game play yielded varied results; only at times immersion and absorption in video games had a positive association with higher states of consciousness such as spiritual experiences.

[3] Gackenbach, Jayne. 1998. *Video Game Play and the Development of Consciousness,* Athabasca University, website: http://www.spiritwatch.ca/videogame.html. Accessed 10/07/2008.

There are currently limited investigations into such cognitive developments with mediated experiences, tests in VR and VG using Gibson's visual-spatial theory have yielded only notions of the possibility for communication technologies to parallel the qualities of enhanced experiences associated with HSC.

Conclusion

In this thesis we have covered a large theoretical background in an attempt to understand our relationship with technology and explore the potentialities for cognitive development and consciousness expansion. We have illustrated a definitive link between technological development, cognitive abilities and human self-conception using the works of Heidegger, Ihde and Ong. Our examination into developmental theory has identified an alternative theory and research which documents the existence of higher states of consciousness and cognitive development beyond the traditional end-point towards post-formal operations period. Using Bruner's notion of the 'cultural amplifier' for cognitive development and Gibson's ecological theory of perception we examined the relationship between VR and VG immersion and its relation to higher stages of consciousness. An argument has emerged that through the interiorisation of the various skill sets required to use technology we alter our cognition and self-conception, suggesting the possibility of technology and intelligence being constitutive of human nature. Considering this notion and our current technological condition the use of mediated environments, exposure to a post-language developmental technology may play a role in facilitating cognitive development towards higher states of consciousness. What can be identified from the research covered is that there is a significant lack of it available into the effects of immersion and presence in mediated environments and experiences of cognitive development.

What relevance and implication does this have for consciousness? Considering that the experience of immersion can transport oneself via technologies of mediation into an environment where by spatial abilities, precursors to full conscious development, are affected, the self can be considered/felt to transcend environments. One could arguably suggest that the experiences of VR and VG technology have affected consciousness in regard to conception of the self in relationship with its environment. This is not to suggest that there is a direct relationship between VR & VG and higher states of consciousness,

but rather the experience of the technology has furthered our understanding of our own consciousness.

The experience of immersion and presence in mediated environments is a common and daily occurrence. In fact software is available for purchase which claims to use a biofeedback system to 'promote wellness and self-care'[4]. Could not a mediated environment employ design features to achieve particular results, to act as a mantra or amplifier for cognitive development? At this stage the answers are beyond us, but the question remains valid and in need of further research.

[4] The Wild Divine Project. Healing Rhythms Software Website: http://www.wilddivine.com/ Accessed: 17th June 2008.

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