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**THE INTERPLAY OF INSTITUTIONAL FORCES
BEHIND HIGHER ICT EDUCATION IN INDIA**

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ABSTRACT

For several years, academics have debated the extent to which ICTs (Information and Communication Technologies) can help poor people in developing countries. The conversation contains diverse views, yet education is always given a prominent role. Education helps shape how people think about technology and in turn, how the technology is used.

This dissertation examines how the idea of ICTs is constructed at Indian universities, and how this process is impacted by institutional forces. The research findings indicate that for a variety of reasons, higher ICT education in India is markedly Western-focused, instrumental and technocratic.

These characteristics of higher ICT education in India are impacted by a process that can be described as institutional collaboration – several diverse institutional forces are acting in ways that are coherent and mutually reinforcing.

This institutional field can be theorised in many ways, some more appropriate than others. The findings fit well with neo-institutional theory but do not fit equally well with discourses of Development. The findings are particularly commensurate with Angell's theory of the Information Age, characterised by a looming conflict between Old and New Barbarians.

TABLE OF CONTENTS

1	INTRODUCTION.....	9
1.1	MOTIVATIONS	10
1.1.1	Problem Domain – ICT Education in Developing Countries	11
1.1.2	Problem Statement	11
1.1.3	Previous Approaches.....	12
1.2	NATURE OF THE RESEARCH.....	13
1.2.1	Research Questions	13
1.2.2	The Link Between the Questions and the Problem	16
1.2.3	Research Methods	17
1.3	OBJECTIVES.....	18
1.3.1	Expected Theoretical Contributions.....	18
1.3.2	Expected Practical and Methodological Contributions	19
1.3.3	Dissertation Outline.....	19
2	LITERATURE REVIEW	21
2.1	INFORMATION SYSTEMS IN DEVELOPING COUNTRIES	22
2.1.1	Central Debates	23
2.1.2	Education in the ICT for Development Debate.....	26
2.1.3	A Major Departure Point.....	28
2.2	ICT EDUCATION.....	31
2.2.1	History of ICT Education	31
2.2.2	Current Issues.....	36
2.2.3	Current Debates.....	39
2.3	INDIAN HIGHER EDUCATION.....	43
2.3.1	History	43
2.3.2	Science and Technology Education.....	48
2.3.3	Current Issues.....	52

3	CONCEPTUAL FRAMEWORK.....	57
3.1	PHILOSOPHICAL ASSUMPTIONS	58
3.1.1	X and the Idea of X.....	58
3.1.2	Ontology and Epistemology	60
3.1.3	Underdeterminism and the Philosophy of Science.....	63
3.2	PRIMARY THEORETICAL LENS: NEO-INSTITUTIONALISM	65
3.2.1	Overview of Neo-Institutionalism.....	66
3.2.2	How Neo-Institutionalism Theorizes Education	79
3.2.3	Contributions and Limitations.....	84
3.3	SECONDARY THEORIES.....	92
3.3.1	Development.....	92
3.3.2	Theories of Indian Society	101
3.3.3	New Barbarianism	103
4	METHODOLOGY	105
4.1	RESEARCH STRATEGY – CURRICULUM ANALYSIS.....	107
4.1.1	Justification for the Study of Curricula	107
4.1.2	How Curriculum Studies are Conducted	112
4.1.3	Discourse and Narrative Analysis	116
4.2	DATA COLLECTION METHODS.....	120
4.2.1	Document Analysis	120
4.2.2	Life History Interviews.....	121
4.2.3	Semi-Structured Narrative Interviews.....	123
4.3	COHERENCE AND SUMMARY OF THE MODEL.....	124
4.3.1	Context and Philosophical Assumptions	125
4.3.2	Theoretical Framework.....	126
4.3.3	Methodology and Research Question.....	127
5	EMPIRICAL FINDINGS	128
5.1	DATA GATHERING.....	129
5.1.1	Gaining Access	129
5.1.2	Following the Data.....	130
5.1.3	Data Set.....	131
5.2	INITIAL FINDINGS – DOCUMENT DATA	133
5.2.1	Example 1 – IIT Bombay Curriculum.....	133
5.2.2	Example 2 – AICTE Curriculum.....	140
5.2.3	Other Publications.....	149
5.3	MAJOR FINDINGS – INTERVIEW DATA.....	154
5.3.1	Focus on the West and the Global Economy.....	154
5.3.2	Preference for Technical Knowledge	160
5.3.3	Heavy Industrial Footprint.....	163

6	ANALYSIS	168
6.1	INITIAL NEO-INSTITUTIONAL ANALYSIS	169
6.1.1	Major Concepts	169
6.1.2	Theories and Propositions.....	171
6.1.3	The Categorisation Framework.....	173
6.2	ANALYSIS OF INSTITUTIONS WITHIN THE INDIAN CONTEXT	174
6.2.1	Historical and Traditional Institutions.....	175
6.2.2	Micro institutions	180
6.2.3	Macro Institutions	183
6.3	ANALYSIS USING SECONDARY THEORIES	188
6.3.1	Rejection of the Discourse of Development.....	188
6.3.2	Rise of New Barbarians.....	190
6.3.3	Summary Arguments.....	201
7	DISCUSSIONS AND CONCLUSIONS.....	204
7.1	CONTRIBUTIONS.....	205
7.1.1	Practical Contributions	205
7.1.2	Contributions to Theory.....	210
7.1.3	Methodological Contributions	215
7.2	LIMITATIONS AND REFLECTIONS.....	218
7.2.1	Issues of Generalisability.....	218
7.2.2	Limitations Due to Theory and Methodology.....	219
7.2.3	Reflections of the Author as a Researcher.....	225
7.3	SUGGESTIONS FOR FUTURE RESEARCH.....	227
7.3.1	Testing the Findings	228
7.3.2	Exploring Various Issues Raised in the Dissertation.....	229
7.3.3	Indian Ascent and the Information Age.....	231
8	INTERVIEW LIST.....	233
9	REFERENCES	235

TABLE OF FIGURES

Figure 1.1: Problem Statement	12
Figure 1.2: Hierarchy of Research Questions	15
Figure 1.3: Overarching Research Question	15
Figure 2.1: Subject of Inquiry	22
Figure 2.2: ACM Curriculum for Undergraduate Computer Science (1968)	33
Figure 2.3: IFIP Technical Committee Curriculum, Graduate Information Systems ..	33
Figure 2.4: 3-year Undergraduate Information Systems Curriculum.....	34
Figure 2.6: AIS Model Curricula for a Graduate Degree in Information Systems	38
Figure 2.7: The Growth of Indian Higher Education	46
Figure 2.8: Government Agencies Setup to Oversee Higher Education.....	49
Figure 2.9: Faculty Enrolment by Subject	49
Figure 3.1: Four Paradigms of Social Research.	61
Figure 3.2: Propositions on how Institutions Affect Organizations.....	70
Figure 3.3: Mechanisms of Isomorphic Change.....	72
Figure 3.4: Propositions on Institutional Isomorphism.....	73
Figure 3.5: Origin and Maintenance of Institutional Patterns.....	74
Figure 3.6: Organizing Vision in Information Systems Innovation	78
Figure 3.7: Candidates for Neo-Institutional Study.	79
Figure 3.9: Five Stages of Growth.....	97
Figure 3.10: Linear Growth and Cyclical Poverty.....	97
Figure 4.1: Comparison of U.K. National School Curriculum.....	114
Figure 4.2: Responses to New Curriculum Initiatives.	114
Figure 5.1: Departments at IIT Bombay.	133

Figure 5.2: IIT Bombay BTech Curriculum.	136
Figure 5.3: Course Description HS205 – IIT Bombay.....	138
Figure 5.4: Course Description HS204 – IIT Bombay.....	139
Figure 5.5: Comparison of AICTE Model Curricula	143
Figure 5.6: Environment and Ecology – Course Description	144
Figure 5.7: AICTE Elective Lists.	146
Figure 5.8: Curriculum at IIT Delhi – Credit Distribution.....	146
Figure 5.10: BSc Computer Science at MIT – Curriculum By Units	148
Figure 5.11: Examples of Theoretical Modules offered at MIT.....	148
Figure 5.12: Comparison of Curricula – HSS Content	149
Figure 6.1: Propositions of Institutional Isomorphism.....	171
Figure 6.4: Theoretical lenses applied to the research findings.....	190
Figure 6.5: Origin and Maintenance of Institutional Patterns.....	197
Figure 6.6: Organizing Vision in Information Systems Innovation.....	198
Figure 6.7: New Barbarian Organizing Vision of the Idea of ICT.....	199
Figure 7.1: New Barbarian Organizing Vision of the Idea of ICT.....	213
Figure 7.2: Summary of Contributions.....	217
Figure 7.3: The Research Enterprise	226
Figure 7.4: Myself in the Research Enterprise.....	227

1 INTRODUCTION

Chapter Abstract

In the literature on ICT for Development, education is given tremendous importance but it is under studied. This chapter introduces the dissertation by providing a background on the problem domain. It then outlines the main research questions and the expected contributions.

Chapter Contents

1.1	MOTIVATIONS	10
1.1.1	Problem Domain – ICT Education in Developing Countries	11
1.1.2	Problem Statement	11
1.1.3	Previous Approaches.....	12
1.2	NATURE OF THE RESEARCH.....	13
1.2.1	Research Questions	13
1.2.2	The Link Between the Questions and the Problem	16
1.2.3	Research Methods	17
1.3	OBJECTIVES.....	18
1.3.1	Expected Theoretical Contributions	18
1.3.2	Expected Practical and Methodological Contributions	19
1.3.3	Dissertation Outline.....	19

To what extent can Information and Communication Technologies (ICTs) help or hinder people in developing countries?

This question is the subject of an ongoing debate in the academic literature. Some authors are optimistic and argue that ICTs can lower costs, provide users with more information, make markets more efficient, and improve public service delivery (Campbell 2001, Eggleston *et al.* 2002, James 2001b). Some go further and argue that ICTs can make societies healthier, wealthier and more democratic (Abbott 2001, Mbarika 2002, Netcheva 2002). Others are more sceptical. They point to the fact that often technology creates cleavages in society, is often forced down the throats of the recipient country, and does not address a pressing need (Sy 2001, Wade 2002). Much hyped ICT initiatives often become a waste of valuable time and money (Avgerou 1998). Despite this profound disagreement, in much of the literature, there is an issue lurking in the background, partially visible but never in full sight. This issue is education. Researchers who write on the issue of ICTs in developing countries frequently mention education but only in passing, as an aside, barely scratching the surface. The frequency of these ‘passing mentions’ points to the fact that education is inextricably bound up in the debate on ICTs and Development.

1.1 MOTIVATIONS

Much of the literature on ICTs and Development argues that ICTs can benefit developing countries but only if local users are taught to use technology in a way that is locally appropriate (Avgerou and Walsham 2000). Moreover, citizens of developing countries should be taught to generate ICT applications that solve local needs rather than simply taking an off-the-shelf solution from “middle America” (see Yahya 1993). Despite the apparent agreement and frequent mention of education being a key factor in the web of relationships regarding ICT and Development, there is a paucity of research examining the nature of ICT education in developing countries.

1.1.1 PROBLEM DOMAIN – ICT EDUCATION IN DEVELOPING COUNTRIES

Thus, ICT education is a problem domain of central significance. Education contributes to the establishment of values and attitudes towards ICTs (Kelegai and Middleton 2002, Olutimayin 2002). Crucially, education plays a large role in delineating how ICTs are to be used (Liebenau and Khiaonarong 1997). As this study will show, a study of education is central to gaining an understanding of the *idea* of Information and Communication Technology.

Since Information Systems is a discipline that studies technology as part of a social system (Avgerou 2000), this study is well-positioned within the boundaries of IS. Moreover, Information Systems researchers have been concerned with the potential impact of ICTs in developing countries for several years, and as will be argued in chapter 2, a study of ICT education can make an appropriate contribution to this body of literature. Furthermore, several IS researchers are moving on from the study of IS as systems development or management. Many are increasingly looking at the social implications of Information Systems (Bhatnagar 2000, Keen 1987). To that extent, the *idea* of ICTs is becoming a major preoccupation of IS researchers. Thus, the study of ICT education in developing countries is both relevant and timely vis a vis the discipline of Information Systems.

1.1.2 PROBLEM STATEMENT

As will be shown in Chapter 2, much of the research on ICT education is normative. Frequently, various curricula are suggested to an audience of educators, or pedagogical techniques are introduced based on the implementation of new technologies (Crawford 1999, Loveless and Ellis 2001). Very rarely is a study presented that is an explanatory inquiry into the present nature of ICT education. As a result, interesting contradictions exist between theories of ICT education that are not fully explored. For example, researchers who study ICT for developing countries have noted the frequency with which initiatives fail when they are not targeted to a local need (Avgerou 1998, Heeks 2002, Madon 1993, Yahya 1993). Thus, they make the

call for ICTs to be used to find *local* solutions to local problems. In contrast – as will be shown in chapter 3 – neo-institutional thinkers have noted the isomorphic tendencies of educational organizations. In order to claim legitimacy and gain access to resources, schools and universities frequently adhere to *global* standards (Bowerman 2002, DiMaggio and Powell 1991b, Scott 1992). The “local versus global” debate is just one example of an ongoing discussion in the academic literature. Many debates are more explicit and will be discussed further in chapter 2.

Thus, the problem that this study seeks to address pertains to the domain of ICT education, and it can be most appropriately summarized in the following problem statement:

In the debate on “ICT for Development”, education is given tremendous importance, but is under-researched. While commentators insist that ICT education in developing countries should be based on finding solutions for *local* problems, neo-institutionalists maintain that educational organizations will converge to a *global* standard. These contradictions and gaps in our understanding pose practical problems since the success of ICT initiatives often depends on training and education. It also poses theoretical problems. Education is pervasive and helps shape the ways we think about ICTs. A poor understanding of this process harms our effort to understand the relationship between ICTs and society.

Figure 1.1: Problem Statement

1.1.3 PREVIOUS APPROACHES

As mentioned previously, there is much normative literature on ICT education and descriptive literature on the implementation of ICT to pedagogical ends. Much of this work is case study based. Other research related to the problem domain involves curriculum studies (Goodson 1994, Young 1971b); a sub discipline within the field of education. This research uses curricula as a reflection of power relationships and social forces within society. While some curricula research has been conducted on ICT education, it tends to be based in industrialised countries (Little *et al.* 2000, Reichgelt *et al.* 2002) and therefore does not make an explicit contribution towards

the debate on ICTs for Development. Much recent IS work concerns the *idea* of technology, and how our relationship with technical artefacts could be theorized. For example, critical theorists have looked at how the concept of ICT is shaped by the powerful in order to control the masses (Moss 2002, Ziegler 1995). Using an interesting philosophical approach, Ciborra (2002a) innovatively proposed that the relationship between humans and technology be seen in terms of hospitality, where the technology is invited into one's home and treated cautiously as an ambiguous stranger. The relevant literature will be discussed in more depth in chapter 2.

1.2 NATURE OF THE RESEARCH

In order to study the phenomenon of interest – namely ICT education – and to make a contribution to how the idea of ICT is constructed, some decisions had to be made that considerably narrowed the research project. Much of the work done prior to the data gathering stage involved narrowing the scope of the study such that the research was manageable but also relevant. To that extent, it is worthwhile to think of the research questions as a hierarchy, beginning with the broad debate and narrowing down to specific questions used to guide empirical data collection.

1.2.1 RESEARCH QUESTIONS

A major departure point for this study was the question posed at the beginning of this chapter: To what extent can ICTs help or hinder developing countries? Naturally, this question cannot be fully answered, but academic research can usefully inform the debate. A journey through the literature revealed the importance of education, yet it seemed under-studied. This is the essence of the problem statement outlined in the previous section.

The awareness of the importance of education led to a more narrow research question: What is the nature of ICT education in developing countries and why? At this stage the research project started to form, and some difficult decisions were then made to make the research more focused. First, it was decided to focus on higher education.

This difficult decision was made in light of a large body of neo-institutionalist research, which argued that higher education presents a particularly rich institutional field where competing interests jockey for resources, power and legitimacy (Meyer *et al.* 1979, Meyer and Rowan 1992, Meyer *et al.* 1994c). Moreover, power struggles within universities have been shown to mirror larger debates within various societies (Goodson 1994, Meyer *et al.* 1979, Narain 1989), thus the study of university curricula can yield fruitful results (Aronowitz and Giroux 1991, Goodson 1994). The decision to focus on universities was reasonable and increased the feasibility of the study. However, it is undoubtedly the case that similar research done on the primary or secondary educational sectors would also be beneficial. This will be discussed further in chapter 7.

A second major decision was made to focus on India. First, India is one of the primary countries of interest in the ICT for Development literature. Many reports have been written about ICT initiatives in India (D'Costa 2003, Madon 1993, Madon and Sahay 2002). When other countries seek to improve their economies or societies through the use of ICTs, India is often cited as the exemplar {Smith, 2005 #716;Bhatnagar, 2000 #16}. Finally, there is the apparent paradox of India as a country with a large population at or near the poverty line, (World Bank 2002) with a successful software export industry (Heeks and Nicholson 2002) that is being watched with interest in follower nations such as Russia, China (Heeks and Nicholson 2004) and Iran (Nicholson and Sahay 2003). Despite the success of India's software export industry, there is little evidence to suggest that benefits are being realized in the wider population (D'Costa 2003). The prominence of India in the ICT for Development debate, and the interesting contradictions inherent in the Indian context, make it a reasonable choice for this dissertation. The decision to focus on India also made the project more feasible, but future research on other countries would be beneficial as well.

Various methodologies were considered to study the nature of ICT education, and these will be discussed further in chapter 4. The method of curriculum analysis was determined to be particularly appropriate and feasible for this study. Thus, the

research question was further narrowed to: What are the relevant characteristics of curricula at Indian universities vis a vis the idea of ICTs and why are these characteristics part of curricula?

The second part of this question was particularly intriguing. At this stage, it was decided to use neo-institutionalism as a primary theoretical lens and so taken-for-granted assumptions took on an important role in the conceptual framework. This led to a yet narrower question: How do institutional forces influence ICT-related curricula at Indian universities?

The hierarchy of research questions can therefore be summarised in the following diagram:

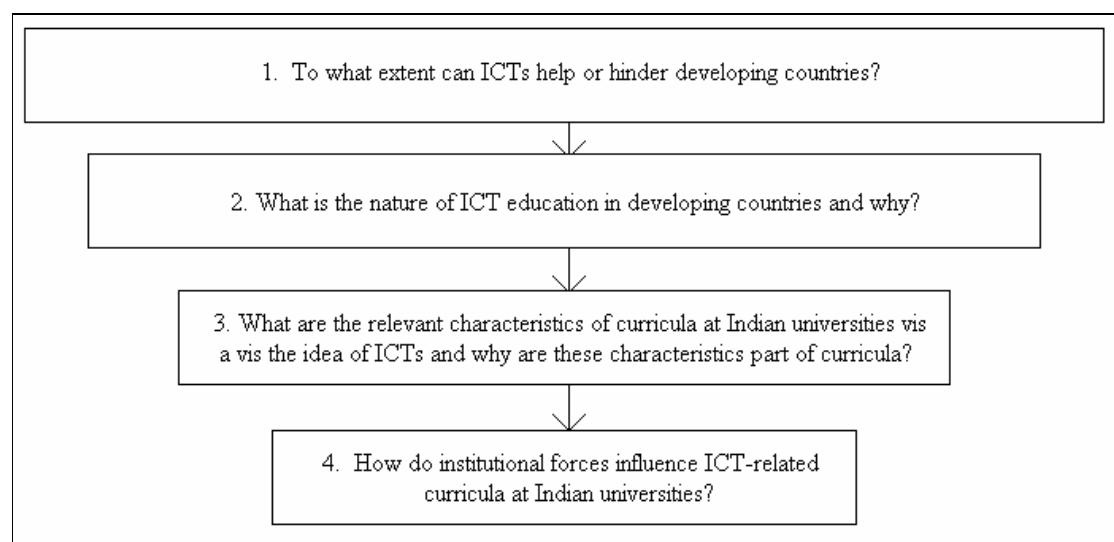


Figure 1.2: Hierarchy of Research Questions

Data was gathered specifically with the aim to answer some of the questions at the bottom of the hierarchy. The analysis was constructed to inform questions higher up the chain. The one research question that best summarises this study is:

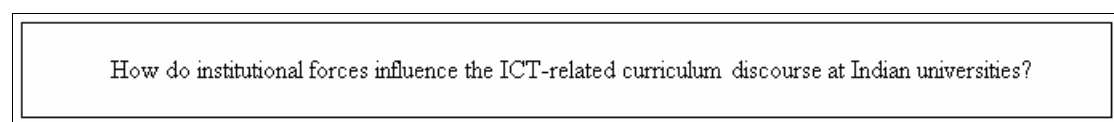


Figure 1.3: Overarching Research Question

1.2.2 THE LINK BETWEEN THE QUESTIONS AND THE PROBLEM

The commensurability between the problem statement and research question has been carefully considered. The link between the existing literature, the theoretical framework and research methodology is built-up over the next three chapters. There is a large academic community who engage in curriculum analysis. However, while this is common within the field of education (see Goodson 1998a, 1998b), it is rare within Information Systems. Nevertheless, as will be shown in chapter 4, it is particularly appropriate for this study. One of the major strengths of curriculum research is the ability to reveal institutional forces. Chapter 3 demonstrates that an understanding of institutional forces is crucial in understanding an underlying social system. Thus, while each decision has drawbacks and limitations, the research framework is reasonable and consistent. Curriculum analysis is an appropriate methodology to study institutional forces. Institutional forces are a reasonable lens with which to examine the nature of higher ICT education in India. Finally, as is indicated by the literature, a study of the nature of education is an appropriate next step for the “ICT for Development” literature.

The empirical data will be used to draw links between various institutional forces and elements of university curricula. These links take the form of: “institutional forces have influenced elements of the curricula in the following ways.” Then by inference, the link is drawn to how this link influences the idea of ICTs.

It is not argued that curricula shape the idea of technology *deterministically*, but curricula are one of the many factors that influence how the idea of technology is constructed. An understanding of the institutional forces underlying curricula development contributes an understanding to the question: How do institutional forces influence the ICT-related curriculum discourse at Indian universities?

Knowledge gleaned from answers to these questions provides some insight to the issue of whether higher education can be tailored to local needs or whether it is handcuffed by global institutional forces. Moreover, such an understanding of ICT

education in India will make a contribution, both theoretically and practically to the ongoing discussion on ICT for Development. These are the central tenets of the problem statement outlined above.

1.2.3 RESEARCH METHODS

As mentioned, the overarching research methodology in this dissertation is curriculum analysis. Curriculum analysis is a form of discourse analysis that theorizes texts and talk as social practices. Discourse analysis stems primarily from scholars such as Foucault and Derrida (Blades 1997, Derrida and Caputo 1997, Foucault 1977) who demonstrated that social concepts and power relations are constructed and shaped through texts and talk. Curriculum analysis is a form of discourse analysis; it is a methodology that examines power relations and the allocation of legitimacy through curricula. Curriculum analysis, as defined by its leading scholars (Bernstein 1977b, Goodson 1998a, Young 1971b) typically looks at the syllabi *and* the processes by which they were developed. This study follows their lead and incorporates a related methodology – narrative analysis – in order to gain different yet related insights into the process of curriculum development.

In order to collect empirical data, appropriate research methods were chosen that are commensurate with curriculum analysis. The first method used was document analysis. Various syllabi and reading lists were studied and compared in order to identify relevant and remarkable properties of the curricula. Marketing publications were also examined in order to verify some findings, although this was a relatively minor source of data. The data collected by examining documents was then augmented through interviews. Indian academics were asked questions pertaining to characteristics of the curricula and the process of curriculum development. Ivor F. Goodson (1985a, 1994, 1998a), one of the leading scholars in the field of curriculum analysis, advocated the use of a previously discredited research method: life history interviews. This style of interview was used in a few cases, and while it was successful to a degree, there were some clear limitations to its usefulness. The

methodological limitations will be discussed in more depth in chapter 7 and the research methodology will be presented and justified more fully in chapter 4.

1.3 OBJECTIVES

There are many objectives of this study. The first is to gain an insight into the research process, how theory, research framework and empirical data are developed synchronously to generate a coherent dissertation. It is obvious, yet should be stated, that a major objective of this study is to produce a document that is well-argued and well-structured and presents a well-developed thesis on the phenomenon of interest; namely, a thesis worthy of PhD. To that end, this study aims to generate a coherent argument on how institutional forces influence higher ICT education in India. In doing so it seeks to make the following contributions.

1.3.1 EXPECTED THEORETICAL CONTRIBUTIONS

As mentioned, while the theory of ICTs for Development is well-developed, it rarely includes an explicit conceptualization of the role of education. One of the aims of this dissertation is to make a contribution to the debate by theorizing how education can influence the relationship between ICTs and Development. Secondly, this study aims to make contributions to selected theories, such as Development and neo-institutionalism. The experience of using these theories and then reflecting on their limitations, could be generative in enhancing how these theories conceptualize reality.

Thirdly, this study hopes to make a contribution to the understanding of higher ICT education in India and by extension, how it shapes the idea of ICT. As will be shown, India presents an example of a country with a rich institutional field. This study aims to generate some understanding of the interplay of institutional forces and how they impact higher education. Finally, in generating a theory of how institutional forces influence higher education, this study aims to make some conclusions, however tentative, about the potential impact of ICTs on India. In doing so, it hopes to make a contribution to social theories on contemporary India.

1.3.2 EXPECTED PRACTICAL AND METHODOLOGICAL CONTRIBUTIONS

Furthermore, this study attempts to make practical and methodological contributions. Practitioners who implement ICT-based initiatives in developing countries can benefit from a better understanding of how ICTs are perceived and how this can influence the success of a given initiative. Since much capital is currently being invested in the Indian IT sector, a study of its higher education system is particularly timely. On a related note, much has been written about the increasing importance of India and other Asian nations (see Economist 2005a). Since this research is looking at university education, it can potentially make a contribution to the discussion on the future of India, if only tentatively. Finally, since curriculum analysis is not a methodology commonly used in Information Systems, through reflection and analysis, there exists an opportunity to make a methodological contribution.

1.3.3 DISSERTATION OUTLINE

This dissertation is organized as follows; first it attempts to establish the context and research framework, then it presents the empirical data followed by an analysis and discussion. Chapter 2 sets the context of this study. It examines the literature from three surrounding fields: ICT and Development, ICT education, and higher education in India. Following, chapter 3 establishes the research framework, outlining the philosophical assumptions and the theoretical lenses used to examine the phenomenon of interest. Chapter 4 explains and justifies the methodological choices and makes an argument of why the overall research framework is both coherent and appropriate.

Having introduced the context and framework of analysis, the findings are presented in chapter 5. The circumstances of data collection is discussed and then the data is presented in two sections; first, the data gleaned from document analysis, and second, the data acquired through interviews. Chapter 6 contains the analysis and builds the overall thesis of this dissertation; the argument of institutional collaboration. Chapter

7 reflects on the overall process, outlines the contributions of the study, and makes some suggestions for future research.

The first step, as always, is to set the scene. The next chapter presents an overview of the relevant literature pertaining to this study.

2 LITERATURE REVIEW

Chapter Abstract

It is appropriate to conceptualize this study as residing at the intersection point of three domains: ICT in Developing Countries, ICT education, and Indian Higher Education. The following chapter discusses some of the relevant literature from each domain and presents the central debates. In doing so, it sets the overall context for this dissertation.

Chapter Contents

2.1	INFORMATION SYSTEMS IN DEVELOPING COUNTRIES	22
2.1.1	Central Debates	23
2.1.2	Education in the ICT for Development Debate.....	26
2.1.3	A Major Departure Point.....	28
2.2	ICT EDUCATION.....	31
2.2.1	History of ICT Education	31
2.2.2	Current Issues.....	36
2.2.3	Current Debates.....	39
2.3	INDIAN HIGHER EDUCATION.....	43
2.3.1	History	43
2.3.2	Science and Technology Education.....	48
2.3.3	Current Issues.....	52

There are many bodies of literature that will inform this research, from a methodological, theoretical and practical standpoint. At times, the boundaries between these areas become blurred. Nevertheless, the following figure depicts the object of study. It is a somewhat arbitrary way to describe this project, but it is useful to illustrate the research context, for the moment keeping separate methodology and theoretical perspective.

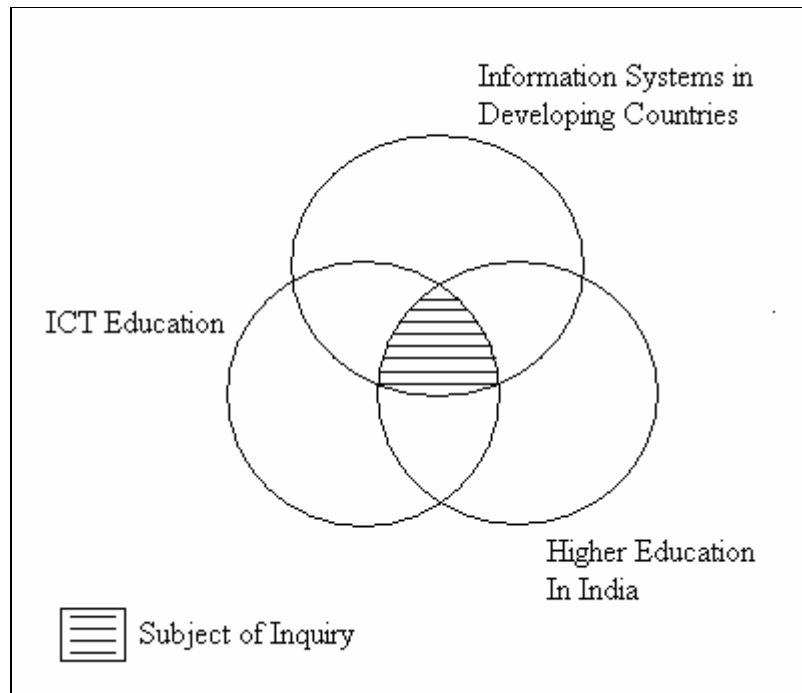


Figure 2.1: Subject of Inquiry

In consideration of Figure 2.1, the following literature review will bring in relevant research from these three areas to paint a picture of how this study will be grounded in the body of academic knowledge.

2.1 INFORMATION SYSTEMS IN DEVELOPING COUNTRIES

The idea that Information Technology (IT) can help developing countries is intriguing to many, because of the benefits that have apparently been realized in the West. As Avgerou (1990) wrote, the literature sometimes contains a naïve taken-for-granted assumption that the success of the West is attributable to ICTs, and therefore bringing the benefits of this development to poorer countries is simply a matter of delivering

Information Technology. This simple and technologically deterministic view might be unsurprising coming from world leaders, such as Kofi Annan (see Annan 2002), but it is also found in the academic literature. Eggleston et. al. (2002) argue that ICTs make markets more efficient and lower transaction costs by making information more available, accurate and reliable. They optimistically refer to it as ‘the gift that keeps on giving’. This view is apparently justified by the prevalence of league tables that show a correlation between GDP and ICT penetration. Correlation is not causation but this has not stopped several academics from focusing the debate on low-cost technologies, open source software, and the liberalization of the telecommunications sector (James 2001a, Mbarika 2002).

2.1.1 CENTRAL DEBATES

Clearly, this does not tell the whole story. Sometimes, an IT implementation does not meet its objectives because of social factors (Madon 1993, Southern 2002). Researchers who see Information Systems as “social” systems have looked at non-technological factors that influence an IT initiative (Bhatnagar 2000). Mixed within the differing views on what makes IT projects successful is a lurking scepticism about the whole endeavour. Wade (2002) argued that telecommunication standards and patent regimes give the West a distinct advantage. Therefore, promoting ICTs in developing countries strengthens a relationship where the South becomes increasingly dependent on the North.

Other authors are not just sceptical of the application of Information Technology but of Development itself. Escobar (1995) argued forcefully that the notion of Development is a construction of the Western industrialized countries whose new form of Orientalism paints a picture of people in developing countries living in darkness. The underlying message that the rich world sends to the poor through the notion of Development is “you have a big problem, but don’t worry, we can help.” The perverse nature of this discourse was also recognized by Avgerou (1998) who argued that the West, with their own particular history and rationality, perceive problems in developing countries with their own particular bias. In this light, the

Western idea that Western technology can be used to solve the problems of developing countries appears disingenuous.

The problem with this approach is not so much the bias, which is unavoidable considering that everyone has their own unique perspective, but rather because it denies the undeniable differences in context. Ciborra (2002b) pointed out that in Jordan, the application of Information Technology for the relatively simple purpose of managing drivers' licences, became fraught with risk. The problem stemmed from the fact that there were conflicts between Jordanian culture and the culture of the Western management consultants who were hired to manage the project. Information Technology can easily threaten the interests of local citizens by altering power relationships. For example, Bada (2002) showed that in Nigeria, much effort is put into building highly valued personal networks. Citizens found the introduction of an impersonal Information System threatening, because it reduced the value of these personal networks, built with much care over the long-term.

Differences in context are often a reason why ICT initiatives fail to meet their initial objectives (Avgerou 2001, Davison *et al.* 2000, Madon 2000, Ziegler 1995). However, contextual reasons can also help explain the rise of ICTs. It is often argued that the fact that Information Technology first became prominent in America was not a result of random chance. America had the appropriate legal infrastructure, high levels of military investment and cultural traits, that together formed an environment conducive to the development of Information Technology (Carmel 1997). In contrast, governments of developing countries are sometimes paternalistic and not production oriented, thus hindering the development and integration of ICTs (Avgerou 1990).

Given the difficulties, one might ask, perhaps developing countries should not bother with ICTs at all? It seems that this question cuts to the heart of a very fundamental human characteristic. Humans have always tried to use new knowledge to improve their lives (see Schumpeter 1975). To be sure, there are some communities that are steadfast in keeping to traditional ways of living, and reject even the simplest of modern conveniences, but in general, humans adopt technology when they can see

some benefit. Secondly, it smacks of arrogance to suggest that “those” people would be better off without Information Technology. People in poor countries seem to want Information Technology (see Leach 2003) and there is no reason to doubt their sincerity (Banuri 1990). Finally, even in the academic literature, nobody is seriously suggesting that developing countries reject Information Technology altogether. According to Castells (1996), the world today is more connected than it ever has been. In the new “information society”, the success of developing countries depends on their information literacy and their ability to handle information, and that in turn depends on education. In our “network society” countries have no choice but to learn to use ICTs in order to interact with other countries in this globalized age. Thus, this study proceeds with the ontological assumption that developing countries should indeed bother with ICTs, and it is the remit of researchers to examine the relationship between technology and society in order to see how they can benefit from each other.

The differences in theory and perspectives can be quite stark. In examining a simple act, such as a rich country donating an old computer to a poor country, there are many perspectives and nuances. Some would say that this is a kind gesture of the rich country, which is generously bridging the digital divide (James 2001a, 2001b). Others suggest that it is coercion on the part of the rich country to force their old technology on the poor (Moss 2002). Some even take this a step further and suggest that such an act is an example of neo-colonialism (Sy 2001).

When seen in this light, some commentators have suggested that the recent interest in technology – and the term “the digital divide” – is just the latest buzzword to describe social stratification, or the income gap (Bernhardt 2000, Murdock 2002). Some authors have concluded that technology can only have a developmental impact when several factors are present (Servon 2002, Steinmueller 2001, Vartanova 2002) including education, which is given significant importance in the ICT for Development debate.

2.1.2 EDUCATION IN THE ICT FOR DEVELOPMENT DEBATE

The literature on ICT education is found scattered around journals from many subjects, including Information Systems, Development, Education, and Policy. This reflects the fact that the subject is inherently multi-disciplinary. Because of this multi-disciplinary nature, policy recommendations and views on ICT education are quite diverse. However, within these diverse views, there are two major ongoing debates about the nature of ICT education in developing countries.

One of the most interesting ongoing debates in the literature is about where ICT education policy should be focused. Peter Sy (2001) looked at IT communities in the Philippines and concluded that ICT education had to be re-addressed in favour of a grass-roots, bottom-up approach.

Bottom-up approaches in mass education that promote meaningful engagement of technology must be given priority over those commercially sponsored, hype-driven programs (Sy 2001).

The language used in this quotation suggests that according to Sy, this point is obvious to anyone except those with commercial interests. However, this is contradicted explicitly by Ziegler (1995) who suggests that the most important factor in harnessing technology to a country's advantage is "knowledge-bearing elites". He thus advocates a more top-down approach to education, that is more focused on power relationships and the future leaders of society. The battle lines of this debate are repeated in a wider argument over who should receive government attention. Bohme (2002) called for more focus on primary education. However Quibra et al. (2003) disagreed and argued that if a country is to exploit potential opportunities arising from ICTs they must develop secondary and tertiary institutions as well.

To complicate the debate further, other authors have tried to focus government attention on adult education. In an interesting paper, Hartviksen et al. (2002) suggest investing in municipal IT schools similar to municipal music schools found in Northern Europe. The authors gathered their empirical data from lower income neighbourhoods in Norway, and claimed that their findings suggest that this type of

schooling, primarily targeted to adults over thirty, can be used to bridge the digital divide. However, in examining the “Lessons from Asian Success Stories” Subhash Bhatnagar (2000) wrote about the importance of “sustained training to all levels”. In this case, he meant “workers, managers and supervisors”. Clearly the debate about where governments should focus their policies is lively and ongoing.

A second debate in the literature is focused on content. There is a significant body of literature on the subject of ICT curricula, not necessarily in developing countries. This literature generally prescribes a curriculum independent of context, and recommends a technical education (Davis 1987, Roberts 2000). Even within this narrow area, there is a debate about what courses should be included in a good technical education, however more interestingly, there are some authors who suggest that the “social science” aspects of ICT should not be ignored, particularly in a developing country context (Granger *et al.* 1997).

Adnan Yahya (1993) stressed the need for education in Management Information Systems (MIS), specifically, courses in data processing and the peculiarities of managing various systems. He proposed that the lack of this type of knowledge is a major cause for problems in managing ICT in developing countries. Reffell and Whitworth (2002) also stressed socio-technical issues and recommended policies that focus on “IT fluency” such as teaching critical and evaluative skills, and the relevant contextual factors. Finally, there are authors who state that cultural issues such as gender, ethnicity and ethics ought to be included in various curricula, arguing that all technology is affected by social context (Granger *et al.* 1997, Little *et al.* 2000).

These two debates – first, on which constituencies governments should focus their attention, and second, what should be taught – are the essence of the literature on ICT education. In the wider context, it is these two questions upon which governments must focus. Differences in policy recommendations found in the literature often exist because of conflicting rationalities for delivering ICT education. Hawkrige *et al.* (1990) discussed four major rationalities for introducing computers into third-world schools: social, vocational, pedagogical and catalytic. Many of these rationalities exist

in the literature on ICT education policy, reflecting differences on the underlying purpose of education.

Some authors suggest that curricula should be changing in order to educate students in “digital literacy” (Buckingham and McFarlane 2001). As mentioned earlier, this opinion is shared by Bohme (2002) who writes that IT is now a fourth basic competence. This view of education stems from a social rationality, a view that the purpose of education is to make students more socialized into their environment. The vocational rationality is also prominent in the literature, with some authors recommending policy that focuses on increasing employability (Kelegai and Middleton 2002).

Other policy recommendations stem from an economic or industrial rationality. In recommending policy for ICT in Fiji, Davis et al. (2002) clearly advocate tailoring ICT policy for the purposes of creating a knowledge economy. Campbell (2001) also makes similar policy recommendations with the intention of creating a technology industry and attracting foreign direct investment. Finally, some authors have proposed that governments tailor education policies with the intention of stimulating research and spurring innovation (Dill and Teixeira 2000).

2.1.3 A MAJOR DEPARTURE POINT

Thus, there are many differing views in the ICT for Development literature on the *role* of education, but its *importance* is frequently emphasized. The following statement put forth by Avgerou and Walsham (2000) is lucid, moderate and is characteristic of much of the recent literature on ICTs for Development – so it is worth quoting at length:

This book seeks to overcome this polarized split between the utopian techno-enthusiasm... and the paralyzing anti-technology attitude... The authors contributing the chapters of this book can be considered to share the following set of broad premises:

- Information and communication technologies, and related systems, have significant potential to aid the economic growth and improvement of social conditions in the developing world;
- however, such potential is not released by simply transferring technologies and processes from advanced economies. The organisational logic, work practices, and cultural conditions which surround and enable such technologies in their original context are often alien to the recipient context. As a result, many IT-enabled projects fail to deliver expected beneficial outcomes, frustrating rather than assisting the recipient country's development efforts;
- in order to better serve development needs, people involved with the design, implementation and management of IT-related projects and systems in the developing countries must improve their capacity to address the specific contextual characteristics of the organisation, sector, country or region within which their work is located (Avgerou and Walsham 2000).

Since this is characteristic of much of the literature on ICT and Development, it is instructive to note the way education is hinted at in this passage. In the third and final premise, it reads "developing countries must improve their capacity to address specific contextual characteristics". Avgerou and Walsham are unclear about what they mean by improved capacity and how this should be done. Nor is it explained more fully by them or other authors in the rest of the volume. However, they presumably feel that it is important since it is the central idea of the third and final premises that the contributing authors "can be considered to share".

Similarly, Robin Mansell (2002) wrote:

For citizens to make sense of the information they receive, they need skills... New media... creates a need for citizens to acquire new capabilities for assessing the value, veracity and reliability of information if they are to participate effectively with the fabric of a global society... If as Castells suggests, 'the Internet is the fabric of our lives' and if those living within this fabric are to have the freedom to achieve the lifestyles they desire, then they must be able to acquire new media literacies (Mansell 2002).

Mansell's argument about the importance of acquiring media literacies is similar to Amartya Sen's writing on Development. Sen (1997a) argued that "Development" should be seen as giving people the fundamental capabilities necessary to live a

meaningful existence and make key decisions pertaining to their own lives. These arguments are prescriptive, suggesting what people “ought to do”. Mansell does not elaborate as to what issues may arise, the inherent difficulties in promoting literacies, or the power relationships involved. Likewise, she makes no comment on the current nature of information literacy in various societies. Mansell’s work is very similar to that of Castells (1996, 1999, 2001) in the manner in which they place importance on developing literacies and technical capabilities; alluding to the importance of education, but not addressing it fully or explicitly.

One final example should suffice. Richard Heeks (2002) looked at the causes of IT failures in developing countries. Using the theory of design-actuality gaps, he argued that there is a need to build the capacity for local improvisation in developing countries. His prescriptive argument is strong; he makes a convincing case for why this is important. However, the notion of “capacity for local improvisation” is left somewhat vague, as to what exactly this is, how it can be increased, and what the issues are.

These texts are from prominent writers in the field of ICT for Development as Avgerou, Castells, Heeks, Mansell, Sen and Walsham. They are also characteristic of the way education is treated in the ICT for Development debate. The importance of education is almost taken-for-granted, but the issues are never fully addressed. This is not a criticism of those authors who have made a significant contribution to the field of ICT for Development. Rather it is an observation that in much of the literature, education is given great importance, but is treated superficially, almost “in passing”. This is major departure point for this study.

2.2 ICT EDUCATION

The label of “ICT Education” contains many different ideas that are not always compatible. Thus it is important to make the following distinction between computer education and computer assisted learning.

- Computer education means teaching people about technology, teaching them how to use technology and what technology can be used for.
- Computer assisted learning – also sometimes called e-learning, online learning, or computer mediated learning, or (unfortunately) computer education – refers to using ICTs as a pedagogical tool, to help teach students how to do mathematics, or learn languages, etc.

This is not a pure dichotomy, when a student learns Spanish using a computer, he will also learn something implicit about the technology. However, this distinction is useful when trying to make sense of the literature on the relationship between ICTs and education. This study is solely concerned with the former; computer (or ICT) education.

2.2.1 HISTORY OF ICT EDUCATION

ICTs and their associated instructional programmes arose in a certain historical context, which is worthy of some discussion. The computer arose in a time and place that was decidedly modernistic. As Carmel (1997) wrote, it is unsurprising that ICTs developed in America given its high levels of military spending, entrepreneurial culture, capitalistic economy and individualistic society. In some sense, ICTs and modern society formed a mutually beneficial feedback loop, fuelling the growth of ICT and further promoting modern ideals.

At the same time, this coloured the way ICT was taught. Literature on ICT education began to appear in the 1960s, and was primarily focused on technical details, programming, and the mathematical applications of computing (Brauer 1985, Ercoli

1985). From a social standpoint, there were papers exhorting ICT education to “meet the needs of industry” (Department of Education and Science [England] 1967), but there was no discussion on designing courses to teach how ICTs could lead to competitive advantage, or how they change aspects of society, or other issues related to politics and the economy.

This is not to say that social issues did not exist; they did and educational planners were clearly aware of them. In 1967, in a booklet called “Computer Education” targeted to academics and policy makers, Diana Law (1967) wrote:

Computers have always been surrounded by a certain amount of mystery. Some people think of them as witch doctors, others as electronic brains. Some see them as square, grey metal "Dr. Whos" who may dominate and rule people's lives - an aura of secrecy, black magic and mumbo jumbo very often surrounds them. It is fair to say that some of this thinking is due to the original computer experts who, wither by accident of intent (and the former implication is preferable) were treated (and expected to be treated) as conjurors, whose expertise means at the same time fascination and mystique. In fact, computers are *not* electronic brains, nor in any way magical; nor will they ever make decisions or dominate our lives. Computers are electronic morons which (and one should say *which* rather than *who*) can do nothing except what they are told to do (Law 1967).

Some IS practitioners might find surprising parallels between the issues raised in 1967 by Law and the current IS literature. What is revealing is the social issues related to computing were clearly apparent. However, when designing curricula, academics tended to focus on technical problems rather than social issues. This booklet (Law 1967) goes on to stress the facilities needed in schools, in particular, the importance of elementary card punching equipment.

In the 1960s, ICT education tended to be called “computer science”. As this discipline went through its growing pains, it was always fighting for legitimacy and trying to find its voice. Practitioners commented that it resided somewhere between the “purest mathematics and the dirtiest engineering” (Oettinger 1968). Such was the place for ICT education. A typical 4-year undergraduate curriculum was as follows:

Module 1. Introduction to Algorithmic Processes
 Module 2. Computer Organization and Programming
 Module 3. Numerical Calculus
 Module 4. Information Structures
 Module 5. Algorithmic Languages and Compilers
 Module 6. Logic Design and Switching Theory
 Module 7. Numerical Analysis
 Module 8. Computer and Programming Systems
 Module 9. Combinatorics and Graph Theory
 Module 10. Systems Simulation
 Module 11. Mathematical Optimization Techniques
 Module 12. Constructive Logic
 Module 13. Introduction to Automata Theory
 Module 14. Formal Languages
 Module 15. Heuristic Programming

Figure 2.2: ACM Curriculum for Undergraduate Computer Science (1968)
Source: (Beckman 1968)

This curriculum is very technocratic, devoid of any reference to the social implications of technology. Social issues started to play a role in the ICT education in Britain with the publication of an “Information Systems” curriculum. In 1968, the IFIP Technical Committee for Education (TC3) in cooperation with the IFIP Administrative Data Processing Group (IAG) initiated a working group to come up with an IS curriculum, which was published in 1974 with the following 4 major components:

Module1: Computers and information processing systems
 Module2: Techniques of management science
 Module3: Organizational theory and practice
 Module4: Information system design

Figure 2.3: IFIP Technical Committee Curriculum, Graduate Information Systems
Source (Buckingham *et al.* 1987)

This work was revised in the mid 1980s by a group that included eminent IS scholars such as Rudy Hirschheim and Frank Land. Their results, a well-specified curriculum

for a full 3-year undergraduate degree in Information Systems, were published in 1987:

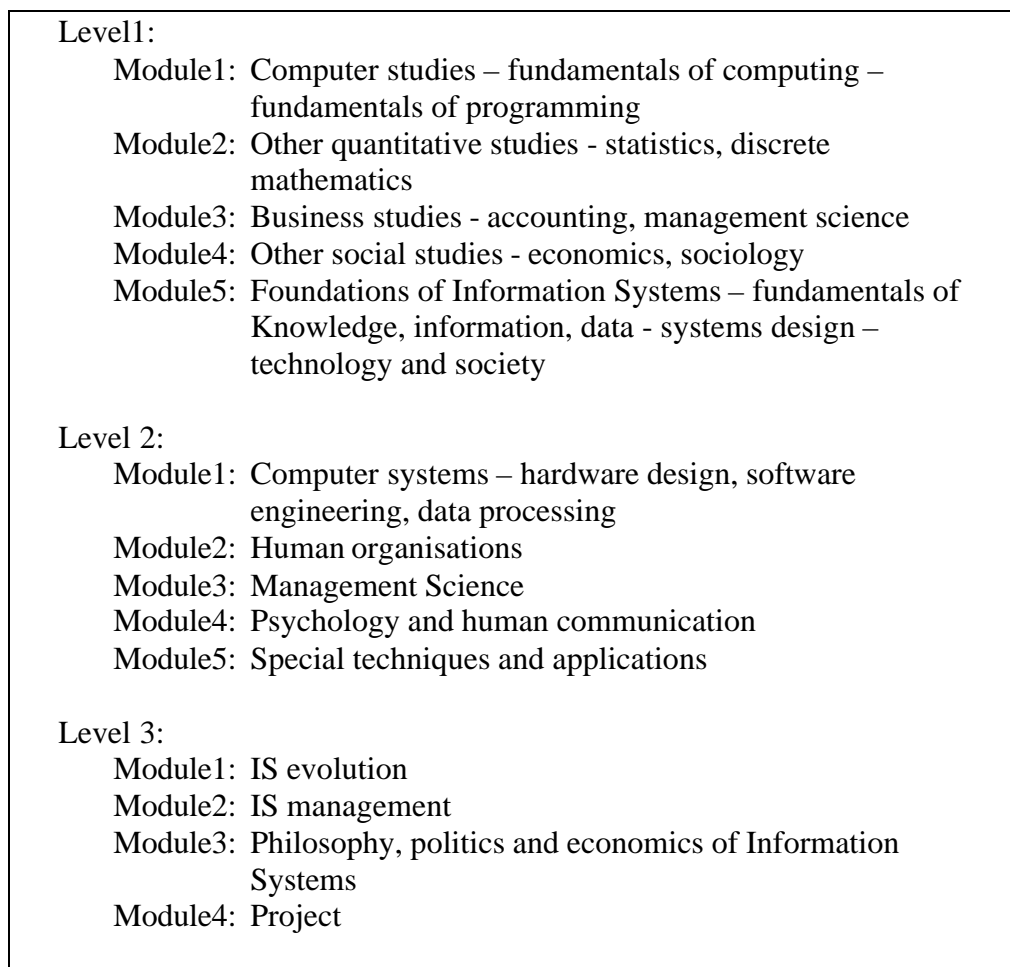


Figure 2.4: 3-year Undergraduate Information Systems Curriculum.
Source: (Buckingham *et al.* 1987)

Several further efforts have attempted to create Information Systems curricula elsewhere in the world (see Davis 1987, Galliers 1987), and to create hybrids between Information Systems and Computer Science (Banbury 1987). A remarkable diagram has been developed by Merkle and Mercer (2003). While it only focuses on the United States, and is definitely arguable, it is an interesting view of the history of ICT education.

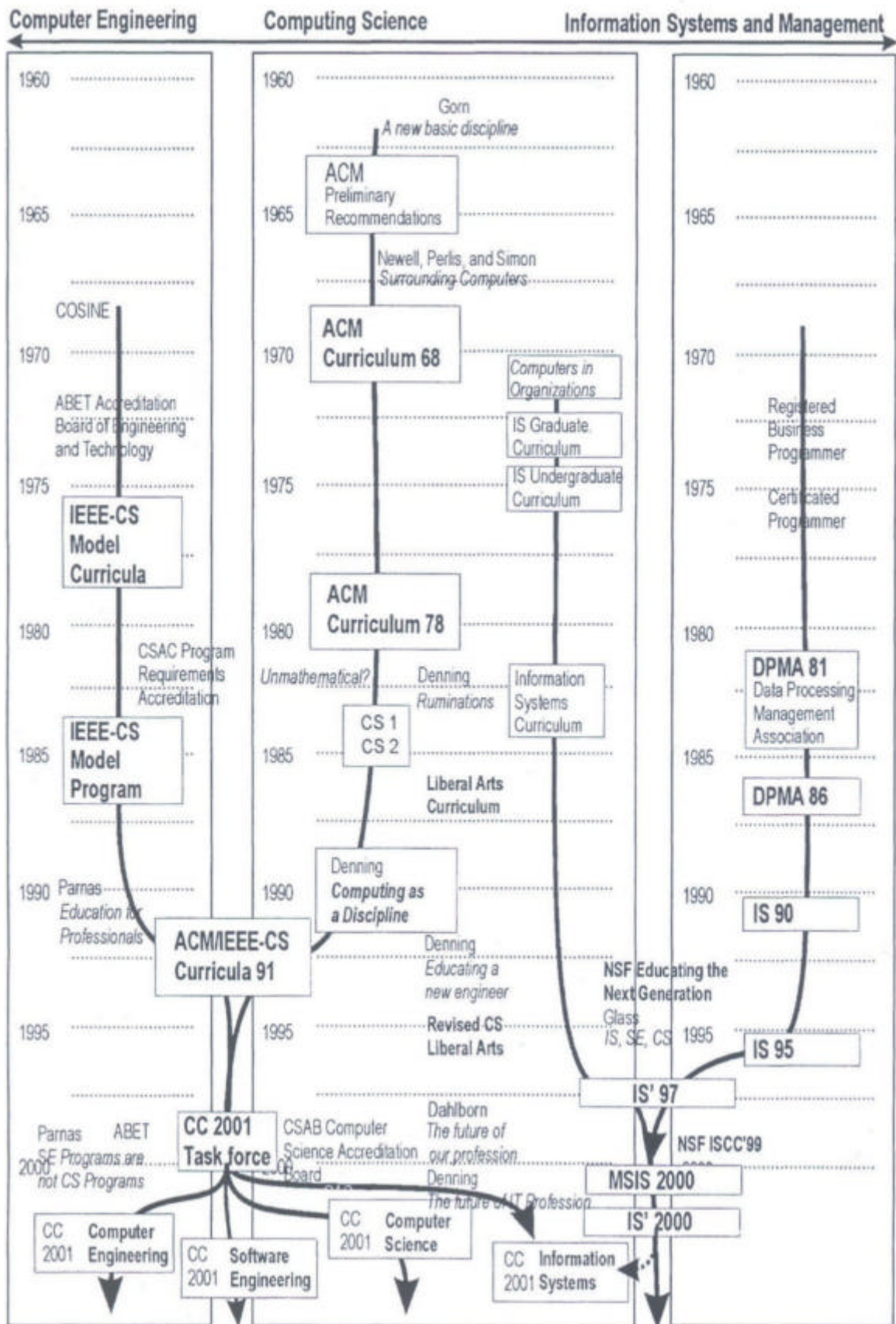


Figure 2.5: History of ICT Education in the U.S.A. Source: (Merkle and Mercer 2003)

These curricula contributed to an ICT education that although maintaining its technical focus, also increasingly took on social issues. However, it is important to note that for the most part, ICT education – including Information Systems – was designed and delivered on the basis of a vocational rationality. The intention was to teach students the skills to get good jobs and to meet the needs of the economy (Galliers 1987).

2.2.2 CURRENT ISSUES

Today, at the tertiary level, most students are still taught about computers in very technical programmes such as Computer Science or Computer Engineering. However, there are disciplines that focus on the social aspects of technology, not just within Information Systems but also related disciplines such as Business IT, Information Management and Library Science (see Adam and Yesha 1996, Gorman and Corbitt 2002, and the discussion in Avgerou 2000).

In regards to the technical programmes, there is a large body of research that discusses what is to be taught, how curricula should be set up, and which programmes best suit student needs (Barrett 1985, Buckingham and McFarlane 2001, Reichgelt *et al.* 2002). However, there seems to be little research done on the curricula for more social computer-related programmes. Most introspective work on Information Systems is focused on research (see Avgerou *et al.* 1999, Robey 1996), not teaching. Nevertheless, some papers have raised some interesting social issues with regards to ICT education.

Little *et al.* (2000) have called for ICT education to be more sensitive to cultural issues and differences that are related to technology. Secondly, following a similar line of argument, Granger *et al.* (1997) highlighted the absence of modules addressing ethics in ICT education. The authors have made several curriculum recommendations on how ethics can take on a more prominent role. Thirdly, Strong *et al.* (1987) have developed an Information Systems curriculum that is primarily technical, but the

authors stress that ICT is developed *for people* and so the focus of the curriculum is on usability, deployment and human-computer interaction.

A common theme that runs through the current literature on ICT education is that of technical literacy. As mentioned, this also plays a role in the debate on ICTs for Development (see Castells 1996, Mansell 2002) and it is part of a general concern that not enough people are getting the skills needed to operate in the 'information age'. Craver (1997) has written an interesting book on teaching media literacy, how to use electronic search engines, electronic databases and how to evaluate electronic information. The issue of technical literacy does not just apply to students, lack of literacy in teachers also has effect on the delivery of ICT education (Williams *et al.* 2000).

This lack of literacy on the part of teachers can create odd dynamics in the classroom. As children play on computers in their homes and during their free time, they are developing digital literacies that in many ways surpass those of their teachers. As Buckingham and McFarlane (2001) argued, this is a new phenomenon and creates a need for new forms of pedagogy and curricula in order for ICT education to maintain its relevance. The problem will become exacerbated as younger and younger children start using ICT, and as computers become prevalent in elementary schools and kindergartens (Chapman 2000).

There are a few observations to make about the current state of the academic literature on ICT education. Much of the literature is prescriptive; outlining what *must* be done so that ICT education can maintain its usefulness. Often, this literature has a revolutionary zeal. There is much less descriptive research that seeks to understand ICT education or to analyse it within a particular theoretical framework. Social issues are definitely gaining prominence as problems of access and relevance are becoming apparent. However, these issues are only appearing in theoretical and reflective academic papers. They are rarely manifested in model curricula.

The academic literature reveals that ICT curricula continue to be based on an instrumental or vocational rationality. Even in Information Systems, a discipline that puts social issues at the forefront, the design of the curricula seems to be underpinned by vocational goals. This is not inconsistent or necessarily problematic, just important to observe. The following figure depicts the model curriculum for a graduate degree in Information Systems developed by the Association for Information Systems

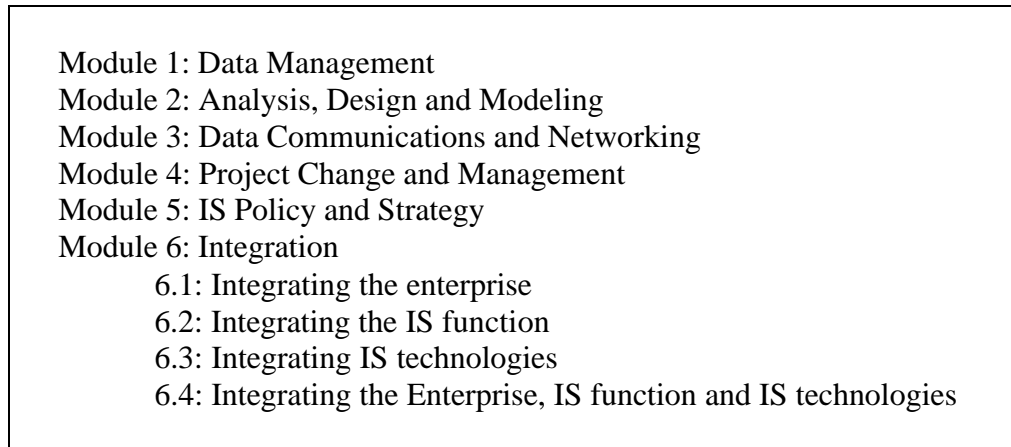


Figure 2.6: AIS Model Curricula for a Graduate Degree in Information Systems
Source: (MSIS 2000)

It seems apparent that the purpose of this course is to equip students with the skills to implement and deploy Information Systems into commercial enterprises, a fact not concealed by the authors of the curriculum. This is very much characteristic of ICT-related curricula. To be sure, within Information Systems and Computer Science as well, there are certain programmes or modules that are solely concerned with theoretical and intellectual development. But for the most part, ICT education is designed so that students can meet some immediate societal or industrial need (Eggleston 1994, Roberts 2000). This is partially due to the context in which ICTs gained prominence and also to the nature of education – and higher education specifically. Universities are under pressure from various constituencies – governments, students, industry – to meet certain societal needs. In current, modernistic, Western societies, needs relating to technology are particularly acute. However, free from those pressures, some lively debates do take place in the academic literature.

2.2.3 CURRENT DEBATES

Reffell and Whitworth (2002) have argued forcefully that most ICT education is ineffective because it is too technical and not at all concerned with local contexts and real world problems. Other case study research seems to support this argument. In Brunei, ICT education was too rationalized and modernistic for the country's rentier economy (Minnis 2000). Likewise, in Papua New Guinea, the desire for a Western style ICT education programme caused disruptive tensions between local and foreign academics (Kelegai and Middleton 2002). However, Neville (1998) argued that Malaysia's ICT education programme was particularly successful *because* it was narrowly focused on a modernistic agenda. On a higher, more abstract level, some argue that computers are over-hyped, do not increase productivity, and so the need for them is overstated (Garnham 2000). Others argue the opposite – that IT is now a fourth basic competence, equal in importance to reading, writing and arithmetic (Bohme 2002).

At the heart of these debates is a fundamental disagreement about what it is that universities do. Some argue cogently that universities must first satisfy the needs of industry, and then other stakeholders will benefit (Eggleston 1994, Kohli and Health 2001, Liu and Jiang 2001, Roberts 2000). Others who support this claim point out that the reason students go to university is primarily because they want good jobs (Dougherty 1988), and argue that education should focus on achieving full employment (Saunders and Machell 2000). But Williams (2000) writes that universities are already too focused on employment and industry, which is detrimental to their teaching and research. He is representative of a more idealistic school that argues that universities should help build pure knowledge, social capital and the capacity for critical thinking (Aronowitz and Giroux 1991, Conceicao *et al.* 2001, Freire 1972, Giroux 1983, Reffell and Whitworth 2002).

Banks (1994) characterized this as “The Great Debate”, between “liberal” and “instrumental” education. For him, liberal education rests on a desire to cultivate the intellect and to develop a highly analytical and critical way of thinking. A liberal

education sees the pursuit of knowledge as active and interconnected, not simply a recollection of facts. Liberal education tends to create a hierarchy of cerebral subjects, such as Latin, Physics and Mathematics that have a higher status than art of craft. The risk of such a system is that schools become divorced from the world of work and education loses any notion of immediate usefulness. On the other hand, instrumental education is based on the premise that education serves society. An emphasis is placed on the relevance and utility of education, where students are expected to apply their knowledge vocationally, contributing to the economy. The risk of such a system is that students are encouraged to simply meet some identified need, rather than think critically with the purpose of achieving some sort of personal or communal advancement. Conlon (2000) is highly critical of instrumental education and calls it a form of paternalism. He argues that instrumental education is underpinned by the following dubious beliefs:

1. The aim of schooling is to prepare for the nation's economic success. IT is at the heart of the knowledge economy. Therefore all children must learn the skill of IT.
2. Postmodernist forces are fragmenting society. Society should not be allowed to fall apart. Social cohesion can be strengthened by ensuring that all children follow the same curriculum. Therefore a standard curriculum will be imposed.
3. The necessary changes are too important to be left to chance. Therefore schools must be made accountable and teachers must be monitored. Considerations of efficiency, high standards and equity justify the use of computer networks and centrally devised IT-based teaching resources (Conlon 2000).

His first criticism of instrumental (or paternal) education is a direct attack on some of the writers mentioned above: For Conlon, "Paternalist" education is an

acceptance of what Goodson and Mangan (1996) have called the "computer literacy ideology". This consists of a set of widely-held but somewhat vague beliefs about IT that can be summarised as follows: computers are everywhere; jobs increasingly require computer skills; therefore everyone should learn about computers at school. The first premise of the argument is correct but the second is dubious and the third is a non-sequitur. Most employment forecasts indicate that only a tiny minority of future workers will require significant IT expertise and the needs of this group require graduate-level education. Other workers who use computers will either do no more than follow simple on-screen instructions or will receive special training for the required task. Of course, future technology may bear little resemblance to the computers that are around today (Conlon 2000).

The need to increase computer literacy is treated as given by most writers on 'ICT education' and 'ICT and Development', that it almost appears banal. Conlon's criticisms stimulate an important debate. He strengthens his argument by proposing that paternalist education necessitates an unduly centralized education system where schools are rigidly controlled from above. This introduces a real risk of a slide towards authoritarianism.

In contrast, he proposes a libertarian education based on the following principles:

1. The main aim of schooling is to prepare the individual to be an intelligent consumer and flexible post-Fordist worker. IT will provide the main marketplace within which individuals operate. Therefore IT should be at the centre of children's learning.
2. Individualism is the future. Therefore the notion of providing the same curriculum for everybody is outdated. Each child will pursue a personal curriculum based on computer learning environments and virtual communities.
3. Eventually most learning will take place in the home. However some schools will survive. These will be known as lifelong learning centres and their functions will be to provide safety-net education for the poor and vocational re-orientation for those who lack marketable skills (Conlon 2000).

Striking the right balance in ICT education is notoriously difficult (Dawson and Newman 2002) and, as Conlon acknowledges, his proposed libertarian system too has weaknesses. It emphasizes a consumerist culture, encourages social disintegration, and undervalues the social function of schooling. Moreover, it can precipitate a slide "towards a dumbed-down, trivialised culture" (Conlon 2000). However, in raising these issues, Conlon articulates the points of contention that are at the heart of a major debate surrounding ICT education. This debate takes on added significance in the context of developing countries and reflects a wider debate on the purpose of education.

Freidrich Ebert, former leader of the German Social Democrat party once wrote: "General education is the vocational education of the upper class. Vocational education is the general education of the working class." (quoted in Feingold *et al.* 1990). Education is not merely the benign and altruistic transfer of skills and knowledge. For many authors, the primary purpose of education is to establish certain

attitudes, values and behaviours (Mitch 1999), the process referred to as the sociology of education. The idea is not new, for the Roman Empire, conquering lands also meant civilising people and “saving the savages” (Spring 1998). Thus, education always had the side effect of spreading and entrenching a certain world view. Today, education also serves that purpose as well; some go as far as to call it “brainwashing” (Angell 2000). These debates take on added significance in the globalised era. As standards converge, the risk of homogenization and excessive profiteering becomes very real (Bird and Nicholson 1999).

Early social theorists such as Durkheim (1956) stressed the instrumental role that education played in society. He argued that society flourishes when it is in a relatively stable state achieved through consensus. He argued that society provides a “moral education” to pass on central beliefs from generation to generation. Talcott Parsons (1959), went further and suggested that education is not only used for socialization, but also for selection into various societal roles. Both Durkheim and Parsons saw the functional role of education as a method of establishing a stable, integrated society of well-functioning interdependent parts (Parelius and Parelius 1978).

However, many authors feel that the consensus theorists have blinded themselves to the obvious hostility, violence and conflicting goals that exist in society. These conflict theorists see the world in a constant state of change. For them, education is a coercive tool used by the powerful to indoctrinate the oppressed and justify their rule (Waller 1961). Samuel Bowles (1972) wrote that capitalism weakens the family and reduces its ability to socialize the young. Further, inequalities of wealth and oppressive factories create a threat to the interests of the elite. And so the ultimate solution is a mass education that supplies workers with appropriate skills, and more importantly, legitimizes existing inequalities by suggesting they are based on merit rather than on coercion (Bowles and Gintis 1977). This argument is present in the literature on ICT education. Moll (1998) argued that technology is not neutral. Introducing ICT into schools and universities in such a dogmatic and enthusiastic way gives a distinct advantage to the private sector, which is – by contrast – to the detriment of public and communal interest.

ICTs provide a unique challenge to education providers. Technology changes at a very fast rate, where education is notoriously slower. This is partly because it is costly to develop materials and curricula, and partly because of the difficulty for teachers to acquire new and necessary skills continuously (Avalos 2000, Cochran-Smith 2003). Once education has caught up, technology has moved on. Exacerbating the problem, industry places heavy demands on society for various skills and abilities that cause ripple-effects throughout the education system (Kohli and Health 2001). These competing forces work in a fluid arena where the very purpose of education is constantly debated. For various reasons outlined in chapter 1, this dissertation is focused on higher education in India. The educational environment in India is particularly interesting given its historical and social context.

2.3 INDIAN HIGHER EDUCATION

There has been much written on the Indian higher education system, both by Indian and international scholars. Some of the issues that are raised are common to those in most countries, while others are specific to the Indian context. A review of the literature in this field reveals that there are a few major themes at the forefront of the discussion of Indian higher education. One is the history and the enduring implications of the British colonial administration. Higher education during this period is seen as being a tool of the Raj, where the enrolment numbers were deliberately kept low. The period after independence saw decades of rapid and sustained growth, which continues to have residual effects today. A second theme that is given prominence in the literature is the importance of science and technology. The following section outlines these issues in more depth and concludes with a discussion on the current debates in the literature.

2.3.1 HISTORY

Much of the literature on Indian higher education begins with a history that notably, tends to start during the later years of British Rule. There are perhaps political reasons

for this, but logical reasons as well. Higher education was a feature of traditional Indian society for many centuries, but the first Universities, as they are currently understood, were established by the colonial administration (Raza *et al.* 1984). In 1857, through an Act of Parliament, the British established universities in the port cities of Calcutta, Madras, and Bombay. The residual effects of the colonial period are hotly debated in the academic literature, especially by Indian scholars. While many argue that the British pillaged India for its resources and used India's riches in large part to fund the British empire (Chandra *et al.* 2002), some argue that the British brought benefits to India, including modernity, railways and the English language (see Lal 1999). While this debate is outside the scope of this dissertation, it is important to acknowledge it in the context of higher education.

It seems clear that the universities set up in India had a different mandate than those at Oxford and Cambridge. The Indian universities were under the control of the East India Company and were managed to the Company's advantage. Steps were taken to ensure that the universities were not centres that could foment revolutionary zeal, or to consolidate a critique of the colonial administration (Raza *et al.* 1984). The programmes offered were insulated from the lives of ordinary Indians. They contained British notions of education and were mainly set up to produce a sustainable outflow of graduates sympathetic to British interests, and clerks who could help in the administration. Regular reforms were initiated by the state, not the university, and this lack of autonomy for higher education was anathema to the traditions of British universities, which had robustly established their autonomy and freedom from state intervention (Ibid.).

Those critical of British colonialism in India argue that the administration manipulated elements of Indian society to their own ends, dividing communities against each other, manipulating the caste system, and using universities to create cleavages in Indian society. As Raza *et al.* (1984) wrote:

The obsolete, the backward looking and the decaying elements of tradition were not allowed to die a natural death... The colonial powers preserved the festering sores of casteism and communalism, parochialism and obscurantism so as to pollute the atmosphere of national resurgence and to infuse ideological debility

in the system. Over this oozing layer of decaying tradition was superimposed a thin veneer of rootless modernity imported from across the seas. These structural inadequacies were expressing themselves most sharply in the sensitive sphere of educational under-development... The unnatural mixture of fossilized tradition and rootless modernity was concocted in the crucible of colonial India (Raza *et al.* 1984).

The authors went on to write:

As the system of alien rule stabilized itself, however, the Universities and colleges were assigned triple functions: intellectually to familiarise students and through them the local population with European thought, relatively disentangled from the shackles of ecclesiastical epistemology, culturally, to transmit and propagate the cultural values and norms specific to Britain, and politically, to produce a class of collaborating clerks and policemen for the various levels of the colonial administration. Institutions of higher education were given formal structures basically with these ends in view (Raza *et al.* 1984).

On top of these critiques, it is striking to note that many Indian scholars, who comment on the characteristics of the colonial higher education system, mention the lack of science and technology education in Indian universities under British rule. For them, this critique is on par with the others mentioned above:

The development of Indian education system not only had serious inadequacies in terms of the size of enrolment but also in terms of its spatial pattern and context. Instead of preparing scientists, technologists and agronomists, Indian higher education was, by and large, engaged in producing “graduated flunkeys” (Raza *et al.* 1984).

By way of counter-argument, one might mention that top British universities in 1857 (and today) were (and are) not necessarily focused on science and technology education either. They offered significant ‘liberal arts’ programmes and produced their fair share of “graduated flunkeys”. For the context of this dissertation, it is important to note the way Indian scholars criticize the British administration. For them, the lack of science and technology education is seen as a *major flaw* of the colonial education system.

In the years following independence, there was dramatic growth in the higher education system. The scale of change that occurred is difficult to appreciate. In 1951, tertiary students in India represented 0.42% of the total population. By 2001, that rate

had increased over 6 times to 2.97% of the population. In the 2 decades from 1951 to 1961, the number of higher education students increased by an annual rate of over 8%.

	Population	Tertiary Enrollment	Higher Education Students as a % of population	Average Annual Growth Rate (%)
1951	361,088,090	1,500,000	0.42	
1961	439,234,771	3,400,000	0.77	8.52
1971	548,159,652	7,600,000	1.39	8.38
1981	683,329,097	11,000,000	1.61	3.77
1991	846,387,888	19,100,000	2.26	5.67
2001	1,027,015,247	30,500,000	2.97	4.79

Figure 2.7: The Growth of Indian Higher Education
Sources: (Department of Education [India] 2004, Raza *et al.* 1984)

The reasons for this are many. Firstly, government stressed a link between development and education, and so put more emphasis on universities than the previous colonial administration (Tharoor 2000). Secondly, Independent India pursued an aggressive policy of import substitution and tried to be self-reliant in many industries and sectors of production (Chandra *et al.* 2002, Malkani 2002). This created a pressing need for qualified university graduates. Thirdly, in the early years, the government had a decidedly socialistic bent and introduced mechanisms to allow previously disadvantaged tribes and castes to gain admission to universities, thus making higher education a new possibility for large sectors of the population (Gore 1989). And finally, increased expenditure at all levels of education created a vertical push that increased the demand for higher education (Raza *et al.* 1984).

Higher education has grown in significant numbers for the past 50 years, but for 2 decades in particular, there was intense pressure on the system to grow rapidly. There was a constant shortage of teachers, equipment, facilities, books, etc. The result was a system of poor quality, student protests and civil unrest (Kumar 1989). One of the lasting effects of this period was a growth in not only universities, but also other forms of tertiary education. The original 3 universities set up in 1857 were based on the University of London, a central university with affiliated colleges (Powar 1995). The growth of students spawned an associated growth in affiliated colleges, although

as Rao (1995a) wrote, sometimes the university worked with the affiliated colleges and sometimes against them. There were also autonomous colleges, not affiliated with any university that gained prominence in the 1960s. Other forms of tertiary education that emerged in the years since independence were “deemed-to-be universities”, and state-run colleges.

The fall in growth during the 1970s – an annual rate of 3.7% as compared to 8.3% in the previous decade (see figure 2.7) – can be characterized as a period of “stabilization, consolidation and quality improvement” (Raza *et al.* 1984). Controls were introduced into the system to help increase the quality and reputation of Indian higher education. This included government bodies that regulated accreditation and examination, as well as the establishment of new forms of higher education including professional institutions and “centres of excellence”. One of the consequences of this expansion, not only in enrolment but also in forms of tertiary education is that statistics on higher education are very difficult to gather and can be inconsistent. Quantitative data often varies considerably from one source to another, but it is clear that the changes that took place during this period were significant.

In addition to the increased enrolments and the emergent diversity in higher education, more women were taking seats in colleges and universities. Moreover, the percentage of students from previously disadvantaged groups (scheduled tribes and castes) increased, although at a slow rate (Raza *et al.* 1984). An unintended change was the emergence of a large bureaucracy.

The issue of who controls higher education has been contentious, with national governments, state governments and universities themselves all jockeying for power. However, in the Indian context, power has tended to flow towards the central government. This has been orchestrated through several constitutional amendments, as well as Supreme Court decisions in favour of the national government (Pinto 1995). The outcome has been several planning commissions at both the state (regional) and national level, as well as statutory bodies to manage higher education.

The primary regulatory body is the University Grants Commission (UGC), a body under the direction of the Ministry of Human Resource Development. The UGC “is the apex national body for the promotion and co-ordination of university education and the determination and maintenance for standards in teaching, examination and research in universities” (Pinto 1995). The UGC has both the mandate to inspect universities and to withhold grants (UGC 2003). The ballooning of alternative forms of higher education – such as professional institutions, autonomous colleges and centres of excellence – have generated numerous questions of jurisdiction, as well as discussions on how these institutions should be funded.

Interestingly, the only other statutory body created to manage higher education is the All India Council for Technical Education (AICTE), established to manage and maintain standards for technical education and to ensure its co-ordinated and integrated development (Pinto 1995). The AICTE, which does not have the power to disburse or withhold funding, assists the UGC in the management of technical higher education. These brief observations on the Indian higher education bureaucracy provide a useful starting point for a discussion on science and technology education.

2.3.2 SCIENCE AND TECHNOLOGY EDUCATION

It is telling that the UGC falls under the directorship of the Ministry of Human Resource Development (MHRD). As shown in the previous section, there is much debate in the general literature on higher education on what it is that universities do. Arguments are made that universities have many purposes such as disseminating knowledge, encouraging critical thinking, conducting research, socializing students, building national identity etc. The development of human resources is only one of these purposes. Where some countries have an independent Ministry of Education, in India, the higher education system is run by the MHRD. This is an important comment on the perception of higher education in India. Secondly, only two statutory bodies were created to manage higher education: the UGC, which has a general mandate, and the AICTE, which manages technical education.

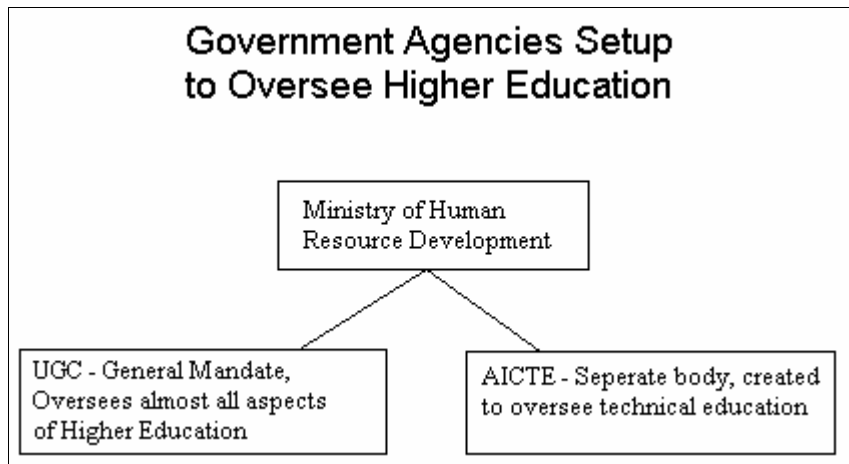


Figure 2.8: Government Agencies Setup to Oversee Higher Education
Source: (Pinto 1995, UGC 2003)

The fact that technical education is considered worthy of its *own* statutory body is indicative of its relative importance.

Interestingly, the aforementioned growth in higher education in the years following independence did not bring an associated growth in enrolment for faculties relating to technology and engineering.

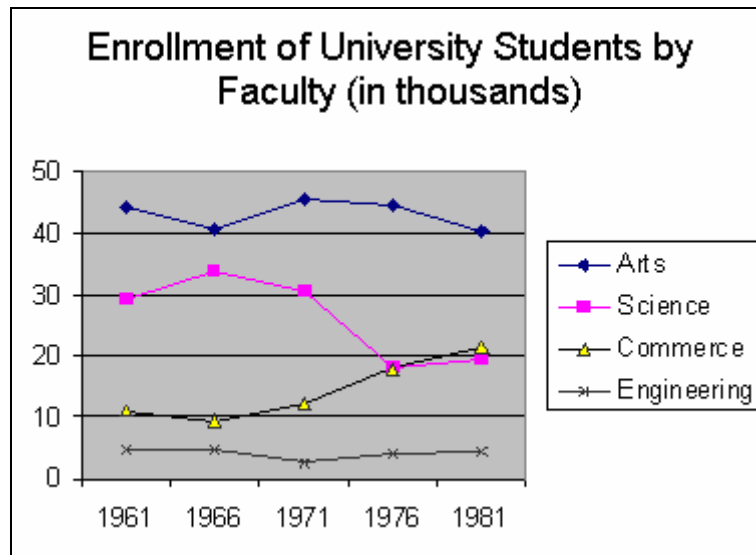


Figure 2.9: Faculty Enrolment by Subject
Source: (Raza *et al.* 1984)

Over the 30 year period from 1951 to 1981, the major change over this period was the growth of Commerce students and the decline of Science. The percentage of Arts and

Engineering students stayed constant. It is noteworthy that this trend was forcefully derided in 1984.

Taking the shifts in the subject spectrum of higher education as a whole, the conclusion is inescapable that even after three decades of planned development, the distortions introduced during colonial times have continued to persist. The search for a white collar job with the help of a passport provided by the university continues to be the main motivating force behind higher education in India. This is a matter of serious concern for education policy makers (Raza *et al.* 1984).

Since Indian independence in 1948, the Indian government has put emphasis on science and technology education. The literature on Indian higher education reveals many reasons for this.

First, for its own reasons, after independence India consciously attempted to create a secular society (Lal 2003). This stemmed from the policies of Jawaharlal Nehru, India's first Prime Minister, who himself was decidedly agnostic, but it also was a useful way of building a country that was incredibly diverse and had a history of religious tension (Tharoor 2000). As John Gray (2003) wrote, secularism was one of the fundamental pillars of modernism, and although India's secularism was quite different from the secularism of the West (Tharoor 2000), it still had the effect of reducing the importance of religion, and creating a fertile soil for the rise in stature of science and technology.

Second, there was the effect of the British administration. It is a commonly expressed view in the literature that the British neglected education in India, particularly science and technology education (Mathur 1966). The new emphasis on technical education is in some ways a backlash to the old regime, but there is another force worth mentioning. The British left India with a system that was particularly well-suited to modernist ideals. While the system of government may have been created to benefit the colonial power, it was a system that was strict, procedure oriented, and highly rational (Chandra *et al.* 2002). In short, it planted the seeds of modernity and instilled a sense of reverence for science and modernity.

Third, India had long-standing traditions of work in science before and during the British administration. This included a rich tradition of chemistry and pioneering work in the study of the properties of mercury (Raina 2003). Moreover, India had a rich tradition of experimentation in agriculture, and its farming techniques were frequently adopted abroad (Ibid.). Thus, the importance placed on science and technology education was based partly on India's own traditions.

Fourth, many hold the view that technology is the great saviour, the force that will alleviate poverty and propel Indian ascension. While this view is criticized in the Western literature on ICT and Development (Avgerou and Walsham 2000), it is pervasive in the Indian literature and not without reason. India is well-known for its software export industry that has brought the country financial resources and international acclaim (Heeks and Nicholson 2002). Moreover, many Indians have become successful in Western countries through achievements in technology-based industries. This has, in turn, led to investment back home (Tharoor 2000) and therefore contributes to the myth of technology as a panacea. Several books from Indian authors are a collection of fawning biographies that praise Indian heroes who have made it in the West (see Kshatriy 2003). It is instructive to note how technology is discussed in the Indian literature on higher education.

Notwithstanding the reservation that may be expressed about the long term effects of science and technology, it has come to be accepted that not only the standard of living but the quality of life of a nation as well, depends today substantially on:

- its mastery of knowledge in science and technology
- its capacity to create new knowledge
- its ability to use the knowledge created for social and economic development

... In the distant past, we had rich and poor people in each country. But today we see the spectacle of rich and poor nations where a whole nation is categorised as advanced or rich and developing or poor. The *decisive* factor in this new divide is the state of advances in the application of science and technology (Swamy 1995) [emphasis added].

But the simplest reason might be the most relevant one. India is a poor country and many students attend universities with the hopes of getting a high paying job. The vocationalization of higher education might be lamented in the West (see Conlon 2000) but it is a fact of life in India, not unreasonably so. As Aggarwal (1995) wrote :

An under-developed country like India can ill afford the luxury of investing huge resources in higher education just to produce the type of graduate manpower which is under-employed and in no way contributes to improving the efficiency and productivity of the key productive sector of the economy (Aggarwal 1995).

Thus, one of the characteristics of the literature on Indian higher education, particularly from Indian scholars, is the importance placed on science and technology education and the underlying assumption of a vocational rationality for education in general. As will be discussed in the next section, there are many ongoing debates in the field of higher education, but despite these, the calls to make technology the cornerstone of education policy continue unabated (Rao 1989).

2.3.3 CURRENT ISSUES

The literature on higher education in India is rich and varied. Many of issues that are being debated are common to any country with a tertiary education system. Some of these include curricula development, research agendas, the relationship between academia and society, etc. However, in the context of India, there are 3 themes in particular that seem to dominate the literature: Quantity vs Quality; Global vs Local; and Politics and Power.

Quantity versus Quality

The massive growth in students during the years following independence continues to have residual effects, as revealed in the debate between quantity and quality. There is no doubt that India has embarked on an ambitious project. Indian scholars have drawn attention to the fact that:

at that time when the great industrial revolution took place in the major European countries the problem of universal education was not even thought of, and it was only after enormous increase in wealth which followed that revolution that even countries like England and France embarked on a policy of educating the entire people. (Panikkar 1961 quoted in Vilanilam 1995)

Pannikkar goes on to write that the question that should engage planners is whether:

they should concentrate on a high standard of education for a limited but large enough section of people... or attempt the double task of providing a minimum education for all and simultaneously undertake a large expansion of university and technical education (Panikkar 1961 quoted in Vilanilam 1995).

In democratic India, universal education seemed the only answer. While thousands demanded more seats in higher education through protests and the ballot box, the tremendous strain on resources led to a decrease in quality. Therefore, the government responded with new and focused initiatives that clearly stressed quality over quantity (see Ahmed 1989). The result was a few “enclaves of excellence within an ocean of retrogression,” with the advanced institutions developing “the affliction of elitism and snobbish haughtiness, putting them on a high plateau, with the majority of institutions, apparently condemned as pedestrian and sub-standard” (Raza *et al.* 1984). Empirical evidence suggests that this condemnation is justified. In 1973, the UGC found that nearly half of the affiliated colleges were unviable. In 1995, more than 20 years later, this situation had not improved significantly – 40% of affiliated colleges were not eligible for UGC assistance because they failed to meet minimum requirements of infrastructure, facilities and staff (Powar 1995).

A large number of newly set up colleges are located in small towns having small enrolment, nominal facilities, limited faculty, small or non-functional library. (Aggarwal 1995)

He also noted:

Interesting, of the 8,000 colleges, more than two-thirds (67%) have only arts, science and commerce faculties. Not more than 10% of these offer education for technical and professional courses (Aggarwal 1995).

Recent evidence suggests that the quantity versus quality question remains a big issue. Evaluation frameworks have been developed and deployed to assess the quality of education offered at various institutions in a system that is large and heterogeneous (Stella 2004). The Indian Supreme Court has recently ordered the “closure of nearly 100 private universities because of quality concerns” (Economist 2005b).

The debate on quality versus quantity also manifests itself in a debate on vocational education. Some scholars have argued that the number of unemployed university graduates is a serious concern (Kapur 1994, Rao 1995b, Raza *et al.* 1984), for them,

too many students are getting a liberal arts education (read low quality) as opposed to a technical vocational education (read high quality). More recently, other scholars have suggested that there is too much focus on employment outcomes and not enough stress on intellectual attainment and the development of a sense of civic duty (Chhokar 2004). While the issue of quality versus quantity in higher education is debated in many countries, it is particularly serious for India, given the high population, high levels of poverty, electoral politics, and the ambitious educational reforms on which the country has already embarked.

Global versus Local

A second debate in the literature is whether India should focus outwardly or inwardly. There is little consensus on the subject and tellingly, conflicting arguments are often put forth in the same paper. As Powar (1995) wrote:

Indian universities are largely conventional in their programmes, and generally inward looking, concentrating on activities relevant to the region in which they are located. In keeping with the present socio-economic and political trends the leading universities will have to *globalise* their teaching and research programmes (Powar 1995). [emphasis added]

He later added:

Higher education in India is today in a critical state. Largely resistant to change it is in danger of becoming irrelevant. The system has not been able to free itself from its colonial roots and identify *itself with local needs* (Powar 1995). [emphasis added]

This debate is also manifested in a discussion of language. Since independence, there has been a discussion of whether children should be taught in English or in local languages (Chitnis 1993). English is often presented as the window on the world, or the language of science and technology, but its use is often lamented. Its detractors argue that it erodes local culture and weakens social ties to traditional community values (Verman 1995).

What is clear is that Indian higher education is influenced by the international community in ways that are both direct and indirect. Since independence, aid from industrialized countries has frequently been targeted at education needs, however, this

aid was tied to conditions that required India to adjust their taught programmes to suit the donor country (Suri 1979). This influence is less overt, but perhaps stronger when considering the issue of legitimacy. It is a priority for Indian educational administrators to “Internationalise” their education system. The benefits are assumed to be greater legitimacy for universities, better employment options for graduates, and more career options for academics (Natrajan 2001). There is also a strong movement to attract foreign students to Indian universities, partially because of the political benefits, but also to offset the large number of Indian students who study abroad (Powar 2001).

Politics and Power

Finally, much of literature on higher education is concerned with power and politics. For Indian academics who write on this subject, it is a common refrain that in order for universities to achieve their potential, indeed for societies to function, universities must be autonomous and free from the influence of the state. A passage from a paper by Muthukumar (1994) reveals that this might be due to events in the recent past:

A people who love and value freedom will have to zealously guard the autonomy of the university system. For, when the country goes through difficult times, when the executive and the judiciary become subservient to the party in power or when they, by force of circumstances, get politicized or when the press loses its freedom and when political parties tend to become dictatorial, the people of the country can look up only to the university for an impartial assessment of the situation and for being advised on the courses open to them... Many a civilization has disappeared from the surface of the earth because there were not enough learned men with good qualities in its society, who could show the right path at a time when there was external aggression and when internal enemies were able to move into positions of power. It is, therefore, in the interest of its continued existence and prosperity that every society must establish and support the growth of autonomous universities (Muthukumar 1994).

The author then lists some of the “Threats to Autonomy”:

- Society through its elected representatives
- Parents of students
- Students of the colleges and departments
- Governments and its officers
- Teachers of the affiliated colleges (Muthukumar 1994).

It is interesting to see these groups called “threats to autonomy” as opposed to stakeholders in the system. The importance of autonomy for universities is repeated throughout the literature (Aggarwal 1995, Arora and Sogani 1994, Dahiya 2001 Powar 1995, Murthy 2002, Pinto 1995, Raza *et al.* 1984). It is easy to dismiss these calls as blatant self-interest. It is not surprising that Indian academics are clamouring for their universities to have more power. However, in their defence, it seems clear that the university system is markedly bureaucratic.

The rapid and sustained growth in higher education has left India with a system that today is very top-down, with heavy government influence (Sarup 1989), one of the end-results being a funding apparatus that is highly bureaucratic (Azad 1989). This system contains a complex web of formal roles and sub-institutions that are constantly jockeying for power and legitimacy. Evaluation is rare and inconsistent (Shah and Shah 1998) and the structure is quite opaque except to a seasoned insider (Narain 1989). These problems are compounded by the presence of regulatory bodies at both the national and state level, and the plethora and diversity of higher education organizations. Given the characteristics of the higher education system, the calls for more autonomy are arguably justifiable.

To conclude, since independence, India has embarked on an ambitious programme of higher education development, with a focus on science and technology education. The rapid growth that ensued is a mark of its success but has also given birth to a complicated and bureaucratic system. The bureaucracy contains many stakeholders jockeying for power, and is replete with various institutional forces. Thus, it is a good candidate for study using neo-institutionalist theory. The conceptual framework will be discussed in the next chapter.

3 CONCEPTUAL FRAMEWORK

Chapter Abstract

This chapter first outlines the relevant philosophical assumptions. This is an interpretive study, heavily influenced by the work of Ian Hacking and Thomas Kuhn. Neo-institutionalism will be used as the primary theoretical lens. This choice is appropriate, but carries some limitations as well. In order to enhance the analysis, secondary theories such as, Development theory, theories of Indian Society and New Barbarianism will also be employed.

Chapter Contents

3.1	PHILOSOPHICAL ASSUMPTIONS	58
3.1.1	X and the Idea of X.....	58
3.1.2	Ontology and Epistemology	60
3.1.3	Underdeterminism and the Philosophy of Science.....	63
3.2	PRIMARY THEORETICAL LENS: NEO-INSTITUTIONALISM	65
3.2.1	Overview of Neo-Institutionalism.....	66
3.2.2	How Neo-Institutionalism Theorizes Education	79
3.2.3	Contributions and Limitations.....	84
3.3	SECONDARY THEORIES.....	92
3.3.1	Development.....	92
3.3.2	Theories of Indian Society	101
3.3.3	New Barbarianism.....	103

The following chapter seeks to outline the conceptual and theoretical frameworks of this dissertation. This study resides primarily in the interpretive research tradition. It uses neo-institutionalism as a primary theoretical lens but leverages other theories as well. This chapter will first give an overview of the relevant philosophical assumptions, and then provide a discussion of neo-institutionalism, followed by a brief outline of secondary theories that will be used in the analysis. Within chapters 5 and 6 is an analysis of the findings from this study, but also a critique of the conceptual framework used. This chapter serves as a starting point for that discussion.

3.1 PHILOSOPHICAL ASSUMPTIONS

The conceptual framework has been developed based on not only a view of reality but also a consideration of what is the most appropriate framework for this study. It is reasonable to start from a subjective ontological position since this study is about the way technology is being shaped at universities. However, some well-argued papers in the relevant literature reveal some contradictions.

A social constructionist, as described by Avgerou (2002) would theorise all attributes of technology arising from people engaging in interpretive action, in their local context, and not from the functional attributes of the technology. This seems like a reasonable departure point from which to proceed. However, arguments to the contrary force a critical reflection. For example, Winner (1993) argued that technical choice has clear observable consequences and Kallinikos (2002) wrote that technology is never completely malleable, it invites specific forms of human interaction. These authors argue that some attributes do arise from the technology itself.

3.1.1 X AND THE IDEA OF X

In an often quoted book, *The Social Construction of What?* Ian Hacking (1999) offers a reconciliation of these views. Hacking argues that the term “social construction” has become trendy and ambiguous. He makes a very clear distinction between:

1. X; and
2. The idea of X

For Hacking, if X was “a tree” then clearly, a tree is not socially constructed. However, the idea of a tree is something that resides in human minds, influenced by a temporal and spatial context. So to say that the idea of a tree is “constructed” is redundant and trivial. To say that the idea of a tree is “*socially* constructed” is *particularly* redundant and trivial. Just because the idea of a tree is socially constructed, it is no less real, and it is not correct to say that everyone can construct their own idea of a tree, each being equally valid.

The separation of a thing and an idea of a thing may not always be appropriate. Indeed, in some cases, it may be absurd. Nevertheless, this assumption can be relevant. Hacking’s well considered argument stems from the fact that an extreme objectivist is blind to the importance of human perception and an extreme subjectivist denies empirically observable realities and becomes paralysed. Hacking’s argument is reasonable, and more importantly, it is an appropriate philosophical assumption with which to proceed.

Throughout this study, a distinction is made between:

1. Technology; what it can do, what forms of interaction it invites, what properties it has; and
2. The idea of technology, what people think of it, how they see it helping their situation, how they shape its meaning.

And, likewise, a distinction is made between:

1. Universities; what they do, what they teach; and
2. The idea of universities; what people think of them, what their role is supposed to be in society.

3.1.2 ONTOLOGY AND EPISTEMOLOGY

This distinction amounts to a difference between ontology and epistemology. For Hacking shows that an extremely subjectivist view, one that many self-styled social constructionists, or postmodernists seem to put forth, is disingenuous. The world is not made up.

However, epistemology is not related to basic assumptions about the world, it is a theory of knowledge, and the pursuit and analysis of knowledge is a particularly human endeavour. Hacking stresses that scientific facts such as the speed of light do not come into being. However, the process of scientific activity that first led people to ask the question “what is the speed of light?” and then develop the apparatus to find the answer was highly contingent and was not inevitable. The speed of light is a scientific fact, but the idea of the speed of light – and the idea to investigate it – exists in the realm of human interference and is highly subjective.

Thus, this study assumes a somewhat objectivist ontology of the world, assuming that trees, technology, and the speed of light really exist, but in the case of this study, epistemology is more relevant. This study is concerned with the *idea* of technology (not technology itself), how it gets shaped and why. For that reason it is appropriate to use an interpretive epistemology. As Bijker (2001) stressed, science and technology are value-laden and it is these values that are of interest. Thus, while this study assumes a somewhat objective ontology of the world, more importantly, it takes a subjective or interpretive view of knowledge; and arguments in the literature suggest that this is not inconsistent. One can see the world as existing and having objective properties, while still believing that meaning only arises from human interaction. This point is made by Crotty (1998) who argues that social scientists can use, for example, social constructionism as epistemology and critical realism as ontology and not fall victim to any philosophical contradictions. The distinction that Hacking makes is central to the conceptual framework. It is the idea of technology that is of interest, and that is reflected in the research questions.

In their oft-cited work, Burrell and Morgan (1979) defined four paradigms for the analysis of social theory.

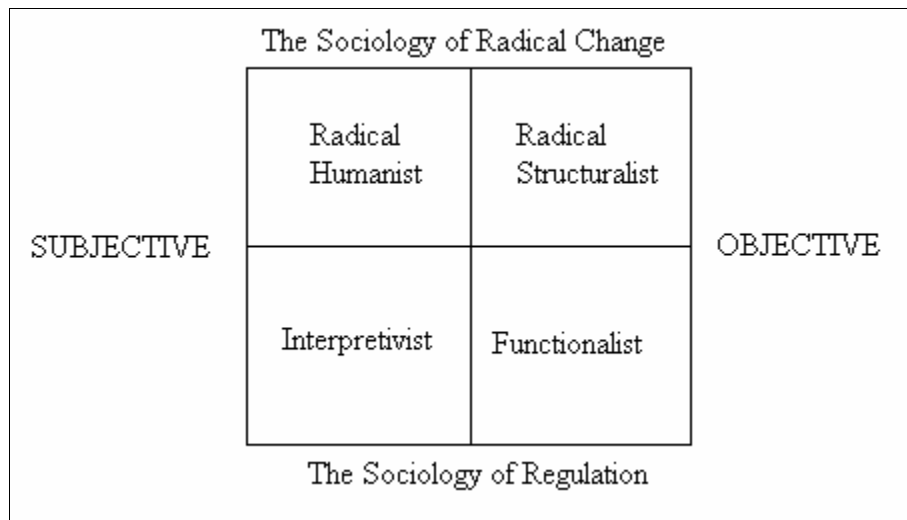


Figure 3.1: Four Paradigms of Social Research.
Source: (Burrell and Morgan 1979)

It is based on two fundamental dichotomies, the first being the ontological distinction between objective and subjective realities. The nature of this research suggests a more subjectivist orientation. The second dichotomy is between on the one side, those who see the world as inherently stable and ordered and who seek to pursue a path of regulation. On the other side, are those who see the world as rife with conflict and exploitation, and therefore seek to pursue radical change. Burrell and Morgan then give names to the four positions based on the diagram above: radical humanist, radical structuralist, interpretivist and functionalist.

This dissertation is located squarely within the interpretivist paradigm. It seeks “explanation within the realm of individual consciousness and subjectivity, within the frame of reference of the participant as opposed to the observer of action” (Ibid.). The radical humanist position is rejected. The aim of this study is not to pursue change from the point of view of a critical theorist. The aim is to obtain an “understanding of the subjectively created social world ‘as it is’ in terms of an ongoing process. (Ibid.)”

The stance of interpretivism is not taken to provide a justification for anything-goes relativism (Feyerabend 1993) or the postmodernist belief that all interpretations are

equally worthy (Derrida and Caputo 1997). Rather, the aim is to describe a particular corner of the world in a certain way, which can be considered *reasonable* based on the choice of theory and methodology and of course, how they are applied. It is in that way that this study is interpretive and not positivist. No attempt is made to map reality or look for a single phenomenon of interest (see Orlikowski and Baroudi 1991) or find uni-directional causal relationships. Importantly, it is accepted that inquiry is not value-free. It is those characteristics that situate this study firmly in the interpretivist tradition.

This dissertation, at its essence, looks at curriculum discourse – how people discuss curricula, how they write about it, how it is negotiated and influenced. One legitimate way of studying ‘the idea of X’ is to study the curriculum discourse surrounding subject matter X. This argument is put forth by Thomas Kuhn (1962) and Ivor Goodson (1994) and will be discussed in more detail in Chapter 6. Interpretive methods are uniquely appropriate for the study of curriculum discourse since discourse – by its very nature – is dependent on human perceptions and subjectivities. Thus, a philosophical foundation based on Hacking’s work that focuses on the idea of technology is commensurate with interpretive research and the study of curriculum discourse.

Qualitative data collection methods will be used, such as document analysis and narrative analysis through interviews. The data will then be analysed using a collection of social theories to link the findings with existing conceptualisations, in an effort to build an argument about the institutional forces that influence the curriculum discourse.

One of the fundamental principles of interpretive research is that the researcher is not an independent observer analysing a situation objectively. Rather, a researcher is heavily involved because of his or her past history, personal agenda, etc. This is not something to be ashamed of, but must be acknowledged. One of the benefits of adopting an established theory is that it provides the opportunity to view the world through a purposely chosen lens. Researchers who do not consciously select a theory

may pick up a theory, blindly, without consideration and will not understand its bias and how it influences the research.

This study is very much empirical, the aim is to analyse the nature of ICT education in India, and contribute inductively to the body of knowledge and theories used. The theoretical lens is chosen partially not only to provide an interesting and consistent perspective on the subject matter, but also to understand the bias, allow for a contribution and to ensure that the perspective does not change capriciously.

Several theoretical perspectives were considered. At first, structuration theory seemed appropriate as it provided a way of seeing the way social structures and human actions reflexively interact (Giddens 1984). However, the focus of this research is not social structures or human action; it is the way the idea of technology is shaped in universities. Secondly, structuration theory seems very broad and unwieldy. Even Giddens himself (1983) has suggested that it is not a concrete research programme. An approach based on critical theory, looking at dominant power relationships and how they affect technology (Giroux 1983, Ziegler 1995) was also considered. This seemed intriguing and appropriate because India is known for its hierarchical caste system. However, this stance seemed too pregnant with ideology to address the research questions and research of this nature often turns into a political manifesto (Aronowitz and Giroux 1991, Freire 1972). Upon further consideration it was determined that the most appropriate theoretical lens for this research would be neo-institutionalism.

3.1.3 UNDERDETERMINISM AND THE PHILOSOPHY OF SCIENCE

The approach taken to this study has been greatly influenced by the work of Thomas Kuhn (1962, 1970). Kuhn powerfully argued that science was not cumulative. Rather it oscillated between long stable periods of 'normal science' and short yet disruptive periods of 'revolutionary science'. The change in assumptions from one period of normal science to the next was so significant that the new torch-bearers had to rewrite the history books to provide legitimacy to the new paradigm.

Kuhn influenced this present dissertation on many levels. First, the subject of inquiry is the curricula used in Indian universities. Curricula are reflections of accepted epistemology (Goodson 1994) and Kuhn stressed that epistemology is always contingent on contextual factors, power relationships and patterns of legitimacy. In contrast, Karl Popper (1970) argued that epistemology is derived from a cumulative method of science. This dissertation proceeds with a Kuhnian philosophy of science.

However, to allow Kuhn to influence one's research is to diminish the results, if only to some extent. Karl Popper was much more idealistic. He called for science to aspire to lofty goals and to build constantly improved understandings based on honest critical reflection of existing theories. To Popperians, Kuhn's relativism was disconcerting.

Popper and his followers were unique in seizing a glaring weakness in Kuhn's theory: Kuhnian normal science was a politically primitive social formation that combined qualities of the Mafia, a royal dynasty and religious order. It lacked the sort of constitutional safeguards that we take for granted in modern democracies that regularly force politicians to be accountable to more people than just themselves (Fuller 2003).

Kuhn saw normal science as a source of stability. Popper saw it as a problem to be overcome. The combination of the underdetermination thesis and neo-institutionalism has given sway to Kuhn's argument, especially in the context of this research. The underdetermination thesis states

that any body of evidence can be explained by any number of mutually incompatible theories. In that case, theory choice is underdetermined by the evidence (Fuller 2003).

When researching social phenomena, such as the construction of the idea of ICTs in India, the underdetermination thesis seems self-evident, of course, there can be more than one explanation. Therefore, in trying to answer the question of which theory becomes acceptable, neo-institutional concepts become highly relevant. Science is dependent on resources, legitimacy and taken-for-granted assumptions.

Epistemology is now more than ever preoccupied with face-saving exercises to shore up expertise, the elusive quest for what philosophers call 'credible testimony' and sociologists call, more brutally, 'boundary maintenance' (Fuller 2003).

Thus, this study attempts to present a reasonable and appropriate conceptualization of how institutional forces influence the idea of ICTs in India. This might not meet some Popperian ideal (see Popper 1970), but it is still worthwhile. The subject matter is particularly rich and multi-faceted and the question is relevant and timely. Moreover, as Fuller wrote, the relativist epistemology that is assumed by taking a Kuhnian stance is not something to be ashamed of.

In many respects, the postmodern condition associated with Kuhn's ascendancy marks a return to a *pre-modern* sensibility. What is often called 'relativism' – be it in praise or condemnation – is simply the ancient attitude, perhaps most clearly defended by Aristotle, that all knowledge must be adequate to its objects (Fuller 2003).

While the philosophical underpinnings of this dissertation were inspired by Kuhn and Hacking, the main theoretical assumptions stem from neo-institutionalism. A discussion of this perspective follows in the next section.

3.2 PRIMARY THEORETICAL LENS: NEO-INSTITUTIONALISM

Information Systems research draws on an eclectic mix of theories. Some say this gives the discipline diversity and flexibility (Robey 1996). Others criticize IS for its lack of a consistent theoretical framework (see Adam and Fitzgerald 2000, Avgerou 2000, Lyytinen *et al.* 1999). This results in a plethora of academic papers commenting on the theories in use. If a theory is narrow, it will be appealing because it will present an occasion to study a particular phenomenon in a consistent way. But some will criticize the theory for being too myopic and for not taking account other factors. If a theory is too broad, it will be appealing by purporting to be 'all things to all people'. But in order to use this type of theory in a real world situation, researchers will have to be particularly good at adaptation and improvisation. Unsurprisingly, this 'customisation' of a theory means that it will be used in a way not intended by its

author, who may then write – ironically – that the theory might not be suitable for use in *actual* research (Giddens 1983, Latour 2004).

Neo-institutionalism – like all theory – is a way of seeing and not seeing (Walsham 1993), but it is particularly relevant to this field of research. It gives a useful perspective on how certain modes of interaction with technology arise, not because they are good, not because they are rational, not because they are profitable, but because they are legitimate. As will be shown, the notion of legitimacy is particularly applicable to the study of higher education and curricula. Since neo-institutionalism takes such a prominent position in this research project, and will be critiqued in chapters 5 and 6, it merits some discussion here. The following sections contain a very brief overview of neo-institutionalism and an argument on why it is relevant for Information Systems research – addressing some of the contributions as well as drawbacks of neo-institutional theory.

3.2.1 OVERVIEW OF NEO-INSTITUTIONALISM

One could place the origins of neo-institutional theory into ancient philosophical debates. In the writings of Plato and Socrates, there are discussions of societal norms and how they would (and should) influence human activity (Delius *et al.* 2000). However, this link is somewhat tenuous. A philosopher who could reasonably be considered to be an institutionalist might be Nietzsche. He was among the first to really question the principle of ‘knowledge’, to question whether the things we know are really known or are just sustained myths (Ansell-Pearson 1997, Safranski 2002). Nietzsche was particularly interested in how myths were sustained through ritual, and not because of any inherent validity of the myth itself (Angell 2000). Nietzsche’s writings lead one to believe that he would be particularly receptive to the neo-institutionalist notion of the legitimacy imperative.

This link is appropriate but does not do justice to Nietzsche’s wide ranging writings. Another thinker who might arguably be considered neo-institutionalist, was Coase (1937) who studied the nature of organizations and the reasons for their development.

He theorized that institutions will persist as they confer benefits greater than the transaction costs of creating and sustaining them. The traditions of Coase have been brought forward by authors such as North (1990), who looked at the way institutions reduce uncertainty by providing a mechanism for efficient economic exchange. This discipline is now termed “the new institutional economics” and although it shares the same origins, it has diverged from neo-institutionalism as it pertains to sociology and organizational analysis. It is this second branch of neo-institutionalism – as it pertains to sociology and organization analysis – that forms the backbone of the theoretical framework of this dissertation.

The “neo” in neo-institutionalism represents a fundamental shift from a previous sociological “institutionalism”, now sometimes referred to as the old institutionalism. The standard-bearer for the old institutionalism is a book by Philip Selznick ‘*TVA and the Grass Roots*’ (Selznick 1949) where he looked at how conflicts of interest were handled within the Tennessee Valley Authority. Selznick’s work focused on the inherent conflicts in an organization and he stressed the importance of the informal structure and informal interaction.

In this, there is a marked difference with neo-institutionalism. Neo-institutionalist theory is less concerned with conflict and vested interests. It focuses more on taken for granted assumptions and the legitimacy imperative. Rather than focusing on the irrationality of the informal structure, the new institutionalism locates irrationality in the formal structure itself (DiMaggio and Powell 1991a).

As DiMaggio and Powell (1991a) wrote, if neo-institutionalism had birthdate it would be in 1977 with the publication of two papers by John Meyer, the more seminal being *Institutionalized Organization: Formal Structure as Myth and Ceremony* (Meyer and Rowan 1991). In 1985, a conference was convened by Lynne Zucker for a number of scholars “intrigued by the effects of culture, ritual, ceremony and higher-level structures on organizations”. According to DiMaggio and Powell (1991a), it was here where neo-institutionalism gained a critical mass to be named and reified. The theory gained in prominence partially as a rejection of behaviouralism, which interpreted

behaviour as an aggregate of individual choice. As March and Olsen (1984) wrote “what we observe in the world is inconsistent with the ways in which contemporary theories ask us to talk.” Studies of organizational and political change were not consistent with rational-actor or functionalist accounts. This empirical realization formed the fertile ground for the growth of neo-institutionalism (DiMaggio and Powell 1991a).

Neo-institutionalist theory argues that the assumptions that we take for granted today did not arise because of history’s efficient course (see Fukuyama 1992). Neo-institutionalists argue instead that assumptions that are taken-for-granted today, arose because of powerful vested interests in the past, and now they have become perennial features (institutions) of society that are never questioned (Avgerou 2002). Bureaucracies, as a way of organising, are a commonly cited example. Many authors have shown that bureaucracies arose, not because they are ideal, but because they suited a particular group of engineers in the early years of the 20th century, who were particularly powerful and forward thinking (Tolbert and Zucker 1983).

Some theorists are particularly interested in the scarcity of resources (Pfeffer 1982), or class conflict (Bowles 1972), or market forces (Porter 1983). Institutionalists are interested in the taken-for-granted assumptions within society, how they are framed, how they limit the possible courses of action, how they grant legitimacy to those who conform and how this conformism strengthens the institution in the process. It is on these forces that their vision is focused.

It is worth observing that there are many new versions on institutionalism. Scott and Meyer (1994b) gave a typology of various institutionalisms, which is useful in making sense of the literature, but it also reveals – and reifies – the confusion regarding the large number of research approaches subsumed under the label “neo-institutionalism”. Scott and Meyer make a distinction between studies that employ variance theories and those using process theories. For them, studies that use variance theories seek to find causal relationship between independent and dependent variables. To add to the confusion, sometimes the institution is treated as the independent variable (Meyer *et*

al. 1994c) and other times the dependent (Zucker 1991). Some studies are concerned with the ways institutions influence society (Meyer *et al.* 1994b), while others are concerned with the way societies influence institutions (Kaarlejarvi 2003), but all are considered “institutional research”.

Process theory research is more concerned with the creation and diffusion of institutions and does not seek to identify strict causal relationships. This research is more interpretivist and is also considered “neo-institutionalist”. Finally, Scott and Meyer (1994b) point out that the unit of study varies considerably; from one particular organization, to an organizational field, to society. Their typology results in 12 categories of neo-institutional research. The new institutionalism – as it pertains to sociology and organization analysis – tends to be process oriented, although as Scott and Meyer show, it crosses the boundaries into other categories as well (see Meyer and Hannan 1979). While this breakdown is useful, it also illuminates the lack of agreement on some basic premises of neo-institutional theory.

According to DiMaggio and Powell (1991a), what makes neo-institutionalism new is its emphasis on the relationship between stability and legitimacy. And as mentioned, while older versions of institutionalism accounted for efficiencies by claiming they exist in the informal structure, the new institutionalism “locates irrationality in the formal structure itself” (*ibid.*). These are the main differences between new and old institutionalism, and they are the major characteristics of the new institutionalism as it pertains to sociology and organizational analysis.

How Neo-Institutionalism Theorizes Organizations

Neo-institutionalists reject the notion of organizational change happening through planned action upon careful consideration. Importantly, neo-institutionalism rejects the theory of the rational actor, that is, individual or groups, recognizing their own self-interests and pursuing them in a planned and methodical way. As DiMaggio (1988) wrote, the precise contribution of new institutional theory is the identification of causal mechanisms leading to change and stability based on *preconscious*

understandings. Most theories are based on the idea that behaviours are driven by human interest. Neo-institutional theory represents a dramatic exception, focusing instead on the taken-for-granted nature of forms and practices. Thus, the way neo-institutionalism theorizes organizations is as ‘legitimacy hungry’ beings, that are constantly conforming and do not at all represent the aggregate of individual decisions or desires. In fact, neo-institutionalists explicitly acknowledge that fact that some preferences are privileged over others (Immergut 1998).

In a seminal paper, Meyer and Rowan (1991) outlined 6 propositions about how institutions affect organizations. These propositions are worth repeating here at length because this paper is widely cited within institutional research, and because the propositions succinctly demonstrate how organizations are theorized within neo-institutionalism:

- Proposition 1: As rationalized institutional rules arise in given domains of work activity, formal organization form and expand by incorporating these rules as structural elements.
- Proposition 2: The more modernized the society, the more extended the rationalized institutional structure in given domains and the greater the number of domains containing rationalized institutions.
- Proposition 3: Organizations that incorporate societally legitimated rationalized elements in their formal structures maximize their legitimacy and increase their resources and survival capabilities.
- Proposition 4: Because attempts to control and coordinate activities in institutionalized organizations lead to conflicts and loss of legitimacy, elements of structure are decoupled from activities and from each other.
- Proposition 5: The more an organization’s structure is derived from institutionalized myths, the more it maintains elaborate displays of confidence, satisfaction, and good faith, internally and externally.
- Proposition 6: Institutionalized organizations seek to minimize inspection and evaluation by both internal managers and external constituents.

Figure 3.2: Propositions on how Institutions Affect Organizations.
Source: (Meyer and Rowan 1991)

The picture that neo-institutionalism paints is one of stability, conformity and convergence. As Meyer (1992b) wrote, this means organizations today have a shadow rationalization – with delegation to institutionalised rationalities and ritual appearance. Meyer goes on to write that in developing countries, formal organizations are more difficult to create. Where they do exist, they are highly rational since less can be taken for granted. In developing countries, the link between formal organizations and the state is much stronger (Ibid.).

Change and Institutionalisation

Intimately related to neo-institutionalism is the notion of institutionalisation. There is some confusion with regards to this term, thus it warrants some consideration. As Hacking (1999) wrote, -ion words such as *construction* can be conceived of as a product (outcome) or as a process. Within neo-institutionalism, this was echoed by DiMaggio and Powell (1991b). The writers mentioned above are more interested in institutionalisation as an outcome, but others have attempted to theorize institutionalisation as a process, how certain assumptions become taken-for-granted.

For Hasselbladh and Kallinikos (2000), assumptions start out as ideals, which are mainly communicated orally. ‘Ideals’ have low precision but high semantic richness. As an ‘ideal’ gains in legitimacy and begins to become unquestioned, it becomes ‘discourse’, gains in precision and importantly, is written down. Finally, these written pieces of discourse become ‘techniques of control’, they are formally codified gaining in precision but losing semantic richness. For Hasselbladh and Kallinikos, this is the process of institutionalisation. According to Hinings and Greenwood (1988), the three main aspects of the organization that can become institutionalised are the domain (what the organization does), the form (how it is structured) and the criteria of evaluation.

As mentioned in a previous section, neo-institutionalism is a theory of stability and so it does not adequately theorize change in a thorough and consistent way (Yang 2003).

Still, many prominent writers have put forth neo-institutional theories on how change occurs in organizations. The most commonly held view is that professed in the widely cited paper by DiMaggio and Powell (1991b). They state that organizations under certain conditions will undergo isomorphic change, meaning they will converge and homogenize in order gain legitimacy and increase their chances of survival. The authors outline three mechanisms of isomorphic change:

- Coercive Isomorphism – organizations responding to formal and informal pressures exerted by other organizations on which they are dependent, and on cultural expectations within society
- Mimetic Processes – organizations dealing with uncertainty and ambiguity by modelling themselves on similar organizations that they perceive as successful or legitimate
- Normative Pressures – organization responding from pressures stemming from two aspects of professionalization: 1) the role of formal education in conferring legitimacy and granting of “expert” status; and 2) the growth and elaboration of professional networks which span several organizations.

Figure 3.3: Mechanisms of Isomorphic Change.
Source: (DiMaggio and Powell 1991b)

The authors go on to make empirical predictions based on their institutional theorizing:

1. The greater the dependence of an organization on another organization, the more similar it will become to that organization in structure, climate, and behavioural focus.
2. The greater the centralization of organization A’s resource supply, the greater the extent to which organization A will change isomorphically to resemble the organization on which it depends for resources.
3. The more uncertain the relationship between means and ends, the greater the extent to which an organization will model itself after organizations it perceives as successful
4. The more ambiguous the goals of an organization, the greater the extent to which the organization will model itself after organizations that it perceives as successful.

5. The greater the reliance on academic credentials in choosing managerial and staff personnel, the greater the extent to which an organization will become like other organizations in its field.
6. The greater the participation of organizational managers in trade and professional associations, the more likely the organizations will be, or will become, like other organizations in its field.

Figure 3.4: Propositions on Institutional Isomorphism.
Source: (DiMaggio and Powell 1991b)

While this is certainly one of the most seminal neo-institutional papers, it is certainly not the only way change is theorized within neo-institutionalism. Andrea Lippi (2000) looked at the particular way that institutions undergo isomorphic change in the Italian public sector. She noted that in Italy, organizational change is not just top-down, as it seems to be predicted by neo-institutional theory. Top down isomorphism is matched with bottom-up diversification and adaptation. This process does not cause anarchy or fragmentation but systematic selection. Institutions get diluted and translated in local contexts, and in the process, are shaped by powerful actors and special interests. She calls this process, allomorphism.

This form of institutional theorizing is echoed by Zucker (1988a, 1988b, 1991). She stresses the constant change that occurs in organizations, what she calls entropy. In a similar line of thinking to that of Lippi (2000), Zucker (1991) wrote “if basic processes of social transmission are incomplete, then many partially institutionalized processes directly lead to social entropy, a tendency toward disorganization in the social system.”

Zucker acknowledges that a theory based on assumptions of organizational inertia is only empirically supportable under limited conditions. However, she asks this very important question:

Given that social systems are characterized by entropy and endogenous change and that the very institutional processes that produce social order inherently cause its gradual decay absent sufficient conditions to maintain existing order, then why to social systems often seem *remarkably stable* in the aggregate? (Zucker 1988b) [emphasis added]

She goes on to say that the answer to this question lies in the historical motivations for organizing such as creating a mechanism for fair exchange and for resolving social dilemmas.

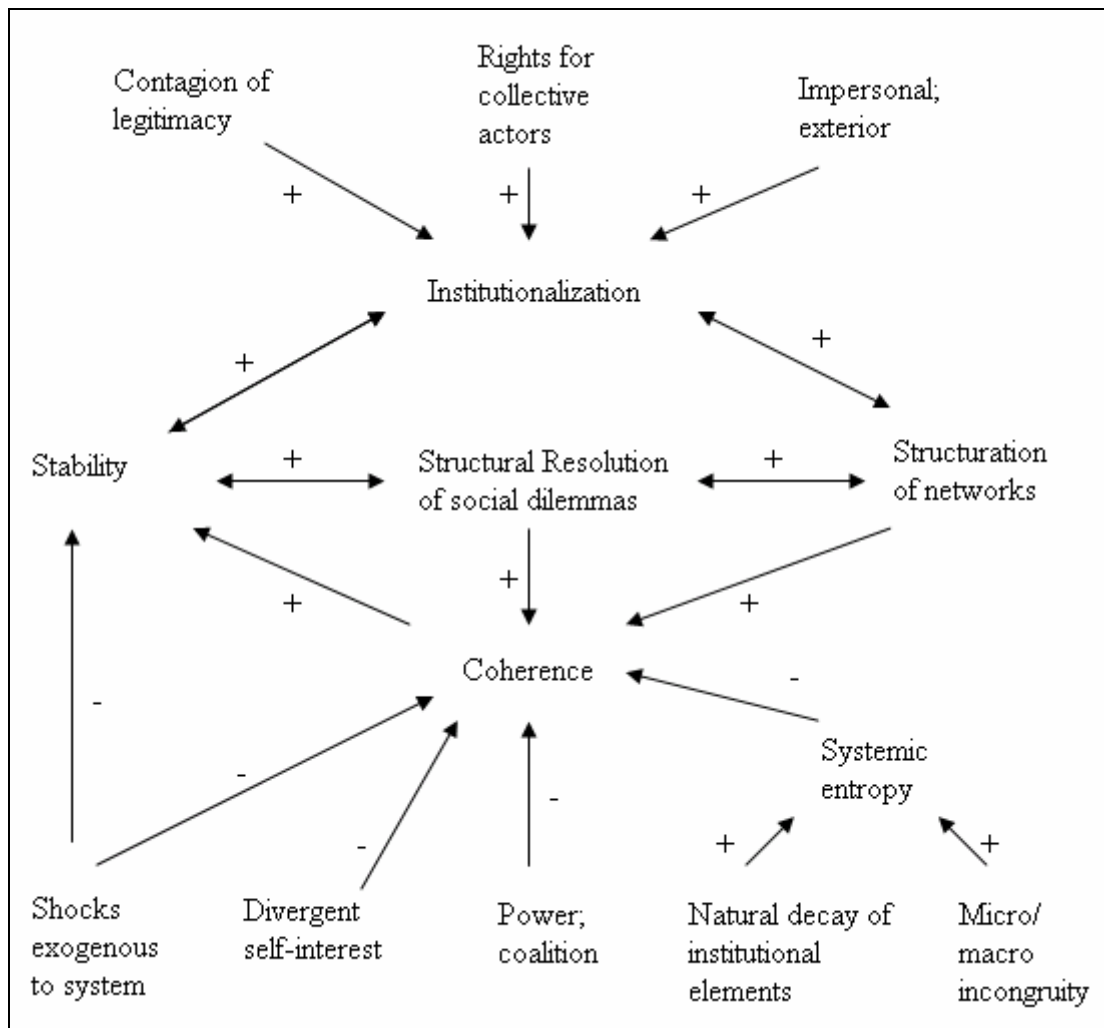


Figure 3.5: Origin and Maintenance of Institutional Patterns
Source: (Zucker 1988b)

Some of this work is reminiscent of the writings of Coase (1937), one of neo-institutionalism’s antecedents, but Zucker also adds one more important element – and a central institutionalist theme – the contagion of legitimacy. She puts forth the diagram (see figure 3.5 above) which she calls “Origin and Maintenance of Institutional Patterns”.

The forces at the top, such as the contagion of legitimacy and the impersonal exterior environment serve to strengthen institutional elements and increase the stability of the

system. The forces on the bottom such as divergent self-interest and natural decay of institutional elements, reduce the coherence of a system – thus reducing stability and promoting chance.

This theory of organizations is certainly assailable, given its somewhat arbitrary selection of factors. Moreover, it is much broader than most neo-institutionalist theory and it seems in danger of reaching the point described by Meyer et al. (1994a) where “everything is related to everything else.” Still Zucker’s theory is worth mentioning here because she is one of the major neo-institutional scholars and her contributions to neo-institutionalism are characteristic of some of the later work that tries to theorize organizational change and stability within an institutional framework.

Neo-Institutionalism in IS Research

Neo-institutionalism is not a theory with an obvious mandate in Information Systems. Much IS work in the past was primarily concerned with the system development or the way technology initiates change and innovation. However, neo-institutionalism has had an obvious relevance to the study of organizations and this field has significant overlap with much of the Information Systems literature. Traditionally, IS researchers conduct their research on organizations (see Ciborra 1996a, Hanseth 2000, Orlikowski and Baroudi 1991) and this intellectual cross-pollination has brought neo-institutionalism into more prominence within IS. Some brief examples should demonstrate the applicability of neo-institutional theory to IS research.

Luo (2000) looked at the rise of international technology organizations (ITO) which he defined as organizations that conduct research on technology, or promote the utilization of certain technologies. Using quantitative data, he shows how the development of the expanded and interdependent nation state system, and the world regime of development affected the establishment of certain ITOs. Luo’s work makes a useful contribution in that in a systematic way, it reveals some of the global macro factors that influence the relationships between technology and society.

In a similar paper, Werle (2001) looked at organizations that facilitate negotiations on technical standards, which ideally will provide an arena of competition and co-existence between different groups and different technologies – known as “Standardization Organizations”. These organizations create standards in an effort to reach an appropriate mix of competition and compatibility. Werle showed how these organizations undergo a process of isomorphism as described by DiMaggio and Powell (1991b). They aggressively seek legitimacy, and in doing so, undergo a process of homogenization. Standardization organizations are good examples of organizations that require high levels of legitimacy to function, and so institutional forces are particularly potent.

Nicolaou’s (1999) paper on the social control of Information Systems development is an excellent example of the way neo-institutionalism offers a new perspective on a well-studied phenomenon. While much research in this field focuses on methods of systems development that are technically rational, Nicolaou looked at methods of systems development that are legitimate. Neo-institutionalist writers have presented an argument that certain organizations – like schools – require high levels of legitimacy and so are particularly sensitive to institutional forces, while others like factories are less sensitive (Meyer *et al.* 1992). But Nicolaou disagrees, and makes a powerful argument that institutional forces are also powerful when relating to production oriented activities such as systems development. His work is supported by other IS papers on this topic (Butler 2003). Developers must gain the backing of senior management and there is always a competition for resources. Moreover, there are several dependencies on external organizations. Where these dependencies occur, the relationship is susceptible to institutional forces. Many have argued that systems development is an occasion to enact real innovative changes, but as Nicolaou argued cogently, systems development teams are under the influence of several institutional forces, and so isomorphism – as described by DiMaggio and Powell – leads to a homogenization similar to what is found in other organizational fields.

Finally, a paper by Swanson and Ramiller (1997) has received considerable attention in the way it has linked IS innovation with neo-institutional concepts. The authors

have argued that a coherent “organizing vision” is required to support the introduction of an IS innovation. The organizing vision is a “focal community idea”, a social account or a story line.

This vision serves key functions in interpretation, legitimation, and the organization and mobilization of economic roles and exchanges. The development and influence of an organizing vision is determined by a variety of institutional forces. Among these forces, the community’s discourse serves as the developmental engine (Swanson and Ramiller 1997).

One of the major characteristics of an organizing vision is that it is ultimately a discourse. As such, it is constantly renegotiated. Sometimes the organizing vision is coherent, other times it becomes ambiguous and frayed.

An organizing vision exists because a collection of social actors agrees that it exists. This agreement is linguistically manifested: simply put, the actors find it possible to engage in discourse about the organizing vision (Swanson and Ramiller 1997).

The organizing vision is first and foremost shaped by the community, which is in turn influenced by the organizing vision. The vision is also affected by the IS practitioner subculture, the business problematic, properties of the technology itself, and the process of adoption and diffusion. These influences are depicted in figure 3.6. While Swanson and Ramiller (1997) are focused on the organizing vision as it pertains to IS innovation, this dissertation will show that the relevance of the organization vision extends beyond the application of new IS initiatives.

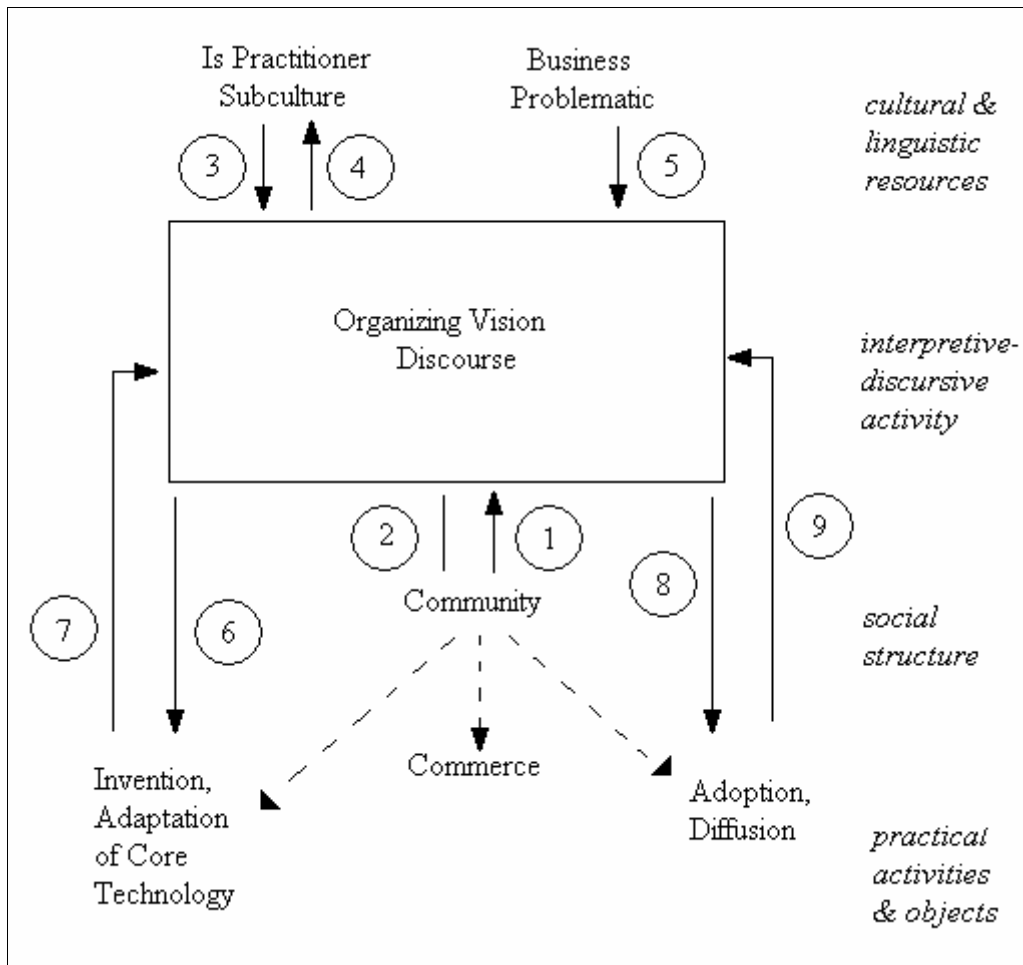


Figure 3.6: Organizing Vision in Information Systems Innovation
 Source: (Swanson and Ramiller 1997)

The notion of an organizing vision is particularly relevant to this study.

Organizing visions provide important cognitive structures that shape thought relative to innovation involving information technologies. The organizing visions active at any point in time define, to a great extent, the possibilities for innovation that IS practitioners and business people perceive to exist (Swanson and Ramiller 1997).

This dissertation will analyse the institutional forces that influence higher ICT education in India and will assess to what extent this forms an organizing vision. This will be discussed in more depth in chapter 6.

3.2.2 HOW NEO-INSTITUTIONALISM THEORIZES EDUCATION

Neo-institutionalism has some clear weaknesses that will be outlined in the next section. Given these limitations, DiMaggio (1988) has listed some objects of study that are particularly well suited to this theoretical lens. He also mentions some fields of study that are particularly well-suited to neo-institutional theory:

1. Aspects of life that are exteriorized and absolutely unquestioned.
2. Highly institutional, weakly technical fields where legitimacy is based on traditional authority.
3. Organizations where its form has been institutionalized, in which case institutional theory is relevant to explain change through concepts such as isomorphism, diffusion, etc.
4. Long term change within and between organizations
5. Countries or other large bodies with distinct institutional structures.

Figure 3.7: Candidates for Neo-Institutional Study.
Source: (DiMaggio 1988)

Based on DiMaggio's (1988) arguments, one could make a reasonable case that education is particularly well-suited to study through neo-institutionalism. Its relevance and necessity is never seriously questioned (point 1) and it is highly institutional, deriving its legitimacy from traditional authority (point 2).

Moreover, as mentioned above, DiMaggio and Powell (1991b) made empirical observations about characteristics of organizations that are more susceptible to institutional forces. Higher education is particularly susceptible because firstly, it relies extensively on the state for financial resources and legitimacy. Secondly, its goals are often conflicting, ambiguous and uncertain. As DiMaggio and Powell (Ibid.) wrote, this means educational organizations will model themselves off other organizations that they perceive as successful, if not in quality, at least in aspiration. Thirdly, there is a reliance on academic credentials in selecting managerial and staff personnel. This may seem obvious that academic organizations will rely on academic credentials, but the relevant point is that as DiMaggio and Powell (Ibid.) theorized, it

means that academic organizations will converge, and resemble other academic institutions in their field.

Thus, education is a particularly worthy subject for neo-institutional research, and this is reflected by the significant amount of research done in the field. One of the more prominent neo-institutionalist writers, John Meyer, writes extensively on education (Meyer 1992a, Meyer *et al.* 1979, Meyer and Rowan 1992, Meyer *et al.* 1992, Meyer *et al.* 1994c). In his many works, Meyer has theorized education as a legitimacy hungry and homogenizing endeavour (Meyer 1992a). While some view education as a vehicle for political revolution, or as a tool to achieve rationalization, Meyer takes a more neo-institutional view. He sees educational organizations as a tool for socialization.

The Sociology of Education

For much of the 20th century, a discipline existed called the sociology of education. One of the main mechanisms for the diffusion of social norms from one generation to the next is education (March and Olsen 1984). Education serves the state by creating a national identity, allocating individuals within society (i.e. various classes and professions) in a manner that is legitimate (Ramirez and Rubinson 1979, Rubinson 1981). Forbearers of the sociology of education included Emile Durkheim (1956) and Talcott Parsons (1959), and others who were interested in the way that education indoctrinates students and shapes society (Clark 1973, Parelius and Parelius 1978, Waller 1961). But while Durkheim and Parsons saw this as education doing a noble service to society, institutionalists such as Meyer, Olsen and Scott see it as education passing down conventional wisdom from generation to generation, which is neither good nor bad, it is merely conventional.

For some, the primary purpose of education is socialization (Mitch 1999) or “saving the savages” (Spring 1998). This was often manifested in a form of cultural education (*ibid.*). Thus, from the early days, education was not only a way to teach people skills, but also as a method to spread and entrench a particular ideology. Today, education

also serves that purpose as well, which some refer to as “brainwashing” (Angell 2000).

However, this perspective puts education in a very negative light. When viewed in this way, one can get the feeling that education is merely a method of distributing propaganda. Some authors view the socializing aspects of education in a much more positive way. Mathur (1966) saw it as a tool to build civic duty and instil a sense of citizenship. In Singapore, the sociology of education is seen as a way of promoting economic development (Spring 1998).

Meyer’s central point is that once education becomes a tool for socialization, society becomes *schooled*. Therefore legitimacy in society is derived in large part from the education system. In order for this myth to be sustained, educational systems and educational organizations must constantly affirm their legitimacy. This means strict adherence to the golden rule: Certified teachers teach a standardized curriculum to registered students in an accredited school. According to Meyer and Rowan (1992), evaluation and inspection are decoupled from classroom instruction because the myth of education needs to be maintained. Moreover, the lack of continuous evaluation means that teachers can improvise and adapt while doing the day-to-day managing of classroom tasks. There is some evidence that evaluation is becoming more central to the practice of education, particularly in Britain (Matthews and Smith 1995). While this may disprove Meyer’s argument about the decoupling of evaluation and instruction, it affirms neo-institutionalist thinking in other ways.

What is generally agreed is that the need to maintain confidence is paramount, firstly, within the current system, where teachers maintain confidence in principals who in turn maintain confidence in administrators. Second, and perhaps even more importantly is the external legitimacy where society maintains confidence in the educational system. As Meyer and Rowan (1992) pointed out, this dependence is historical as well. Since every individual who works in the education system requires the confidence of society for the myth to be maintained, they too are a product of the

education system. And so the confidence must be maintained for all of their intellectual ancestors (and those of their colleagues) as well.

As Meyer and Rowan (1991) stressed, organizations arise for 2 main reasons:

- Task 1: To coordinate work
- Task 2: To define programmes that are rational and legitimate.

Schools are often criticized for performing the first task poorly, for not adequately teaching students the relevant material. But Meyer and Rowan (1991) argue that schools in fact, place emphasis on the *second* task, and in most of the world, wherever confidence is maintained, the education system is considered an unqualified success.

For Meyer *et al.* (1992), the success of the education system lies in the decoupling that takes place between actual task of instruction and the integration within larger society. For organizations that have primarily formed to coordinate work (task 1), their work is sealed off from the environment and are very inward focused, for example a factory. But organizations that seek legitimacy – such as schools – must integrate with larger structures, and must buffer those larger structures from the actual work that takes place within the organization.

This decoupling is manifested in the fact that few of the official policies regarding education have to do with actual class instruction, and the criteria for success are often ambiguously defined. Importantly, according to Meyer, evaluation and inspection is rare and often perfunctory, unlike in an organization that is formed to coordinate work (task 1) such as a factory. Within educational policy, there is no detailed instructional programme, and superintendents have no authority over instructional work. However, it is instructive to note that there is tight control over classifications, of teachers, or students and of subjects. The legitimacy imperative and the continued maintenance of confidence are of paramount importance.

Not only does Meyer theorize education as a legitimacy hungry endeavour but also as a converging and stabilizing system (Meyer and Rowan 1991). These two aspects are

certainly related. As educational organizations in one country seek legitimacy to maintain confidence, they inevitably look globally as well as locally. Particularly in developing countries, as a society grows economically, it fuels an expansion in education. The importance of education grows as a society becomes more modernized, as legitimacy is gained from schools and official institutions, not tribal affiliations. However, this does not explain the suspicious coincidence that the form and structure of educational organizations around the globe are so similar. For that we turn to neo-institutional theory.

Much of Meyer's work is borne out through empirical evidence (see Meyer 1992a, Meyer and Hannan 1979, Meyer *et al.* 1994b, Meyer *et al.* 1994c). Using both qualitative and quantitative research, through many papers, Meyer and colleagues build a substantial case for this particular theoretical perspective on educational systems. Others have also done empirical case study work and support this institutional view of education (Gornitzka 1999, Kirby-Harris 2003). Schools and universities around the world are suspiciously similar.

While the evidence for this position is significant and compelling, there is a dissenting voice that is worth mentioning here. Kraantz and Zajac (1996) studied liberal arts colleges in the United States. They explicitly used an institutional framework and devised a rigorous research strategy using quantitative data. They set out to test the 6 hypotheses presented by Meyer and in each case, found them to be false. The authors found that these colleges tended to look to market forces to dictate the scope and speed of organizational change. As the colleges turned to more professional or vocation curricula, they tended to seek out market niches. Technical conditions, not institutional forces, became the predictors of change. Moreover, schools became less homogeneous, they did not mimic the more prestigious schools as Meyer would have predicted. Kraantz and Zajac went even further to show that when a college underwent change that was contrary to established norms, it seemed to suffer no negative effect.

What is striking about this paper is that it forcefully and precisely attacked neo-institutionalism at its core. It focused on an organizational field – education – that has a particular fitness with institutional theory. It directly attacked the hypotheses put forth by Meyer, the central propositions of neo-institutional theory, and found them wanting. In defence of neo-institutionalism, it must be pointed out the liberal arts colleges in America that focus on professional or vocation training are not the organizations that are studied by Meyer, DiMaggio, Powell and other neo-institutional scholars. For one, these colleges do not rely on other organizations for legitimacy or resources, nor do they rely on the state. Secondly their goals are less ambiguous than other educational organizations, having opted to deliver a more vocational education. Thirdly, these colleges are not dependent on professional associations for resources and legitimacy and therefore need not ascribe to previously established norms. However, this paper is significant because of they way it hits the core of neo-institutionalism and attacks it from within. It questions the very principles that the theory rests on. A critique of neo-institutional theory will be presented in Chapters 5 and 6 in light of the findings from this dissertation. However, before proceeding, certain contributions and limitations can be identified in the existing literature as well and are worth mentioning here.

3.2.3 CONTRIBUTIONS AND LIMITATIONS

One of the main contributions of neo-institutionalist theory is that it critically questioned the assumption of the “rational actor” As some have pointed out, this criticism appears in other works, such as the literature on adaptation theory and in the works of Talcott Parsons (Hasselbladh and Kallinikos 2000). But neo-institutionalism draws attention to particular agents within a given system.

Within sociology, there is a famous debate about whether agency resides in human beings or social structures. This was debated by the ancient Greeks (Delius *et al.* 2000) and continues in the Information Systems literature today (Kallinikos 2002, Orlikowski 2000). Despite some considerable effort to bridge the gap, the debate continues. Neo-institutionalism is a theory that gives agency primarily to social

structures. This results in a limitation that will be discussed further in the next section. But in focusing on the social structure, neo-institutionalism focuses on different aspects than class conflict (Bowles and Gintis 1977), resource dependency (Pfeffer 1982) or social reproduction for the common good (Durkheim 1956).

The main contribution of neo-institutionalism is the way it gives agency to social phenomenon such as conformism, legitimacy seeking and informal rules (March and Olsen 1984, Meyer and Rowan 1991). These phenomena have previously been acknowledged, but not theorized in a consistent way. Although neo-institutionalism has many different flavours, it draws one's attention to taken-for-granted assumptions that have often arisen not because of their merit, but because of the timing of their arrival, the actors who created them or the circumstances of their inception. Neo-institutionalism is particularly relevant to IS for three reasons: it draws attention to the relationship of IS to the modern world; it focuses on the importance of the legitimacy imperative; and theorizes on the ways institutions diffuse as organizations respond to institutional forces.

Relationship to Modern World

Information systems practitioners are particularly interested in the relationship between humanity and technology. When focused on this relationship, a very central point to observe is the place of ICTs in modernity. The western world today can be characterized as a highly rational place, a place where efficiency and productivity are respected and revered (Giddens 1990). Success is measured according to numerical methods; organizations – both public and private – must be organized in a rational fashion in order to gain legitimacy. This rationality has given new importance to management, frameworks and models (Hoskin *et al.* 1997).

The computer, and all its related technology, is the ultimate rational, modernistic tool. It is ideal for crunching numerical data, the type of data with the most legitimacy. It stores and aggregates data, generates reports and monitors specific variables – essential functions for the rational, modern organization. Most importantly, one of the

main ideas behind modernity is that science will simplify and “tidy-up” the world (see (Angell 2000). Ambiguity and confusion will be replaced by rational models, well-thought-through scenarios, computer simulations, and operating rules. In the tidy organized world, the computer is the ultimate tidy tool (ibid.).

This fitness between technology and Western society has made ICTs very trendy, and has made Information Systems an interesting field in which to conduct research. However, IS practitioners ignore the context of the modern rational world at their peril. A better understanding of the relationship between technology and humanity can be gained with a better understanding of the macro-context of technology.

Unlike other theories, one of the central uses of institutionalist theory is to question the development of the modern world, to question the deification of rationality and efficiency, to question the constant need for management. Considering how closely tied are technology and modernity, this amounts to a questioning of technology itself. Such an inquiry can only help Information Systems.

Legitimacy Imperative

A second reason why neo-institutional theory has merit in the context of Information Systems is because it draws importance to the issue of legitimacy. This issue is not new to IS practitioners, and perhaps its influence is most acute in the study of ICT evaluation, where researchers have noticed that formal evaluation of IT initiatives are rarely carried out, except for the purpose of lending legitimacy to a decision, post hoc (Angell and Smithson 1991, Serafeimidis and Smithson 2003). But it is not simply in this arena that legitimacy plays an important role.

Much IS research is done in the area of systems development or IS management. This research ranges from well-defined models such as the spiral model (Boehm 1988), or the waterfall model (Royce 1987), to prescriptions for a more over-arching strategy, such as the recommendation that companies create an environment where employees

are free to tinker, experiment, make mistakes and improvise (Ciborra 1991, 2002a). But interestingly, these arguments rarely touch on the issue of legitimacy.

During the dotcom boom of the late 1990s, companies that engaged in arguably excessive outsourcing practices were rewarded with ever-rising stock prices (Linder *et al.* 2002). The move to outsource was not necessarily the most effective way to manage the business, but it was the most legitimate in the eyes of the market. Some authors (see Boehm 1988) have argued for the Popperian (see Popper 1970) approach – that knowledge and strategic prescriptions must stand primarily on the strengths of their merit, but as Meyer wrote (1994), an idea that runs contrary to powerful and entrenched institutions will not easily be realized.

Finally, the legitimacy imperative has relevance in other ways regarding technology. All technology is value-laden to some degree (Bijker 2001), and these values are often dependent on powerful institutions. For example, a computer, together with its related technology is a very flexible tool. However, despite this, it is most commonly used for applications such as word processing and basic number crunching. Likewise the Internet, one of the much-hyped technological innovations in recent memory, was first used primarily as a tool for simple messaging (e-mail) and to distribute pornography (Smith 2001).

Why are the uses of this flexible tool so limited? The answer seems to be in the institutional thinking that is embedded in technology. ICT arose in a certain spatial and temporal context that defines how it can be used. What is more, ICTs became associated with a particular demographic – young, white males – and this demographic also infused technology with certain values (Fountain 2000). Neo-institutionalism gives IS researchers tools and a vocabulary to help understand why these values exist and how they diffuse from one context to another.

Neo-institutional theorists stress that the quest for legitimacy is central to much decision making. In fact, in the literature on ICT and Development there are many case studies describing situations where ICT initiatives do not go as planned because a

significant amount of “legitimacy seeking” takes place. This often conflicts with the project’s original goals (Madon 1993, Minnis 2000). Moreover, neo-institutionalism lays bare the fact that much ICT adoption in both developing and developed countries is done to acquire legitimacy, something that is often overlooked by other theories of socio-technical interaction.

Conformism and Diffusion

The way that an institution is passed around and duplicated is often called ‘diffusion’ or isomorphism (Scott 1992, Scott and Meyer 1994a). Some institutionalists are particularly interested in this phenomenon, in particular DiMaggio and Powell (1991b) who argued that isomorphism happens because of coercion, imitation and normative pressures. They also examined the conditions that enable high levels of institutional isomorphism. In particular, Scott and Meyer (1994b) argued that institutional isomorphism is common between institutions that require high levels of legitimacy.

This is an issue of particular interest in the field of ICT and Development. Manuel Castells (2001) argued that the world today is more connected than ever. Once it was possible to develop a system of government entirely distinct and unique, but no longer. Developing countries have no choice but to embrace ICT. While some dispute this point, it must be observed that institutional isomorphism acts as an obstacle for those developing countries that seek to set up education systems that are uniquely appropriate for their local contexts. Diffusion is a complicated phenomenon (Hasselbladh and Kallinikos 2000) and sometimes institutions fail to be diffused, or they mutate and transform when they appear in a new context (Lippi 2000).

Diffusion is studied on many levels; the factors that effect diffusion, the adaptation that is associated with diffusion, and the properties of institutions that influence diffusion (Jepperson 1991, Meyer *et al.* 1992). As some neo-institutionalist authors have pointed out, diffusion happens globally, and so the locus of institutionalisation is the ‘world society’ (Meyer *et al.* 1994b). The work that neo-institutionalists have

done in the area of diffusion can be of particular use to IS researchers who are interested in technology adoption, inter-organizational systems, and why the taken-for-granted assumptions about ICTs seem to be similar around the globe.

Thus, this theoretical lens can be of particular use to IS researchers, because one: it critically analyses modernity, a important facet of the context of ICTs, two, it brings new focus on the legitimacy imperative and three, it draws attention to the issue of institutional diffusion and informs many aspects of IS research.

Although neo-institutionalism makes a real contribution to Information Systems, there are drawbacks and they are significant. Like all theories, neo-institutionalism is a way of seeing and not seeing; while shedding light on some important issues, neo-institutionalism also fails to account for major aspects of contemporary life.

A Theory of Inertia and Homogeneity

Neo-institutionalism is primarily a theory of stability. It focuses on the way that institutions entrench certain modes of behaviour and thus strengthen forces of inertia. The theory provides a detailed vocabulary to explain how organizations converge, and adopt common structures and behaviours in order to conform to formal and informal rules.

There are several problems with this. Firstly, we observe much change and heterogeneity in the world. Not all organizations look identical and change is endemic to human existence. Neo-institutionalism does account for change, but primarily in the form of institutional diffusion, or isomorphism as termed by DiMaggio and Powell (1991b). The theory does not account for other forms of change such as bricolage (Ciborra 2002a) or divergence (see Heeks 2002). Moreover, not only does neo-institutionalism fail to account for change broadly speaking, the way it theorizes institutional change is immature and ambiguous (Yang 2003). There has been some work in this area (Hasselbladh and Kallinikos 2000, Lippi 2000, Strang and Meyer 1994) but this type of research is still in its infancy.

The notion of homogeneity is particularly problematic. As mentioned, a well-argued paper by Kraatz and Zajac (1996) showed that even within the education system there is considerable divergence and remarkable diversity between organizations. This is noteworthy because neo-institutionalists have proposed that educational organizations are in great need of legitimacy and so are especially responsive to institutional forces. Kraatz and Zajac's demonstration of how small liberal arts colleges in America change and respond to market forces calls into question many central institutionalist propositions.

Neo-Institutionalism brought the issue of rationalization to the fore, but several issues emerge: how do social ideas translate into administrative patterns? Why do some institutions diffuse easily, while others not at all? (see Hasselbladh and Kallinikos 2000). Moreover, some institutions undergo considerable change during the process of diffusion (Lippi 2000). As Hira and Hira (2000) wrote, neo-institutionalism provides a useful model of the constraints imposed on certain actors. However, by failing to explain the source and avenue for modifications of the constraints, neo-institutionalism fails to provide satisfactory notions of change. Researchers who use neo-institutionalist theory must be aware that it is a tool that does not equip them to understand the significant amount of change and diversity present in the world.

Agency Given to Institutions and Social Structures

A second limitation of institutionalist theory is the way it narrowly assigns agency. As mentioned previously, philosophy has been privy to a long debate on whether agency resides in social structures or human action. Writers such as Giddens (1983) and Latour (2004) have tried to bridge the gap and have contributed to a prevailing view that there is a somewhat reflexive relationship between humans and their environment, although there are differing views on which is more relevant.

Neo-institutionalism is a return to the school of Emile Durkheim (1956) that gave primary agency to social structures (Clark 1998, Mohr 2000). The criticisms that were

levied against Durkheim for not acknowledging the impact of human action can once again be applied to neo-institutionalism. In neo-institutional theory, it is the institution that has agency (Diermeier and Krehbiel 2004). In that sense, neo-institutionalism can be seen as a very top-down theory, or one that focuses on deductive, rather than inductive processes within society. Institutions are seen as weapons of coercion that mitigate collective action, enforce agreements, and structure relationships (Mulé 1999).

By giving agency primarily to institutions, neo-institutional theory denies that impact of local actors, which has been shown to be quite relevant in the arena of Information Systems. Moreover, neo-institutional theory denies the agency that is inherent in technological artefacts and how they constraint decision making by inviting certain forms of interaction (see Kallinikos 2002). This can be a major limitation of neo-institutional theory since focusing on institutions is not always appropriate.

Too Broad and Unclear

Finally, the theory is considerably broad. As mentioned previously, Scott and Meyer gave a typology of various institutionalisms that were all quite distinct yet fell under the same label. Some authors have tried to alleviate confusion by labelling one major branch “neo-institutionalism” and the other “new institutional economics”. While this distinction seems to be broadly accepted, there are still many papers that seek to combine both institutionalisms in an effort to bridge the gap (DiMaggio and Powell 1991a, Gornitzka 1999, Immergut 1998, Jepperson 1991, Mulé 1999). As Hasselbladh and Kallinikos (2000) wrote bluntly, the theory is too broad to direct empirical research. It covers too much in some respects and too little in others. Broad definitions fail to account for the distinctive process of institutionalization and the theory has no limits or sense of what is more or less relevant.

What is striking upon reviewing some of the neo-institutionalist literature is that a significant amount of effort is dispensed in locating the work within neo-institutional theory. Several paragraphs, if not pages, are used to explain that there are several neo-

institutionalisms, which after only a cursory glance at the literature is well understood but constantly needs to be repeated. Moreover the discrepancy has also spawned a large number of papers that try to bridge the gap or alleviate the confusion (Immergut 1998, Mulé 1999, Scott and Meyer 1994b, 1994c). This is of course welcome and, in fact, it is necessary. But the plethora of these types of papers point to the inherent confusion and inconsistency within neo-institutionalism. The result is that many researchers get to customize the theory as they choose. Those who want to attack institutionalism can build a straw man in order to knock it down (see Bendor *et al.* 2001). One can use neo-institutionalism to guide positivistic research as well as interpretive. In some ways, the eclecticism is an asset and brings a certain vibrancy to the field, but it is also problematic because it means that neo-institutional theory does not theorize empirical reality in a consistent way.

Criticisms of neo-institutionalism often arise because the theory is poorly defined and it means different things in different disciplines. Despite the work of Scott and Meyer (1994b, 1994c) and Jepperson (1991) to make sense of the confusion, different notions of neo-institutionalism limit its effectiveness. Like all theory, neo-institutionalism has its limitations and weaknesses; however, for the reasons described above, it is appropriate as a primary theoretical lens for this particular study.

3.3 SECONDARY THEORIES

To provide richness and depth, secondary theories that will also be used to inform the analysis. These secondary theories are introduced here.

3.3.1 DEVELOPMENT

One of the starting points for this research is the relationship between ICT and Development. While the notion of Development might seem intuitive, it is in fact conceptually confused, with many contradictory ideas falling under the same “Development” umbrella. Some scholars have pointed out that “development seems to

defy definition” (Cohen and Shenton 1996). It is often construed as ‘enlarging people’s choices’, ‘promoting economic growth’ or ‘empowerment’, to name a few.

If Development is, in fact, the study of trying to make people’s lives better, then all research activity could be considered to fall under this umbrella. In the literature, one can find references to ‘development economics’, ‘development sociology’ and ‘development anthropology’. One might even consider possible areas of study such as ‘development chemistry’ or ‘development mathematics’ although ‘Development’ typically falls under the remit of the social sciences.

History of Development

Several texts locate the modern roots of development with the origins of sociology (Cohen and Shenton 1996). In fact, the “idea of Development” – as the progressive transformation of society – begins to assume a modern form in the writings of the ‘founding fathers’ of social science” (Bernstein 1973). What is interesting to note is that many of the major debates that exercised the founding fathers of social science continue today unresolved. However, they are now couched in the discourse of Development. Development is the “dominant organizing myth of our epoch”. (Aseniero 1985) surpassing “progress” in the Enlightenment or even “growth” in classical economics (Cohen and Shenton 1996). The jargon has changed but the essence has not.

Adam Smith, the father of modern economics is famous for the following quotation:

man has almost constant occasion for the help of his brethren, and it is in vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favour, and shew them that it is to their own advantage to do for him what he requires of them.. It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own self-interest (Smith 1937 [1776] Quoted in Cohen and Shenton 1996).

Smith has found admirers in modern Development discourse. Neo-liberal capitalists have espoused a programme of Development that includes free trade, privatization and small government. That this has – in some cases –achieved disastrous results

(Stiglitz 1992) would not surprise Adam Smith. As Amartya Sen (1989) argued, Smith has been misappropriated. Smith was deeply concerned with ethical considerations pertaining to the function of the marketplace. “A large portion of the *Wealth of Nations* can be read as a warning against the machinations of the ‘men of commerce’ (Cohen and Shenton 1996).”

Two historical critiques of Smith must be mentioned here because they continue to resonate today in the Development discourse.

In arguing the question of whether national wealth was distinct from that of national ‘happiness’, Malthus argued that ‘perhaps Dy. Adam Smith has considered these two inquiries as still more nearly connected than they really are.’ Pointedly, Malthus charged that Smith had ‘not stopped to take notice of those instances where the wealth of a society may increase without having any tendency to increase the comforts of the labouring part of it’. These ‘comforts’ were defined as the ‘two universally acknowledged ingredients, health and the command of the necessaries and conveniences of life’. He agreed with Smith that: ‘Little or no doubt can exist that the comforts of the labouring poor depend upon the increase of the funds destined for the maintenance of labour, and will be very exactly in proportion to the rapidity of this increase.’ But then Malthus suggested that ‘perhaps Dy. Adam Smith errs in representing every increase of the revenue or stock of society as an increase in these funds. (Malthus 1986 [1798] quoted in Cohen and Shenton 1996). [sic]

Malthus continued, writing of the:

most disheartening reflection that the great obstacle in the way of any extraordinary improvement in society is of a nature that we can never hope to overcome. The perpetual tendency in the race of man to increase beyond the means of subsistence is one the general laws of animated nature which we can have no reason to expect will change... it is evident that no possible good can arise from any endeavour to slur it over or keep it in the background. On the contrary, the most baleful mischiefs may be expected from the unmanly conduct of daring not to face the truth. (Malthus 1986 [1798] quoted in Cohen and Shenton 1996)

The common criticism, that Development today is too focused on economic growth, can trace its roots back to Thomas Malthus.

A second critique of Smith, is the famous Marxist critique. Capitalism requires some people to be exploited. Development and underdevelopment are two-sides of the same coin (Khamisi 1983). In a capitalistic system, underdevelopment of some is a necessary condition for the development of others. The critique results in a call for

more communistic forms of governance. The strong influence of Marx is visible in the *Dependency Theory* of Development, which focuses on the imperial nature of modern capitalism.

In the 19th century, Development was always considered the responsibility of the European colonizer. This is commonly known as ‘trusteeship’. Those in the colonies were considered ‘savages’ or ‘uncivilised’. Thus, Development started with a palpable Eurocentrism. Although trusteeship has been renounced, Development continues to be criticized for its Eurocentric – or at least, western-centric orientation.

Interestingly – especially in consideration of this research project – Cohen and Shenton (1996) have shown that discussions of Development were often situated in the context of “British – Indian” relations during the colonial period. In fact, several notable social scientists worked for the British East India Company or as a civil servant in the India office, including J.S. Mill, Thomas Malthus, Jeremy Bentham, David Ricardo and John Maynard Keynes. The subject they often wrote about was the reciprocal effects of Indian and British development.

For many Orientalists who championed the cause of British Colonialism, India was positioned as degenerate or uncivilised. For others such as Edmund Burke, it was British rule that was responsible for poor conditions in India (Cohen and Shenton 1996). The discussion of how to improve the lives of the less fortunate in India contained ideas that are still part of the development discourse today: land reform, civil rights, free trade, environmental improvement, education and the diffusion of technology.

Thus, current or alternative views of Development repeat themes that were espoused in earlier works (Cohen and Shenton 1996). The different ideas of what “Development” is, and how one should help the poor are reflected in the multiple causes of poverty. Agunga (1997) neatly summarizes the various “causes” put forth for poverty in a chapter that he refers to as the “blame assignment syndrome”. One set of explanations are external. They are summarized in the following figure:

- Governments of Industrialized countries who are:
- frequently changing their development policies,
 - actively protecting their own domestic markets,
 - protecting the markets for multi-national corporations (MNCs),
 - refusing to allow debt relief,
 - and tying aid to their own self-interest.

Figure 3.8: External Causes of Poverty. Source: (Agunga 1997)

External blame is also heaped on MNCs for exploiting the poor and on NGOs for being self-righteous, unaccountable and amateurish. Blame is also apportioned out to social scientists who see the situation myopically, centred on their respective disciplines, and fail to appreciate the holistic picture.

Agunga also goes to outline the internal explanations that centre on the governments of developing countries. They are accused of conflicting crimes such as embracing western values too much, or failing to globalize. In addition, they are criticized for failing to ensure political stability, perpetuating hopelessly corrupt practices and leading superfluous lifestyles. Blame is also apportioned on the poor themselves for being ungrateful, fatalistic, lazy or lacking a work ethic required in the modern age.

Theories of Development

Agunga's long list reflects the difficulty in conceptualizing the problem of poverty, and therefore the enterprise of Development. In the post-war period, Development thinking was centred on various theories, one being modernization. The modernization theory of Development is said to have been given birth by Harry Truman who in his inaugural address claimed:

For the first time in history humanity possesses the knowledge and the skill to relieve the suffering of these people [poor]... Greater production is the key to prosperity and peace. And the key to greater production is a wider and more vigorous application of modern scientific and technical knowledge. (Truman inaugural address, quoted in Escobar 1995).

Modernization was historically wrapped up in the notion of progress, a “linear unfolding of the universal potential for human improvement that need not be recurrent, finite or reversible.” (Cohen and Shenton 1996). Indeed, growth was often seen to be going through 5 stages:

- Traditional – dependent on nature
- Transitional – early adoption of scientific technology
- Take-off – capital accumulation, early industrialization
- Drive to maturity – highly industrialized
- High-mass consumption – the American Dream.

Figure 3.9: Five Stages of Growth.
Adapted from: (Cohen and Shenton 1996)

Poverty on the other hand was seen as a vicious cycle of low investment, low incomes, low productivity and low savings. It is interesting to observe that the linear path was seen as healthy and desirable – climbing the ladder. However the cyclical path was seen as been problematic or degenerative – going around in circles.

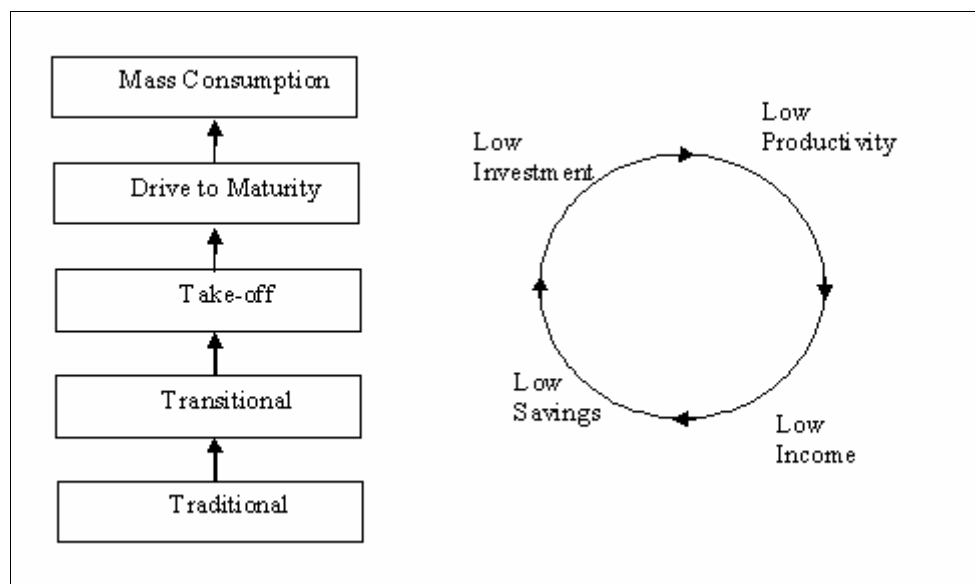


Figure 3.10: Linear Growth and Cyclical Poverty

Modernization was synonymous with growth, productivity and industrialization. The Marshall plan and the associated growth of Germany and Japan gave it some credence, although by the 1970s, the theory of modernization was heavily criticized.

First of all, the notion of progress negates the idea of decay and destruction. This is significant but largely theoretical. Empirically, what was observed was that development projects based on the theory of modernization were not achieving the desired results. Income inequalities were widening. Some saw Development as a deliberate attempt by the West to create a relationship of dependence. While this can be disputed, what is certainly true is that there is an element of trusteeship to the theory of modernization. Moreover it was overtly positivistic, the underlying assumption being that “there is a proper course of development which could be guided by intent.” (Cohen and Shenton 1996). Modernization is a western-centric theory, resting on the notion that the Western powers know best – as evidenced by their economic power – and so their path to modernity should be emulated. As Banuri wrote:

The project of modernization has been deleterious to the welfare of Third World populations because the project has forced indigenous people to divert their energies from the *positive* pursuit of indigenously defined social change, to the *negative* goal of resisting cultural, political and economic domination by the West (Banuri 1990).

The criticism of modernization resulted in a backlash that arrived in many forms. Dependency theory – as mentioned – was a contemporary version of Marxism. It saw the inherent properties of the capitalist system as the root causes of poverty. Although it found credence in academic circles, it was often criticized for being too macro-political and not focusing on the real needs of local people. In response, several theories emerged that focused on achieving some sort of equality between those in the North and South. These ideas were found in the theory of “Basic Needs” as well as “Integrated Rural Development”. However, as Agunga (1997) wrote, these were all very much top-down theories that assumed that some “higher-up” would pronounce on which needs were considered “basic” or how rural development should be integrated. In some sense, it was a return to the renounced notion of “trusteeship” common in the 19th century. Moreover, Sen (1997b) articulately criticized the focus on equality by showing that since humanity is inherently diverse, striving to achieve equality in one area will naturally lead to inequality in another.

For Sen (1997a), Development was conceptualized as “freedom”, the freedom to pursue one’s life how one wished. Sen saw Development as the removal of unfreedoms, such as obstacles to the pursuit of education or restrictions on trade. For Sen, poverty is not solely an economic concept, it is much bigger than that, it is ‘capability deprivation’. The removal of unfreedoms so that people could gain capabilities is not only instrumental in precipitating Development, but also constitutive of Development. Sen’s theory is powerful and gives a refreshing contribution to what seemed like an exasperating area of study – replete with chronic blaming and recycled ideas. However, to some extent, Sen is open to criticism because there is not a clear programme for practical application. Moreover, the suggestion that certain ‘unfreedoms’ can be defined externally and identified for removal, raises questions of who gets to define these unfreedoms and leaves the theory with a faint hint of trusteeship (Cohen and Shenton 1996).

The literature on ICT and Development tends borrow from various theories of Development, one example being “Human Capability Theory”. Conceicao et al. (2001) wrote a paper stressing the importance and challenges in creating a “learning society”. Similarly, Robin Mansell (2002), leveraging recent work on human capability by Amartya Sen, stressed the importance of developing media literacy. This attitude reflects current Development theory, stressing the importance of human capabilities and empowerment.

A second Development theory that is present in the literature is that of Basic Needs. This is very clear in the work of Bohme (2002) who presented IT as a basic competence. It is also found in the work of Manuel Castells (1999) who wrote that changes in the education system were crucial to the goal of reintegrating social development and economic growth, something that developing countries must do in the information age.

The ability to move into the Information Age depends on the capacity of the whole society to be educated, and to be able to assimilate and process complex information. This starts with the education system, from the bottom up, from the primary school to the university. And it relates, as well, to the overall process of cultural development, including the level of functional literacy, the content of

the media, and the diffusion of information within the population as a whole (Castells 1999).

Finally, some of the literature on ICT and Development has roots in modernisation, an early Development theory that gained prominence in the 1950s (Shadrach 2002, Sidorenko and Findlay 2001). It would not be correct to suggest that the literature on ICT education policy has “returned” to modernisation, given the important work by Castells, Mansell and others, however it is important to note that this underlying view of the world is still very much present. Modernisation theory is present in the literature on ICT education policy in developing countries, and beliefs from this theory such as the assumption that technology leads to growth, underpins much of the research and opinions on ICT and Development.

Escobar

It is Escobar (1995) who is noted for conceptualizing Development not as an economic theory, or as a programme for poverty alleviation, but rather as discourse. He stresses that the notion of Development is constructed by statements and modes of thinking arising in the West. Quoting an influential United Nations document, he writes that it was often assumed that in order to achieve economic progress.

Ancient philosophies have to be scrapped; old social institutions have to disintegrate; bonds of cast, creed and race have to burst; and large numbers of persons who cannot keep up with progress have to have their expectations of a comfortable life frustrated. Very few communities are willing to pay the full price of economic progress (United Nations 1951 quoted in Escobar 1995).

While this view today seems contemptible, as Escobar writes, at the time it was uttered “it made perfect sense.” Escobar’s work stems from that of Edward Said who is noted for looking at the systematic way

European culture was able to manage – and even produce – the Orient politically, sociologically, ideologically, scientifically, and imaginatively during the post-Enlightenment period (Said 1979).

The discourse of Development allowed poverty to be problematized in a certain way. This resulted in the discipline of Development, and resulted in a whole slew of professionals armed with best practices and rational techniques, which were to take

the *third world* out of darkness and into light. Escobar's work is rigorous in the way it shows how the Development discourse evolved and how it now determines the relations between the North and South.

In his concluding chapter, Escobar shows that there is a significant and growing literature that focuses on grassroots movements and local culture – the literature is “interested not in development alternatives, but in alternatives to development” (Escobar 1995). In some sense, this work stems from that of Foucault and other post-structuralists who are critical of the way dominant powers shape discourse. As Deluze wrote about Foucault, “you have taught us something absolutely fundamental. The indignity of speaking on someone's behalf” (quoted in Cohen and Shenton 1996). In chapter 6, the findings of this dissertation will be analysed in terms of these theories of Development.

3.3.2 THEORIES OF INDIAN SOCIETY

By necessity, the analysis will utilize certain perspectives on Indian Society. Theorizing Indian society is notoriously difficult, and every attempt to do so comes with a disclaimer in the form of a preamble. In the case of India, Walsham's (1993) oft-cited observation that “theory is a way of seeing and not seeing” is particularly true. However, as one reviews the literature on Indian society various perspectives emerge.

Several volumes could be (and have been) written about Indian society, and it has been difficult to keep this dissertation focused on *Higher ICT education in India*, rather than *India* itself. Emerging out of the discussion are three dominant themes in the contemporary literature on Indian society, which will be used in the analysis in chapter 5.

The first theme is that of “India on the Rise”. India is frequently presented as a future superpower, especially by the Indians themselves (Chandra *et al.* 2002, Gill 2004, Yadav 1999), not just in various literatures, but also on television programmes and in

Bollywood cinema (Khan 2004). This argument is fuelled in part by the success of India's IT sector and its growing and youthful population – in contrast to the aging population of the West (Foot and Stoffman 2000). This view of India is reified by the successful nuclear tests in May 1998 and the India's pursuit of a permanent seat on the UN Security Council (Malkani 2002). The theme of India as a rising power – culturally, financially, militarily – is very present in the contemporary literature. It is relevant to this study because ICTs are seen as having a major role in Indian ascension.

Secondly, a major preoccupation of Indian scholars is the conflict between the obvious diversity within India and the idea of *Indian-ness* (Lal 2003, Malkani 2002, Tharoor 2000). Comparisons abound between India's Hindus, Sikhs and Muslims, between Keralans and Biharis, between the North and the South. Thinking of Indian societies in terms of distinct groups is fuelled by the history of the caste system, but also of recent separatist movements in some Indian states. The issue of Indian diversity is very relevant to this study as well. This study concerns the ICT curriculum discourse and those people who interact reflexively with it. While the people involved with ICTs in India (directly and indirectly) represent a small fraction of the Indian population, they receive a disproportionate amount of attention and are quite distinct, in many ways, from other groups within India.

Finally, there is the ongoing discussion about poverty, social deprivation and inequality. This is often similar to the general discourse on Development discussed earlier, but in India, it is often accompanied with a growing critique of the rising Indian middle class as being harsh, self-centred and ruthless in the pursuit of success. As Tharoor (2000) wrote, the lack of government welfare means that communities support each other but:

very few Indians have a broader sense of community than that circumscribed by ties of blood, caste affiliation, or village. We take care of those near and dear, and remain largely indifferent to the rest... This attitude is also visible in the lack of a civic culture in both rural and urban India, which leaves public spaces dirty and garbage-strewn, streets potholed and neglected, civic amenities vandalized or not functioning. The Indian wades through dirt and filth, past open sewers and fly-specked waste, to an immaculate home where he proudly bathes twice a day (Tharoor 2000).

The indifference to the poor is also tolerated in the endemically corrupt political system that is rhetorically condemned but practically condoned (Varma 2004). In fact, prominent citizens frequently boast of their ability to manipulate the system (ibid). This section serves to introduce this view of Indian society, which will be dealt with in further depth – and in conjunction with the research findings – in Chapter 5.

3.3.3 NEW BARBARIANISM

Many authors have put forth theories of Indian society (Arora and Athreye 2002, Sen 2005), however Ian Angell's (2000) theory of the transition into the information age appears to be particularly commensurate with the findings from this study. This does not deny the other strains within Indian society; however the use of New Barbarianism is appropriate and provides ornamentation to the central neo-institutional analysis. Since this theory will be used in the analysis (Chapter 5), it warrants some mention here.

Angell's theory of the new information age is a world divided into New Barbarians, Old Barbarians, and the masses. New Barbarians are the elite. They are markedly global and move freely to the spots where they have the greatest advantage. New Barbarians are not sentimentalists, they are self-driven and have an indifferent attitude to altruism. Moreover, as the engines of global society, they are beyond the reach of governments and their laws of taxation. By contrast, it is the Old Barbarians that focus on morality and try to exhort the masses to resist the opportunism of the New Barbarians and return to an idealized past.

Angell's theory is anchored in the writings of Friedrich Nietzsche who predicted the emergence of the self-interested being. As Angell (2000) writes "Nietzsche's hero is a 'free man', who drives forward with individualistic ideals, and who is consequently a threat to the herd."

Our psychologists, whose glance lingers involuntarily on symptoms of decadence alone, again and again induce us to mistrust the spirit. One always sees only those effects of the spirit that make men weak, delicate and morbid; but now there are coming.

new barbarians { cynics
experimenters } union of spiritual superiority
conquerors } with well-being and an excess of strength.

I point to something new: certainly for such a democratic type there exists the danger of the barbarian, but one has looked for it only in the depths. There exists also another type of barbarian, who comes from the heights: a species of conquering and ruling natures in search of material to mould. Prometheus was this kind of barbarian (Nietzsche 1968).

According to Angell, Nietzsche's individual way of thinking is what is required in the information age, "mass movements are from the now-defunct Machine Age" (Ibid.).

The implications of New Barbarianism are many. Democratic institutions will weaken as the rule of law succumbs to amoral opportunism. Taxation will become increasingly difficult. Frontiers will become irrelevant as labour and capital move freely around the global instantly. Workers of the future must add value or perish "Nature is not immoral when it has no pity for the degenerate" (Nietzsche 1968).

Some have found Angell's theory of the future morally repugnant, contradictory and apocalyptic (EJIS 2000). However, the findings from this study suggest that those engaged in higher ICT education in India, and those who control the curriculum discourse, are remarkably well theorised as "New Barbarians". Contemporary writings on Indian society make the case even stronger that this strand is emerging in Indian society. In consideration of the findings, it is essential to note that Angell's theory does not lament the lack of social conscience. Rather it "celebrates and recommends today's new barbarians" (Angell 2000).

To conclude, the conceptual framework is based on interpretive assumptions and a theoretical lens informed by neo-institutionalism, theories of Development and New Barbarianism. The methodology used in conjunction with the conceptual framework is the subject of the following chapter.

4 METHODOLOGY

Chapter Abstract

This chapter outlines the methodology used in this study. The overall methodology is curriculum analysis that is, the study of curricula and the process of curriculum development in order to understand patterns of legitimacy and power relationships. While this method is hardly ever used in Information Systems research, it is widely-used within the field of Education and has become a sub-discipline in its own right. The methods of data collection are document analysis – mainly syllabi – and interviews with academics.

Chapter Contents

4.1	RESEARCH STRATEGY – CURRICULUM ANALYSIS.....	107
4.1.1	Justification for the Study of Curricula	107
4.1.2	How Curriculum Studies are Conducted	112
4.1.3	Discourse and Narrative Analysis	116
4.2	DATA COLLECTION METHODS.....	120
4.2.1	Document Analysis	120
4.2.2	Life History Interviews.....	121
4.2.3	Semi-Structured Narrative Interviews.....	123
4.3	COHERENCE AND SUMMARY OF THE MODEL.....	124
4.3.1	Context and Philosophical Assumptions	125
4.3.2	Theoretical Framework.....	126
4.3.3	Methodology and Research Question.....	127

The following chapter will outline the methodological approach undertaken for this study. While all methods have weaknesses, some are more appropriate than others. This chapter seeks to build an argument that the study of curricula is a reasonable way to investigate the phenomenon of interest for this dissertation. The first section will justify the use of curriculum analysis as an overarching research strategy. The second section will discuss the data collection methods and the final section will summarize the research model and assess its coherence.

This project has been informed by Paul Feyerabend's (1993) writings on methodology, where he unequivocally rejects any adherence to formal methodological processes. While it is acknowledged that a dogmatic insistence on method can be a hindrance, Feyerabend does not call for a haphazard or unconsidered approach. Rather, his writing exhorts one to consider an innovative research strategy combining several methods on the basis of appropriateness. It is that type of research approach that will be described here.

Several ideas were considered and rejected before identifying curricula analysis as a central research strategy. It is worth briefly mentioning some of these rejected ideas here. Because this was to be an interpretive study, it was easy to rule out positivistic methods such as statistical regression modelling and other forms of measurement. A longitudinal study of student attitudes to technology was also considered. However, this too was rejected due to issues of commensurability with the original research questions and the practical considerations of limited resources. Secondly, an ethnographic approach was considered, targeting students in a university environment. This approach had obvious benefits but was rejected because it was decided that the data collected would contribute only tangentially to the questions of interest. A journey into the literature suggested a mixed approach using discourse and narrative analysis with an overall research strategy of curriculum analysis.

4.1 RESEARCH STRATEGY – CURRICULUM ANALYSIS

The study of curriculum has a recent yet rich history in social science research. It has informed seminal works, including those that have influenced this study. As mentioned in chapter 3, this research is partially inspired by the work of Thomas Kuhn (1962). Kuhn is known for his ground-breaking work on the paradigmatic nature of science, and the categorization of scientific work into normal and revolutionary science. However, he also made methodological contributions as well. Kuhn often based his analysis on empirical evidence gleaned from – among others – university curricula (Ibid.). Within curricula and textbooks, he saw the tenets and assumptions that circumscribed the domain of normal science. He never referred to these guiding tenets as “institutions” although he discussed them as such. It was this inspiration that led to the consideration of curriculum analysis as an overarching research methodology and a justification of its relevance to the phenomenon of interest.

According to Geoff Whitty (1985), the study of curricula took on a new direction in the late 1960s and early 1970s, led primarily by scholars at the Institute of Education – a college within the University of London. One of the leading academics in this field was Michael F. D. Young who related the

principles of selection and organization that underlie curricula to their institutional and interactional setting in schools and classrooms and to the wider social structure (Young 1971a).

The work of these scholars forged a new path for successive generations of researchers. Their work reveals the benefits – and limitations – of curricula analysis.

4.1.1 JUSTIFICATION FOR THE STUDY OF CURRICULA

The practical considerations of undertaking a PhD force a researcher into studying a particular aspect of the phenomenon of interest. Curricula are an excellent candidate in this regard because they have the capacity to reveal taken-for-granted assumptions within a particular domain, and they are researchable. Curricula are manifested in

documents that can be read and understood. Moreover, as many education scholars have suggested, they reflect values and forces within an education system. Whitty (1985) and Coffey (2001) have argued that curricula are “ideology in practice”, a mechanism to achieve cultural reproduction from one generation to the next. Curricula can also act as a reflection of power relationships within a society.

How a society selects, classifies, distributes, transmits and evaluates the educational knowledge it considers to be public reflects both the distribution of power and the principles of social control (Bernstein 1971 quoted in Goodson 1998a).

Bernstein added elsewhere:

There is nothing intrinsic about how educational time is used, or the status of the various contents or the relation between the contents. I am emphasizing the social nature of the system of choices from which emerges a constellation called a curriculum (Bernstein 1977a).

Ivor F. Goodson (1985a, 1994, 1998b) has developed wide-ranging works in the study of curriculum. He argues that curricula underpin assumptions about power relationships and institutional forces, and that the study of curricula increases our understanding of interests and values represented in schools (Goodson 1994). School subjects are not monolithic, but change and are re-negotiated. The process of becoming a subject is co-evolution, with ties to community and universities. The debate over curricula can be interpreted as a conflict between subjects over status, resources and territory (Goodson 1994). Thus, curriculum construction has such central significance, and the study of curriculum can be particularly illuminating. Within curriculum, patterns of resource allocation, legitimacy, and power relationships are all inscribed (Goodson 1998b).

Finally, the study of curricula is intriguing because of the way it treats what we know as *problematic* in order that it becomes as object of inquiry (Young 1971b).

It is not surprising that treating knowledge in this way has excited more than a ripple of interest, particularly amongst philosophers of education, for the worthwhileness of particular educational activities can no longer be justified in absolute terms once the social basis of such justification is recognized. The apparent self-evident justification for education into particular forms of

knowledge is laid bare as an ideological statement. The process through which particular curricula are institutionalized and justified becomes open to sociological examination ... We are forced into an often uncomfortable re-examination of the content and underlying assumptions of the curriculum at all levels (Gorbutt 1972).

While the advantages of curriculum analysis are many, it is clear that this form of study also has limitations. First, curricula do not *perfectly* reflect the instruction that takes place at a university; there are many informal rules that some call the “hidden curriculum” (Buckingham and McFarlane 2001, NBEA 1992). Similarly, curricula do not *perfectly* reflect values within society. While some scholars have written of curriculum as analogous to a “mirror”, Wexler rejected this analogy arguing

that knowledge production is constituted by transformative activities that are the series of editings and recodings during which the raw materials are continuously transformed ‘Social montage’ is therefore more apt a metaphor for the sociology of school knowledge (Wexler 1982 quoted in Whitty 1985).

In this sense, curricula are not deterministic, they are merely nodes in a web of relationships, each node continuously “editing and recoding” (Wexler 1982) the raw materials, introducing biases, simplifications and time lags.

The difficulties of employing curricula as a mirror are compounded by the multiple definitions of curricula. At its most narrow, curriculum means the intellectual material to be transmitted to students. As the concept of curriculum broadens, it begins to include the textbooks used, the reading lists employed, the organization of the material into modules or subjects, and even the pedagogical techniques used to deliver the material. In some cases curricula can include related extra-curricular activity that is incorporated in an effort to augment the core material (Goodson 1985b). The problems of defining curricula can pose limitations to its usefulness as a form of study.

Finally, curricula can reflect certain biases of the teachers or administrators who are entrusted with their design. In some cases this can reflect a research agenda (Buckingham and McFarlane 2001, Goodson 1998b) or power relations within the organization (Goodson 1998c) or as Weinstock (1976) wrote, broader political biases.

Teachers fulfil an essential function in the community but, having themselves chosen not to go into industry, they often deliberately or more usually unconsciously instil in their pupils a similar bias (Weinstock 1976).

Weinstock (Ibid.) goes further and shows that this bias is reflected in the impression that an outsider receives of a teaching profession that is actively committed to an anti-industry agenda. Thus, inherent political biases are therefore a central weakness of curriculum analysis that must be acknowledged.

Nevertheless, while acknowledging these limitations, past research by Goodson and others suggests that an examination of university curricula is a reasonable way to understand the way institutional forces influence the social construction of technology.

There is quite a large body of literature pertaining to the study of curricula. As Goodson (1994) wrote, much of the research on curricula in the past tended to be prescriptive, dictating what curricula should look like and outlining methods to assist in the design. But he argues forcefully that this view of curriculum contains an element of historical amnesia. Scholars who view curricula in this way are trying to say how things *should be* when they have little understanding of how things *are* (Goodson 1998b). The type of research that Goodson is calling for has much in common with the neo-institutionalists. They share a view that underlying forces, taken-for-granted assumptions and the legitimacy imperative need to be examined in order to gain a real understanding.

As previously mentioned, scholars such as Young (1971b) and Bernstein (1977b) heralded a new form of study, sometimes referred to as the New Sociology of Education (Gorbutt 1972, Whitty 1985) with a methodological focus on curricula. Much of this research adopted a neo-Marxist theoretical position, focusing on

the ways in which the interests of dominant groups in society are translated into social values which inform schools, which in turn replicate the social structure (St John-Brooks 1980).

However, as Whitty (1985) argued, this form of neo-Marxism was a mixed blessing. It provided some initial enthusiasm and rationale for a new form of research, but also bred a sort of radical pessimism which “seemed to suggest that little could be done until after the overthrow of capitalism” (Ibid.).

In too many accounts, schools were seen merely as a part of the ideological apparatus of the state whose role was to secure the hegemonic control of the bourgeoisie and the perpetuation of the capitalist mode of production (Whitty 1985).

There is some research being undertaken in the area of ICT curriculum that does not adopt a neo-Marxist or similarly political position. However, much of this research is prescriptive and ahistorical, supporting Goodson’s argument regarding the current state of curriculum research. Some of the ICT curriculum research is simply concerned with how technology will necessitate curriculum changes (Buckingham and McFarlane 2001, Loveless and Ellis 2001). Another body of literature focuses on the development of curricula for technical courses such as Computer Science or Computer Engineering (Barrett 1985, Gorgone and Gray 2000, Henson 1995, Reichgelt *et al.* 2002). But as Goodson (1998b) wrote, this research is prescriptive, and the nature of curricula is neglected in favour of research focused on curriculum development and implementation.

Nevertheless, the descriptive and explanatory body of literature in this field is growing. In the same way that IS literature has shifted into an arena with a new focus on context, curriculum research has done likewise. Several books have looked at the local, national and international contextual factors that effect curricula in advanced economies (see Kelly 1980, Moon and Murphy 1999). This type of research has changed the nature of curriculum theory, which now views curricula as an agent of socialization and a reflection of the will of powerful actors within a social system. Young (1998) wrote of curricula as *organized* knowledge, framing what can be studied and what cannot. As mentioned, Whitty (1985) and Coffey (2001) theorized curricula as ideological practice.

4.1.2 HOW CURRICULUM STUDIES ARE CONDUCTED

While the worth of curriculum studies is well-supported by the existing literature, there are differing views on how to pursue this type of research. Those who undertake prescriptive research on how to develop curricula for Computer Science and Computer Engineering programmes (Barrett 1985, Gorgone and Gray 2000, Henson 1995, Reichgelt *et al.* 2002) typically examine the various needs of industry and students. While this literature is interesting to examine, it is beyond the scope of this project. This study concerns the social aspects of curricula, inspired by the work of Goodson (1994, 1998b), Bernstein (1971) and Young (1971b) and how these social aspects reveal the interplay of institutional forces. Even within this sub-discipline, there are many competing methodological ideas.

One of Goodson's central methodologies is the historical analysis of how school subjects come into existence (Goodson 1998a). Goodson reveals this form of study in two ways, the first is similar to the neo-Marxist approach in this area, focusing on:

the scrutiny of the process whereby unspecified dominant groups exercise control over presumably subordinate groups in the definition of the school knowledge (Goodson 1998a).

The second research approach takes on a less political perspective that focuses on sociohistorical constructs of a particular time. Layton (1972) characterized the emergence of a school subject as a process in three stages. In the first stage, "the callow intruder stakes a place in the timetable, justifying its presence on grounds such as pertinence and utility." Teachers are rarely trained but bring "the missionary enthusiasm of pioneers to their task". In the second stage, a tradition of scholarly work emerges and the subject matter becomes organized. In the third and final stage, teachers constitute a professional body and students are initiated into the tradition. Goodson (1998a) used Layton's (1972) framework in a study of the emergence of Geography, from birth pangs, to a quest for legitimacy and finally to institutionalization.

Several other works present interesting findings gleaned from the historical study of subject histories. Often, subjects depend on powerful professional associations to promote the interests of a given field (Bell 1985, Radford 1985) as well as informal networks (Ball 1985). In a study of the British Mathematics curriculum, Cooper (1985) revealed various class and gender biases, elements that were also revealed in Purvis's work on domestic subjects. Reid's (1985) study of the English curriculum (employing Meyer and Rowan's (1992) neo-institutional concepts) demonstrated the importance of external interest groups. Goodson and Mangan (1998a, 1998b) analysed how the introduction of computers precipitated curriculum changes. This work demonstrates the usefulness of the historical study of school subjects as a research method. In particular, it exhibits the importance of studying the *context* of curricula. As Rudolph wrote:

The best way to misread or misunderstand curriculum is from a catalogue. It is such a lifeless thing. So disembodied, so unconnected, sometimes even intentionally misleading. Because the curriculum is a social artefact, the society itself is a more reliable source of curricular information (Rudolph 1977 quoted in Goodson 1985b).

Goodson employs another form of analysis, looking at curricula in terms of national interest and ideology. Referring to the development of a national curriculum in the U.K., he wrote:

in practice the balance of subjects in the National Curriculum suggests that questions of national identity and control have been pre-eminent, rather than industrial or commercial requirements. For example, information technology has been largely omitted, whilst history has been embraced as a 'foundation subject' ... On the face of it, this pattern of prioritizing might seem encouraging: sponsoring liberal education and humanist study over more narrow utilitarian concerns, favouring education over training. Regrettably this does not seem to be the case. History has, I believe, been chosen to revive and refocus national identity and ideology (Goodson 1998d).

This type of study reveals not only national influences, but also the stability of curricula, both of which are neo-institutional ideas. Goodson presents the following table that is particularly illuminating in the way it exposes the inertia of curricula. It is instructive to note the similarities between the curricula of 1904 and 1988.

National Curriculum 1904	National Curriculum 1988
English	English
Maths	Maths
Science	Science
History	History
Geography	Geography
Physical Exercise	Physical Education
Drawing	Art
Foreign Language	Modern Foreign Language
Manual Work	
Domestic Subjects	Technology
(Music added soon afterwards)	Music

Figure 4.1: Comparison of U.K. National School Curriculum.
Adapted from (Goodson 1998d).

Goodson (1998c) identified a third methodology for the study of curriculum, the micro-politics of curriculum change. This study reveals the resistance that often accompanies proposed changes and the ‘war of attrition’ that can often result. This is similar to studies that theorized curriculum development as a political competition for resources (Byrne 1974). Goodson presented the following table summarizing typical responses to a new curriculum initiative.

Type	Response
Hostile	“You’re building a nice little empire” “Here comes Mr. Euro Studies”
Skeptical	“That sounds NICE” “Not more education”
Comparative	“It’s not better than what we’ve got” “Other things are far more valuable”
Ignorance	“But we do French already” “I suppose it’ll help with their geography”
Personal	“It’s beyond me” “I’m a mathematician, not a social scientist”
Apathetic/ Lethargic	“It sounds a good idea but I’d rather not.”
Suspended	“I really am too busy, you know” “If you get it off the ground then I might join you next year”
Situational	“How are you going to fit it in?” “I can’t see parents wanting their children to get a CSE in this!” “Where are you going to get the money?”

Figure 4.2: Responses to New Curriculum Initiatives.
Adapted from (Goodson 1998c)

This type of study exposes the curriculum development process as a very personal and political endeavour.

“Curriculum studies” has now grown to become a discipline itself. Much interesting work has been done in this field using a variety of methodologies. One in particular is that of discourse analysis. Several authors leverage Foucauldian ideas in their curricula analysis. For example, Gruenewald (2004) showed how environmental education has failed to meet its socially and ecologically transformative goals because it has been institutionalized into the general education discourse. Kaomea (2000) has argued that a seemingly progressive Hawaiian studies programme actually perpetuates the colonial perspective of Hawaiians. She goes further and suggests that the curriculum is developed primarily in the material interests of Hawaii’s tourism industry. Lebrun et. al. (2002) presented an interesting analysis of Quebecois textbooks in the post-war period.

The benefits of this type of discourse analysis are exemplified by a series of articles on Israeli curriculum during recent years characterised by political conflict. Since curricula present legitimate knowledge, education organizations play a crucial role in a highly politicized environment. Deborah Court (2004) used interviews to analyse the struggles that take place when developing national curriculum for a state that is democratic, multicultural, but at the same time, Jewish. Firer (1998) studied human rights education through the study of textbooks and argued that textbooks are adopting a much more tolerant attitude but still portray the attitude of a country at war (Ibid.). Al-Haj (2005) similarly argued that as multicultural education evolved during times of conflict and peace, curriculum presented a more and more complex analysis but retained a nationalist narrative.

The conclusion is that the introduction of a multicultural ideology seems to be an impossible task when a specific national ethos stands at the center of the school curriculum. This is especially true in states that are experiencing an “intractable conflict” in which the past is used to justify the present (Al-Haj 2005).

The work presented in this section demonstrates the usefulness and relevance of curriculum analysis as an overarching research strategy. It can be particularly revealing in the way it exposes taken-for-granted assumptions within society. But while the literature offered here demonstrates the appropriateness of curriculum analysis, it also reveals its diversity. There are many ways to study curriculum. This research project primarily employs discourse and narrative analysis, methodologies that will be discussed in the following section.

4.1.3 DISCOURSE AND NARRATIVE ANALYSIS

This project is set in the interpretivist tradition and so the research methodology is based on hermeneutical or dialogic methods rather than experimental (Guba and Lincoln 1994). Discourse analysis is a research methodology that, according to Potter (1997), is the study of looking at texts and talk as social practices. One of the central principles of discourse analysis is that utterances are not just *about* things, they also *do* things. In consideration of this project, what is of interest is the way that curriculum discourse constructs the idea of ICTs.

The data collection methods employed in this study stem not just from curriculum research but from broader schools of discourse and narrative analysis. As mentioned in the previous section, discourse analysis has been used as a methodology to study curriculum for quite some time, and scholars such as Young (1971b), Bernstein (1971) and Goodson (1994, 1998b) have demonstrated its usefulness in the way it reveals institutional forces, power relationships and sources of legitimacy. As a methodology it has a recent, yet distinguished history. Many commentators (see Fillingham 1993) have identified Michel Foucault as the father of discursive analysis. Foucault's (1977) argument of how notions such as "madness" are not objective, but are defined through discourse, opened the door to a new tradition of research that studies the way truth is constructed through the use of language (Chomsky 2003, Derrida and Caputo 1997).

Often, this form of analysis is used to reveal the intricacies of power relationships. This ideological bent is unsurprising given how Foucault developed his revolutionary method as a way to expose how dominant classes use language to exert force over the weak (Dreyfus and Rabinow 1982, Moss 2002). Lytinen and Klein (1984) proposed that this type of analysis could be applied to Information Systems research.

information systems which are designed to increase organization effectiveness must also increase human understanding emancipate people from undesirable social and physical constraints, distorted communication and misapplied power (Lytinen and Klein 1984).

The authors put forth a theory with which to study IS based on discourse analysis and Habermas's (1972) writings on critical social theory.

Nevertheless, not all forms of discourse analysis are used in conjunction with critical theory. Wynn et al. (2003) and Robey and Markus (1984) analysed the discourse of Information Technology at the organizational level. Orlikowski and Yates (1994) examined categorizations of genres and their impacts on organizational communications. A more extensive review of the literature employing discourse analysis can be found in Cukier et al. (2004).

Discourse analysis has been the umbrella term covering studies of – among others – conversations (Corsaro 1985), texts derived from mass media (Vartanova 2002), various speech acts (Coulthard 1990), documents of historical record (Struever 1985), linguistic construction (Fillmore 1985) and government documentation (Danet 1985). Data derived from these texts have contributed to theories on race relations (Wetherell and Potter 1992), feminist theory (Wilkinson and Kitzinger 1995), institutions (Meyer 1994), and power relations (Howarth 2000) to name just a few. Thus the remit of discourse analysis has expanded considerably and there are many different approaches and techniques (see Wood and Kroger 2000). Discourse analysis has often been linked conceptually to linguistics, semiotics and even neo-Marxism (Howarth 2000). These flavours of discourse analysis differ primarily by the texts (data sources) they employ and the ideological thrust of the theory construction. A full review of the variations and contributions of discourse analysis is beyond the scope of this dissertation.

However, it is necessary to acknowledge the difference strands and to position this project as a study of discourse as it pertains to university curricula.

Finally, it is worth observing that the common point of departure for researchers using discourse analysis is to look at the way *social reality is constructed through language* (Riessman 1993). The degree to which reality is constructed through language is a matter of contention. Some authors such as Levi-Strauss and de Saussure argue that *everything* is constructed through discourse (Fillingham 1993). This fundamental view is echoed in the works of Habermas:

The human interest in autonomy and responsibility is not mere fancy, for it can be apprehended a priori. What raises us out of nature is... language. Through it structure, autonomy and responsibility are posited for us. (Habermas 1972 quoted in Lyytinen and Klein 1984)

In this way discourse is given a deterministic quality. However, other authors such as Wetherell and Potter (1992) have argued that discourse plays an important but not primary role in constructing social reality. For this study, discourse is not assumed to have deterministic properties, rather it is taken as a node in a web of relationships. This ontological stance allows for the incorporation of narrative analysis as a second research methodology.

Narrative analysis is a research methodology that focuses on the stories told from various respondents. As Riessman (1993) wrote, there is a certain reflexive irony in that notion of a researcher conveying a story to a reader, in a similar way to how informants convey stories to the researcher.

Story telling, to put the argument simply, is what we do with our research materials and what informants do with us. The story metaphor emphasizes that we create order, construct texts in particular contexts (Riessman 1993).

Narrative analysis has to do with “how protagonists interpret things” (Bruner 1990).

In narrative interviews, participants are asked to describe current experience, with the researcher listening for convincing explanations of “why things are the way they are (Bruner 1990)” (Wagner *et al.* 2004).

Narrative studies are very much anchored in interpretive traditions, with no epistemological focus on the notions of truth or fact.

The research is not expecting to access the truth; instead, the narrative is treated as a performance in which events are retold in a particular order and for particular effect. The narratives gathered are interpreted as “artifactual representations of the intentions, actions or goals of actors situated in time” (Czarniawska 1998). The task is to interpret these artefacts in order to come to a finer reading of the situation and provide plausible theoretical explanations (Bruner 1990)” (Wagner *et al.* 2004).

What is particularly revealing is the way narrative analysis allows respondents to reveal what aspects of the phenomenon of interest are important to *them*. This stands in sharp contrast to a highly-structured interview or questionnaire, where the aspects of importance are determined a priori by the *researcher* during the research design process. “Narrators indicate the terms on which they request to be interpreted by the styles of telling they choose” (Riessman 1993).

However, this form of analysis has obvious limitations. It is a research methodology that relies of the personal accounts of various events or phenomenon, however human memory is imperfect. But it should be acknowledged that narrative analysis appears severely flawed only when held up against objective or positivist notions of truth. Narrative analysis has different epistemological underpinnings, seeing language as a constitutive element of social reality.

When talking about their lives, people lie sometimes, forget a lot, exaggerate, become confused, and get things wrong. Yet they *are* revealing truths. These truths don't reveal past “as it actually was,” aspiring to a standard of objectivity. They give us instead the truths of our experiences... Unlike the Truth of the scientific ideal, the truths of personal narratives are neither open to proof nor self-evident. We come to understand them only through interpretation, paying careful attention to the contexts that shape their creation and to the world views that inform them. Sometimes the truths we see in personal narratives jar us from our complacent security as interpreters “outside” the story and make us aware that our own place in the world plays a part in our interpretation and shapes the meanings we derive from them. (Personal Narratives Group 1989 quoted in Riessman 1993).

The essence of narrative analysis is the researcher's interpretation – which is often an interpretation of an interpretation.

When handling narrative data it is important to recognize that narratives move on and interviewees reframe stories in subsequent accounts, black-boxing issues that used to be open controversies, repositioning themselves, redefining priorities. Rather than seeing this as a problem, changing narratives can form a point of analytical leverage. Here, the narrative approach enabled us to reveal insights in processes of negotiation over time (Wagner *et al.* 2004).

Thus, narrative analysis is relevant to this study because of the way it reveals issues of importance and institutional constraints as perceived by the protagonists.

4.2 DATA COLLECTION METHODS

As demonstrated in the previous section, there are many ways to study curriculum. In the case of this study, difficult decisions had to be made in order to collect data that was useful and appropriate, taking into account practical limitations. It was decided to employ three data collection methods and use data from each to arrive at an interpretation of the phenomenon of interest. As several authors have argued (Eisenhardt 1989, Mingers 2001, Van Maanen 1979), a combination of data collection methods is necessary in order to assess and verify the quality of data.

4.2.1 DOCUMENT ANALYSIS

The first method of data collection was document analysis. First and foremost, this meant the gathering of syllabi both past and present. These documents were gathered and studied closely in order to gain some insight into the way subjects are delineated and what categories of knowledge are given priority. This follows the general thrust of the work described in the previous section, undertaken by Goodson (1998d), Reid (1985) and Bell (1985) among others. An attempt was made to follow Goodson's (1985b, 1998a) recommendation by focusing on the *history* of curricula as well as the current syllabi. Where possible the history of the curricula were examined, however as described in the next chapter, this proved difficult due to documents not being available and the present-orientation of Indian higher education. In conjunction with the syllabi, consideration was given to the reading lists to see what sources were included, which authors and subjects were given prominence, what relevant streams

of knowledge were ignored. This follows the work of – among others – Ball (1985) and Cooper (1985). Finally, marketing publications from the university were reviewed because they gave a sense of how curricula were positioned by the university in the minds of the general public. Marketing publications were a very minor source of data however, as demonstrated in the next chapter, they contributed to the analysis in a small yet useful way.

It is important to note that all three of these sources are insufficient on their own. Curricula documents do not necessarily reflect what gets taught in the classroom, there is often a “hidden curriculum” (see NBEA 1992). Moreover, reading lists and marketing publication are limited in the extent that they reveal information about institutional forces. However, these three sources of documents *together* can usefully inform the phenomenon of interest. When combined further with two other data collection methods, they provided a relevant and appropriate data set for this analysis.

4.2.2 LIFE HISTORY INTERVIEWS

Goodson made a powerful argument in favour of using the life histories of teachers and academics as a useful source for data in the study of curricula (Goodson 1998b). He briefly outlined some of the excellent work in this area beginning in the 1920s studying the lives of American Indian Chiefs, Polish immigrants and professional thieves.

Despite this good work, life history fell into disfavour in the 1960s due to the fact that it was not testable, refutable or verifiable. Essentially, it was rejected because it was not sufficiently positivistic. Goodson pointed to the phenomenological sociology of Berger and Luckman (1967), which laid a fertile ground for life history, but argued that there has been little work in this regard to date. In current research, historical and biographical analysis is rejected in favour of situation and occasion (Goodson 1998b). As with any method, there are weaknesses of life history, but as Goodson’s work shows, it can be a very useful way to understand curricula, particularly when it is used in conjunction with other methods.

Given the difficulty of finding past syllabi, life history proved to be a useful way to identify historical changes and overall trends in higher ICT education that would not have been apparent simply by studying documents. Life history was used in a way similar to Goodson. Senior academics at Indian universities were interviewed and asked the following types of questions:

- How has the nature of your job changed since your career started?
- What battles were contested in your early years?
- What battles are contested now?
- Which changes to curricula were particularly contentious?

This type of data collection method, while certainly imperfect, raised interesting insights into the development of curricula, the institutional forces at play, and the way the idea of technology is redeveloped and renegotiated.

It is worth noting that life history is rarely employed in Information Systems research. In some sense, this means that its use in this project opens up the potential for a methodological contribution. While it is true that life history fell into disfavour in the 1960s, Goodson has developed a strong research programme with life history as a primary data collection method. Secondly, Claudio Ciborra (2001) has called for researchers to examine moods and human emotions in their analysis of Information Systems. In a sense, his exhortations for research in this area are similar to Goodson's in that they place renewed importance on how people find themselves in various situations.

Mills (1970) wrote that "social science deals with problems of biography of history and of their intersections within social structures." Life history is a method which embraces this philosophy.

When one conducts a life history interview the findings become alive in terms of historical processes and structural constraints. People do not wander round the world in a timeless, structureless limbo. They themselves acknowledge the importance of historical factors and structural constraints. (Faraday and Plummer 1979 quoted in Goodson 1998b)

4.2.3 SEMI-STRUCTURED NARRATIVE INTERVIEWS

When meeting with academics from Indian universities, the interviews were not just conducted as studies of life history, but they were also used to corroborate information gathered from documentation and to ask about specific elements of various curricula. In that sense it is appropriate to discuss “interviews” as a third data collection method, separate from life history because the nature of the questions and the data gathered were quite distinct. Moreover, the respondents were different. Life history interviews were primarily conducted with senior academics within Indian universities. However, junior academics were interviewed as well, in addition to other university staff involved in the process of curriculum development. The data gathered from these interviews proved useful.

The interviews were semi-structured and were inspired in part by Erica Wagner’s work using narrative analysis (Wagner *et al.* 2004) and Paul Feyerabend’s (1993) thoughts on methodology, arguing for a plural and creative approach to methodology. Open-ended questions were asked in order to allow the respondent to shift the conversation to areas of importance. Occasionally, statements were made (not questions) in order to trigger a conversation starting from the immediate consciousness of the respondent. This style of interviewing was inspired by the writings of Riessman (1993) and others who argued in favour narrative analysis, where the researcher interprets – rather than aggregates – the data. Some of the questions or statements used to prompt discussion included:

- Who is involved when the curriculum is revised?
- It was interesting to see the ratio of boys to girls on campus.
- Why did you pick this textbook?
- In the West, academics struggle with the question of whether to make education liberal or instrumental.
- Why were there several curriculum changes implemented during these years?

- Chemistry is part of the Computer Science curriculum.....
- Why is this author on this reading list?
- Who developed the materials for this subject?
- This government initiative seems counter-intuitive.

In the spirit of Feyerabend (1993), the interview process was often adapted and improvised, based on the experiences of the respondents, and there was a real attempt to “follow the data.” This strategy might lack in methodological rigour but as Feyerabend wrote, methodological rigour can limit the penetration of the analysis (Ibid.).

Thus, data was gathered from the following sources:

- Current syllabi
- Past syllabi (where possible)
- Reading lists
- Marketing materials of the university
- Life history interviews of senior academics
- Unstructured interviews with junior and senior academics

but not sequentially. Data was gathered from all sources at the same time in a continuous process over several months. Because of this hermeneutic process, the data from one source was constantly evaluated against that from another. This process was slow and painstaking at the beginning but eventually a critical mass of data was reached and its interpretation began to resemble a coherent story.

4.3 COHERENCE AND SUMMARY OF THE MODEL

Before proceeding to the research findings, it is worth discussing the coherence of the overall research model. Careful consideration has gone into choosing aspects of the framework that are mutually commensurate. The research question, context, philosophical assumptions, theoretical framework and methodology have all been crafted to create a consistent and appropriate research model. As this was a

hermeneutic process, the aspects of the framework were developed simultaneously. Therefore, to discuss them discretely is necessary but unfortunate. The following discussion argues for the coherence of the research model. It will arbitrarily start with the research context (literature) and follow clockwise around the diagram in figure 4.3.

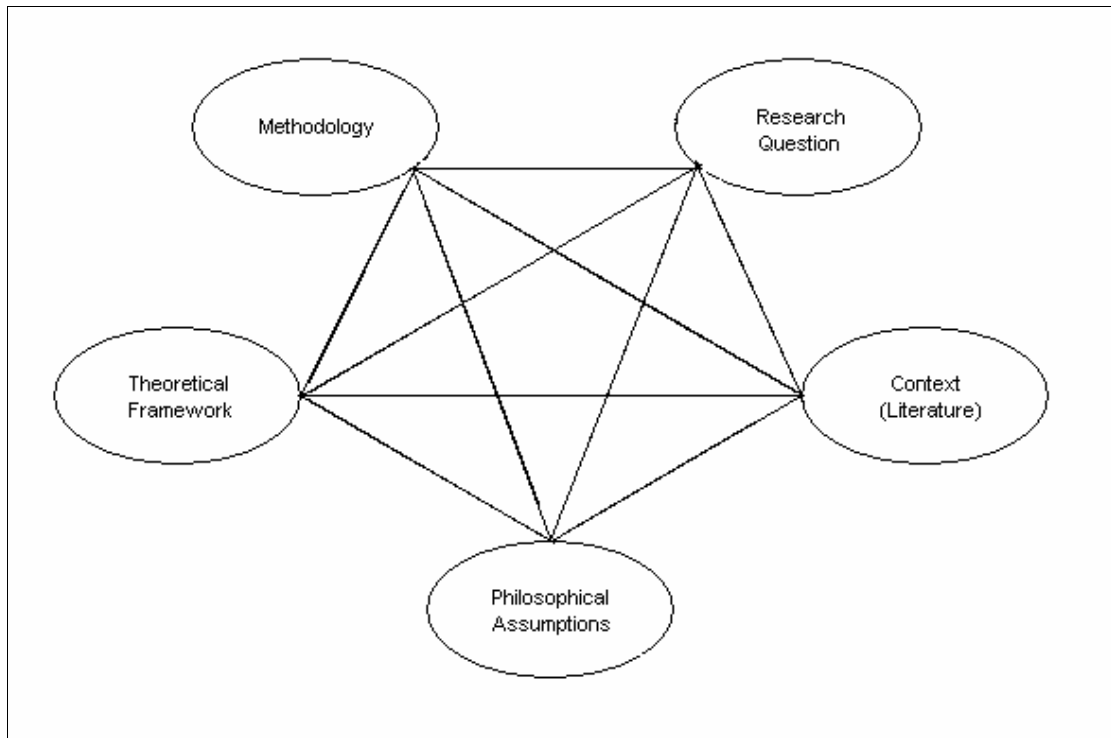


Figure 4.3: Coherence of the Model

4.3.1 CONTEXT AND PHILOSOPHICAL ASSUMPTIONS

The major departure point for this study was the observation that within the literature on ICT for Development, education was represented in a peculiar way. The importance of education was echoed by nearly all scholars, no matter what the background, orientation or viewpoint on the link between ICT and Development. However, despite this conspicuous agreement, the study of education was notably absent in the relevant literatures. The literature on ICT education is extensive and diverse, however it is quite distinct and separate from the literature on Development. While much was written about how to teach ICTs, and how ICTs could have a pedagogical impact, little was written about how education affects the link between

ICT and Development. There was a need to study how ICT education shaped the perception of ICTs, and why. Specifically pertaining to the literary context, it was necessary to examine whether ICTs were inscribed with notions of Development; whether they were seen as tools to help those who were worse-off, and why.

Such a study requires an interpretive epistemology. The very notion of studying *perceptions* means it is disingenuous to adopt objectivist or positivist notions of truth. While the nature of this study does not necessitate searching questions about the exact nature of reality, it is sufficient to observe that the most appropriate philosophical stance to take in order to study perceptions of ICTs is that of interpretivism.

4.3.2 THEORETICAL FRAMEWORK

The primary theoretical lens of neo-institutionalism was chosen because of its appropriateness for the field of study. Neo-institutional theory examines taken-for-granted assumptions that influence various courses of action. In this sense, it rejects the notion of the rational actor for one that is affected by institutional constraints. As Meyer and Rowan (1991, 1992) have shown, neo-institutionalism has particular applicability in the field of education, because education is a “legitimacy hungry” endeavour. Thus, when studying the perceptions of ICTs, and particularly how and why those perceptions are influenced through higher education, it is reasonable to do so using the lens of neo-institutionalism. Because neo-institutionalism is concerned with social phenomena, it is also commensurate with interpretive epistemology.

Two other theoretical lenses were incorporated into the framework in order to make the analysis richer and more generative. Theories of Development were an obvious choice given the initial departure point stemming from the literature on ICTs for Development. A third theory was that of New Barbarianism (Angell 2000). This perspective is heavily based on Nietzsche (1968, 1990) and theorizes social reality as harsh and unforgiving, where pragmatism and opportunism prevail over traditional myths and conventional wisdom. As will be shown, this is particularly commensurate with the data gleaned from the Indian context. As a social theory, it is also consistent

with interpretive epistemology and its underlying assumptions about social reality have relevance to the study of how institutional forces influence the perception of ICTs

4.3.3 METHODOLOGY AND RESEARCH QUESTION

Finally, there are many ways to research how education shapes the perceptions of ICTs and why. It was decided to study this phenomenon by looking at curricula. To a reasonable extent, curricula reflect attitudes and institutional forces influencing education. Moreover, they are manifested in documents that can be read and understood. In this way, the choice of curricula was practical but it was also highly relevant. To understand how education shaped the link between ICTs and Development, it was worthwhile to examine the ICT-related curricula.

The literature on curriculum studies suggested a methodology based on discourse and narrative analysis. This is commensurate with interpretive epistemology as it requires interpreting the impact of language. It is also commensurate with the aforementioned theoretical framework. Meyer is one of the foremost neo-institutional theorists and he worked extensively with the study of discourse (see Meyer and Rowan 1991). Moreover, Nietzsche's theorizations of language as a "prison-house" (Jameson 1975) echoes the way in which it is given significant agency by those who study discourse.

To conclude, this study is focused on the perception of ICTs and how they are influenced by university curricula – but a deeper question is of course "why". This study presents an analysis of how institutional forces influence the way technology is perceived in India. The vehicle to do so is the study of ICT-related curricula. Thus, this inquiry can be summarized by the following research question: How do institutional forces influence the ICT-related curriculum discourse at Indian universities?

The findings and analyses are the subjects of the following three chapters.

5 EMPIRICAL FINDINGS

Chapter Abstract

This chapter outlines the data collected in India during the summer of 2004. The main findings suggest that Indian higher ICT education is markedly focused on the global economy to the detriment of local problems. Moreover, there is an overwhelming instrumental focus with preferences given towards technical positivistic epistemology over interpretive forms of knowledge. Finally, industrial interests are invited and welcomed into the curriculum development process and are given a wide remit to impact the development of curricula.

Chapter Contents

5.1	DATA GATHERING.....	129
5.1.1	Gaining Access	129
5.1.2	Following the Data.....	130
5.1.3	Data Set.....	131
5.2	INITIAL FINDINGS – DOCUMENT DATA.....	133
5.2.1	Example 1 – IIT Bombay Curriculum.....	133
5.2.2	Example 2 – AICTE Curriculum.....	140
5.2.3	Other Publications.....	149
5.3	MAJOR FINDINGS – INTERVIEW DATA.....	154
5.3.1	Focus on the West and the Global Economy.....	154
5.3.2	Preference for Technical Knowledge	160
5.3.3	Heavy Industrial Footprint.....	163

The following chapter presents the empirical findings of this research project. The first section outlines the details of the data collection. The second and third sections present the empirical findings using the two major data collection methods employed in this project.

5.1 DATA GATHERING

The methodology was carefully chosen and a research plan was constructed before data collection. Nevertheless, the plan had to be adapted to accommodate the exigencies of daily research in India and issues pertaining to access. In the course of collecting data, some barriers became apparent, as well as opportunities. Thus, a flexible strategy was adopted using a pluralist and adaptive methodology based on the work of Feyerabend (1993), keeping in mind the principles of the research plan and the overall research question: How do institutional forces influence the ICT related curriculum discourse at Indian universities?

5.1.1 GAINING ACCESS

Prior to arriving in India, during the months of March, April and May, numerous emails were sent to Indian academics to establish contact, introduce the research project and book interviews. The focus was placed on undergraduate courses at universities in India's major metropolises, mostly because of their influence and reputation but also because of their accessibility. This was useful in that it dramatically narrowed the scope of the research project but presented some weaknesses in terms of the generalisability of the findings that will be discussed further in Chapter 7.

It should be acknowledged that universities were chosen in a somewhat opportunistic fashion. Obtaining access proved to be quite difficult in some instances. A considerable effort was spent e-mailing academics in India's urban universities. The effort was focused on academics in departments directly related to ICT such as "Technology Management" and "Computer Science". High ranking members of

relevant government bodies such as the UGC and AICTE were contacted as well, often at regular intervals.

Initial response rates were quite low, approximately 80 academics were approached through email, which directly resulted in 13 interviews. The remaining 20 interviews were obtained through network-building. Approximately 20 officials from government bodies were approached (UGC and AICTE), of which none responded to offer interview time.

The number of interviews to be conducted was constrained by the amount of time allocated in India. The 10 week period was spent gathering documents, conducting interviews and writing research notes as feverishly as possible. Over time, interview respondents were gathered through a process of network-building as well as cold-calling through e-mail. Some respondents were very generous and offered to contribute introductions that would facilitate or improve the quality of the data.

The gathering of interview respondents through network building was unexpected and had pros as well as cons. Allowing the initial interview respondents to select subsequent interview respondents may have introduced a bias into the study. It is possible that academics would recommend like-minded people for further interviews. However, there were also major advantages to this approach. The most obvious advantage was that the sample size became larger and more documents became accessible. Secondly, access to higher ranking officials became possible through network building that may not have been otherwise possible. Interviews with senior officials proved particularly useful. Thirdly, it allowed for the opportunity to follow the data.

5.1.2 FOLLOWING THE DATA

Often times, academics would draw attention to seemingly unrelated matters, for example, the admissions process for a particular university. In some cases, the method used to select students had an influence in how the curricula were constructed. The

opportunity to interview academics involved with the admissions process arose through the building of contacts, and this helped in the development of the overall analysis. The adjustments made were necessary and appropriate in the case of this research – and a reasonable argument can be made that they are highly defensible for social science research in general (Feyerabend 1993). This will be discussed at length in Chapter 7.

Originally, it was planned to study the historical changes that have taken place regarding curricula, however several difficulties emerged. Tracking down historical curriculum documents turned out to be notoriously difficult. At several universities and private institutions, several hours were spent going from department to department, but the documents were never found. In hindsight, the initial idea that meeting minutes would be available for examination appears particularly naïve. Life history turned out to be “hit and miss”, sometimes the academics were very forthcoming and gave their honest impressions of how curricula have changed. Other times they seemed closed, or were simply not interested enough in the past to provide any useful information. One finding of this project was that Indian academics are very present and future oriented. This will be discussed further in Chapter 7. The document analysis phase proved to be worthwhile if limited. It revealed some interesting aspects of ICT-related Indian higher education that were later confirmed, augmented or rejected. It was through interviews where really interesting data was gathered pertaining to the institutional forces that influence higher education. Nevertheless, the findings that arose from the study of the documents collected lay the groundwork for the development of the overall analysis.

5.1.3 DATA SET

The data was gathering over an intensive 10 week period during the summer of 2004 (June 29 – September 4). Nine campuses were visited, often for periods that stretched over several days. Documents pertaining to the curricula were gathered from each campus and a total of thirty-three interviews were conducted. Twenty-seven interviews were conducted with academics at Indian universities, three interviews

were conducted with researchers who study Indian higher education, and three interviews were conducted with officials at the Canadian High Commission in Delhi, who monitor higher education in India. These official diplomats were able to raise important issues that were studied further in subsequent interviews with academics. One such issue was the importance of the admissions process at the IITs. The diplomatic officials were also generous in providing contact information and helping to arrange subsequent interviews. Detailed information about the 33 interviews can be found in the “Interview List”, Chapter 8.

Getting the curriculum documents was not always easy. Sometimes the curricula were not formally documented, sometimes access was restricted. Four *complete* curricula were gathered – a complete curriculum includes the syllabus, reading list, credit allocation, choices for electives, course of study (i.e. the order in which the modules are taken) and typically, long and helpful explanations. Where the complete curricula were not available, usually some documentation was gathered, such as course offerings in limited detail, or marketing materials outlining the general points of the curricula.

To summarize, the data set is as follows:

- Nine campuses were visited in India between June and September 2004.
- Thirty-three interviews were conducted in total, twenty-seven with Indian academics and six with researchers and officials who monitor higher education in India.
- Four complete curricula were gathered – including syllabi, readings lists, credit allocations, available choices for electives, course of study, preambles, and explanatory notes.
- Where the complete curriculum was not available, some documentation was collected that outlined the curricula in limited detail.

5.2 INITIAL FINDINGS – DOCUMENT DATA

The syllabi and other pedagogical documents made available by the universities indicated some interesting aspects of ICT education in India and information about the institutional forces that influence curriculum development were primarily teased out during the interview phase. Upon examination, many of syllabi revealed interesting characteristics of the ICT-related curricula. Rather than present all the documents gathered, a few characteristic exemplars will be presented and a discussion follows of how the relevant aspects contribute to the overall curriculum discourse.

5.2.1 EXAMPLE 1 – IIT BOMBAY CURRICULUM

At IIT Bombay, all undergraduate students are candidates for a Bachelor of Technology (BTech) degree. The degree can be awarded from the following departments:

- Aerospace Engineering
- Chemical Engineering
- Civil Engineering
- Computer Science & Engineering
- Electrical Engineering
- Mechanical Engineering
- Metallurgical Engineering & Materials Science
- Physics

Figure 5.1: Departments at IIT Bombay.
Source: (IIT Bombay 2004d)

All BTech students follow the same curriculum in the first year, however in years 2 to 4, the modules become more specialized depending on within which department the student is registered. The Curriculum for the BTech degree in Computer Science and Engineering at IIT Bombay follows.

Curriculum for the BTech (Computer Science and Engineering) at IIT Bombay					
		Lectures	Tutorials	Practical	Credits
		Hrs / Week	Hrs / Week	Hrs / Week	
Year 1 First Semester					
CH 101	Chemistry I	2.00	1.00	0.00	6.00
CH 115	Chemistry Lab.I	0.00	0.00	1.50	1.50
CS 101	Computer Programming & Utilization	2.00	0.00	2.00	6.00
HS 101	Economics	3.00	0.00	0.00	6.00
MA 103	Mathematics I	2.00	0.00	2.00	6.00
ME 111	Workshop Practice I	0.50	0.00	3.00	4.00
PH 101	Physics I	2.00	1.00	0.00	6.00
PH 115	Physics Lab.I	0.00	0.00	1.50	1.50
NC 101	N C C				PP/NP
NO 101	N S O				PP/NP
NS 101	N S S				PP/NP
Year 1 Second Semester					
CH 102	Chemistry II	2.00	1.00	0.00	6.00
CH 116	Chemistry Lab.II	0.00	0.00	1.50	1.50
EE 152	Basic Elec. Circuits(DO-1)	2.00	1.00	0.00	6.00
MA 104	Mathematics II	3.00	0.00	2.00	8.00
ME 112	Workshop Practice II	0.50	0.00	3.00	4.00
ME 118	Engineering Graphics & Drawing	0.00	1.00	3.00	5.00
PH 102	Physics II	2.00	1.00	0.00	6.00
CS 152	Abstractions and Paradigms for Programming (DIC)	2.00	1.00	0.00	6.00
CS 154	Programming Paradigms Lab	0.00	0.00	1.50	1.50
PH 116	Physics Lab. II	0.00	0.00	1.50	1.50
NC 102	N C C				PP/NP
NO 102	N S O				PP/NP
NS 102	N S S				PP/NP
Year 2 First Semester					
CS 207	Discrete Structures	2.00	1.00	0.00	6.00
CS 213	Data Structures and Algorithms	3.00	1.00	0.00	8.00
EE 261	Electric Circuits Lab	0.00	0.00	1.50	1.50
HS 205	Sociology	3.00	0.00	0.00	6.00
MA 203	Mathematics III	3.00	1.00	0.00	8.00
PH 205	Physics III (DO2)	2.00	1.00	0.00	6.00
CS 293	Data Structures Lab	0.00	0.00	3.00	3.00

Year 2 Second Semester					
HS 204	Introduction to Literature	3.00	0.00	0.00	6.00
CS 210	Logic Design	3.00	0.00	0.00	6.00
CS 212	Electronics Design I	3.00	0.00	0.00	6.00
CS 206	Formal Methods in CS	3.00	0.00	0.00	6.00
CS 288	Logic Design Lab	0.00	0.00	3.00	3.00
CS 292	Electronics Design Lab I	0.00	1.00	1.50	3.50
CS 296	Software Systems Lab	0.00	1.00	3.00	5.00
MA 212	Probability Random, Processes and Statistical Inference	1.00	0.00	6.00	2.00
Year 3 First Semester					
CS 301	Design and Analysis of Algorithms	2.00	1.00	0.00	6.00
CS 331	Theory of Computation	2.00	1.00	0.00	6.00
CS 325	Computer Organisation	3.00	0.00	0.00	6.00
CS 329	Principles of Programming Languages	3.00	0.00	0.00	6.00
CS 317	Database and Information Systems	3.00	0.00	0.00	6.00
CS 395	Assembly Programming Lab	0.00	1.00	3.00	5.00
CS 389	Programming Languages Lab	0.00	0.00	1.50	1.50
CS 387	Database and Information Systems Lab	0.00	0.00	3.00	3.00
CS 397	Works Visit				PP/NP
Year 3 Second Semester					
CS 324	Language Processors	3.00	1.00	0.00	8.00
CS 344	Artificial Intelligence	3.00	0.00	0.00	6.00
CS 330	Microprocessors and Interfaces	3.00	0.00	0.00	6.00
	Elective I	3.00	0.00	0.00	6.00
CS 350	Linear Optimisation	3.00	0.00	0.00	6.00
CS 390	Microprocessors and Interfaces Lab	0.00	0.00	3.00	3.00
CS 386	AI Lab	0.00	0.00	3.00	3.00
CS 394	Language Processors Lab	0.00	0.00	3.00	3.00
CS 396	Seminar	0.00	0.00	3.00	3.00
Year 4 First Semester					
HSS	HSS Elective	3.00	0.00	0.00	6.00
CS 447	Operating Systems	3.00	0.00	0.00	6.00
CS 495	Operating Systems Lab	0.00	0.00	3.00	3.00
	Elective II	3.00	0.00	0.00	6.00
	Elective III	3.00	0.00	0.00	6.00
CS 497	BTP				5.00
CS 388	Practical Training				PP/NP

Year 4 Second Semester					
CS 456	Computer Networks	3.00	0.00	0.00	6.00
	Elective IV	3.00	0.00	0.00	6.00
	Elective V	3.00	0.00	0.00	6.00
	Inst Elective	3.00	0.00	0.00	6.00
CS 498	B.Tech Project				15.00
Elective group II and III					
CS 473	Reliable Computing				
CS 471	Introduction to VLSI Design Automation				
CS 457	Peripherals & Interfaces				
CS 475	Computer Graphics				
CS 451	Distributed Systems				
CS 407	Digital Signal Processing				
CS 415	Numerical Computation				
CS 467	Functional and Logic Programming				
CS 449	Topics in Artificial Intelligence Programming				
Elective group I, IV and V					
CS 444	Database Management Systems				
CS 410	Electronic Design-2				
CS 462	Analytical Models of Computing Systems				
CS 464	Advanced Computer Architecture				
CS 478	Advanced Microprocessors				
CS 468	Computational Models in Pattern Recognition and Learning				
CS 460	Natural Language Processing				
CS 470	Modelling and Simulation				
CS 474	Cognitive Psychology				
EE 448	Information Theory and Coding				
ME 446	Production Management				
ME 462	Appropriate Technology				

Figure 5.2: IIT Bombay BTech Curriculum.
Source (IIT Bombay 2004a)

In the first semester of the first year, all BTech students (not just Computer Science students) take courses that are deemed to be essential to produce quality graduates. It is interesting to observe the modules selected. Traditional sciences such as Chemistry and Physics are very prominent. In addition to these modules, Mathematics and “first principles” modules on computer programming are added to the curriculum. It is also worth observing the importance put on laboratory work in the first year and dearth of social science courses. In fact, only one non-technical course is taken in the first year – Economics – which itself is given an overwhelmingly quantitative focus (IIT Bombay 2004a). Thus, one can discern a particularly instrumental orientation to the

first-year modules and a dominant preference for heavy technical content. One other note: the modules listed as NC, NO and NS taken in the first year (both semesters) are for non-academic purposes. They are used for such purposes as facilitating physical activity, promoting awareness of the university facilities, and also – interestingly – giving students an elementary brief on the Indian Armed Forces (Interview 3). Although these modules are not regarded with any importance at IIT Bombay (Interview 3), it is interesting to note the topics that get chosen for discussion. As will be argued later, the curricula are influenced by the overwhelmingly masculine character of technical education and by the prevailing feeling that India is a country on the rise. This is reflected to some degree in the topics chosen for the non-credit courses.

In the second semester of year 1, students take more of the same. Chemistry, Physics and Mathematics continue to be emphasized and modules on Electrical Engineering (basic electric circuits) and Mechanical Engineering (engineering graphics and drawing) are added. No social science modules are offered in this semester. Thus, the focus becomes even stronger on technical modules with a practical focus. The two Computer Science modules offered also have a practical focus on elementary programming. The relevance of Science and Engineering modules to Computer Science can be hotly debated. In fact, at universities in other countries, mechanical or electrical engineering modules are not compulsory components of the Computer Science curriculum (see University of Waterloo 2004). Likewise, Chemistry and Physics are not deemed relevant to be added to the degree requirements (Ibid.). At MIT (2004b) and the University of Waterloo (2004), Mathematics and social science modules are given more importance over Chemistry, Physics and Engineering. This is significant in that it gives the IIT Bombay curriculum a more technical and instrumental orientation.

In the first semester of Year 2, students continue with Physics although Chemistry is dropped, thus indicating that Physics might have more legitimacy as an academic discipline. Electrical Engineering is also revisited although Mechanical Engineering is dropped. Students also take a third Computer Science module and see that Computer

Science is now consuming a major portion of their contact time. It is worth noting that one Humanities and Social Science (HSS) module is included in the curriculum for this semester; Sociology. One can imagine that this module would be quite a departure for second year students who have had an almost exclusively technical university education and have taken only one HSS module; Economics – with a quantitative focus. The course description for HSS 205 (Introduction to Sociology) is particularly interesting.

Course Description HS 205: Introduction to Sociology

1. What is sociology, some sociological concepts: social structure, status, role, norms, values etc. Socialization, and culture and change.
2. Social stratification - various approaches and concept of social mobility.
3. Population and society - Trends of demographic change in India and the world, Human Ecology, Trends of Urbanization in the developing countries and the world.
4. Major social institutions - Family and marriage, caste and tribe and organizations: (i) formal organization (bureaucracy) (ii) informal organization.
5. Processes of social change - Modernization (including Sanskritization), industrialization, environmental/ecological changes and Development.
6. Social movements - protest movements, reformist movement and radical movements in India.

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Figure 5.3: Course Description HS205 – IIT Bombay.
Source: (IIT Bombay 2004b)

In consideration of the module content and reference list, it seems that this is the one module that has a distinctly Indian flavour. It is noteworthy in light of dominantly technical and acontextual epistemology of the BTech curriculum.

In the second semester of second year, students follow a curriculum nearly full of Computer Science modules that are practical and instrumental. There is also one Mathematics module and one HSS module that is interestingly, 'Introduction to Literature.'

Course Description HS 204: Introduction to Literature

1. Nature of Literature: Literature as a Humanistic Experience, Definitions: (i) Humanities : concern with culture, values, ideologies; (ii) Literature : concepts of imitation, expression, intuition & imagination.
2. Major Themes of Literature : Nature, Science, Selfhood, Love, Rebellion.
3. The Language of Literature : Modes of literary and non-literary expression, The concepts of Figurative language, Imagery, Symbolism, Style.
4. The Forms of Literature : Prose Narratives (short stories & novels), Poetry, Drama, Essays.

References

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4. Henrik Ibsen, A Doll's House, Macmillan India, 1982.
5. George Orwell, Animal Farm, Penguin, 1951.
6. J. Bronowski. The Ascent of Man, BBC, 1973.

Figure 5.4: Course Description HS204 – IIT Bombay.
Source: (IIT Bombay 2004b)

The reference list makes use of one Indian text but is clearly dominated by Western and in particular British literature. The influence of Western texts will be explored further in light of other data.

In the third year (both semesters), the curriculum is composed solely of Computer Science courses – 18 modules in total. There are some electives listed but importantly, those electives may only be chosen from the Department of Computer Science and Engineering. Many students find this year particularly difficult (Interview 10). It is worth noting that while the curriculum is made up of exclusively Computer Science modules, there does seem to be a reasonable mix of practical and theoretical content.

In the fourth year, students are given much more freedom in choosing their modules. Four Computer Science modules are required, and four more can be selected from the department's electives lists. Students also follow one HSS elective and one institute-wide elective. In the fourth year, considerable weight (15 credits) is given to the final-year project that is often based on the research agendas of various Professors, or project suggestions from private-sector partners (Interview 10). Within the BTech curriculum are certain institutional forces and dominant themes, such as the primacy of technical knowledge and a strong focus on Science and Engineering. Moreover, the curriculum suggests a certain rationalism prevalent in the software development process. Systems development is positioned as a highly scientific process with well-defined models and procedures. While this is highly contested in the academic literature (Ciborra 1991, 2002a, Orlikowski 1992), it is a dominant theme within this curriculum. Thus the IIT Bombay BTech curriculum hints at certain dominant themes and institutional forces – elements that begin to take shape in consideration of other data.

5.2.2 EXAMPLE 2 – AICTE CURRICULUM

Prestigious institutions such as the IITs have considerable leeway in developing their curricula. However, in recent years several private institutions have appeared in India's metropolises, which has created a need for a regulatory body to certify and grant legitimacy to appropriate schools. This task has fallen under the jurisdiction of the All-India Council for Technical Education (AICTE). The AICTE publishes model curricula and it is interesting to note their curricula in comparison with the IIT

Bombay curricula. The AICTE publishes two curricula that are directly related to ICTs; one is Computer Science and Engineering (CSE), which is primarily for a technical engineering degree. The other is Information Technology (IT), which is meant to emphasise more social and practical knowledge associated with ICTs. It is interesting to consider which modules are included in the Information Technology curriculum and how they differ from the Computer Science and Engineering curriculum. The following table outlines the two curricula and a discussion follows.

Comparison of AICTE Model Curricula	
Model Curriculum Computer Science and Engineering	Model Curriculum Information Technology
Year 1 First Semester	
Language (Prof. Comm. In English)	Language (Prof. Comm. In English)
Engineering Chemistry	Engineering Chemistry
Engineering Physics 1	Engineering Physics 1
Mathematics 1	Mathematics 1
Engineering Mechanics	Engineering Mechanics
Basic Electrical Engineering	Basic Electrical Engineering
Chemistry/Physics Lab (to be taken in alternate weeks)	Chemistry/Physics Lab (to be taken in alternate weeks)
Engineering Mechanics/Electrical Lab	Engineering Mechanics/Electrical Lab
Engineering Graphics 1	Engineering Graphics 1
Workshop Practice 1	Workshop Practice 1
Year 1 Second Semester	
Introduction to Computing	Introduction to Computing
Environment and Ecology	Environment and Ecology
Engineering Physics 2	Engineering Physics 2
Mathematics 2	Mathematics 2
Engineering Thermodynamics	Engineering Thermodynamics
Basic Electronics	Basic Electronics
Basic Electronics Laboratory	Basic Electronics Laboratory
Computer Programming Laboratory	Computer Programming Laboratory
Engineering Graphics 2	Engineering Graphics 2
Workshop Practice 2	Workshop Practice 2

Year 2 First Semester	
Computer Programming	Computer Programming
Computer Organisation	Computer Organisation
Electronics 2	Electronics 2
Mathematics 3	Mathematics 3
Computer Programming Lab.	Computer Programming Lab.
Electronics Lab 2	Electronics Lab 2
Computer Organisation Lab	Computer Organisation Lab
Strength of Materials	Foundations of IT
Material Testing Lab	Organisational Structure
Engineering Economics	IT Lab
Year 2 Second Semester	
System Analysis and Design	System Analysis and Design
Data Communication	Data Communication
Data Structure and Programming	Data Structure and Programming
System Software	System Software
System Software Lab	System Software Lab
Data Structure Lab	Data Structure Lab
Data Communication Lab	Data Communication Lab
Digital Circuit Design	Management Account & Finance
Discrete Mathematics	Organisational Management
Digital Computer Design Lab	Mini Project (System Analysis & Des.)
Year 3 First Semester	
Formal Language & Automata Theory	Formal Language & Automata Theory
Computer Networking	Computer Networking
Relational Data Base Systems	Relational Data Base Systems
Operating Systems 1	Operating Systems 1
Micro Processor Based Systems Design	Micro Processor Based Systems Design
Computer Network Lab	Computer Network Lab
Relational Data Base Systems Lab	Relational Data Base Lab
Operating Systems Lab	Operating System Lab
Microprocessor Lab	Microprocessor Lab
Management Science	Managerial Economics
Year 3 Second Semester	
Internet Fundamentals and Application	Internet Fundamentals and Application
Internet Lab	Internet Lab
Computer Graphics Lab	Computer Graphics Lab
Language Processor Lab	Simulation & Modelling Lab
Systems Administration Lab	Systems Administration Lab
Interactics Computer Graphics	Interactics Computer Graphics
Language Processor	Indian Business Env. H. R. Management
Computer Architecture	Simulation & Modelling
Operating Systems 2	Operating Systems 2 (Systems Adm.)
Analysis and Design of Algorithms	Marketing Strategies Planning

Year 4 First Semester	
Software Engineering	Software Engineering
Object Oriented Programming & Methodology	Object Oriented Programming & Methodology
Data Base Application Design	Data Base Application Design
Open Elective 1	Open Elective 1
Professional Elective 1	Professional Elective 1
Software Engineering Lab	Software Engineering Lab
Data Base Application Lab	Data Base Application Lab
Object Oriented Prog. Lab	Object Oriented Prog. Lab
Project 1	Project 1
Year 4 Second Semester	
Web Technology	Web Technology
Visual Programming	Visual Programming
Open Elective 2	Open Elective 2
Professional Elective 2	Professional Elective 2
Professional Elective 3	Professional Elective 3
Project 2 + colloquium	Project 2 + colloquium

Figure 5.5: Comparison of AICTE Model Curricula
Source (AICTE 2000a, AICTE 2000b)

Immediately, it is worth observing that the curricula are the same for the first year. Not only are they identical, but they are similar to the IIT Bombay curriculum mentioned above. Chemistry, Physics and Mathematics are given prominence in addition to some IT related courses. Interestingly, English proficiency is a first year requirement in the AICTE curricula, but not at IIT Bombay. This point suggests that perhaps at IIT Bombay, proficiency in English is assumed rather than taught, hinting that IIT Bombay is a more elitist institution, whose applicants are assumed to be fluent in English. These arguments will be re-visited in light of other data. Modules on Thermodynamics, Electrical Circuits and Engineering Graphics also give these curricula a very strong engineering bent, even more so than the IIT Bombay curricula. In the first year, only one non-technical course is offered (in the second semester) that being Environment and Ecology. This must be considered an anomaly – it is a peculiar choice given that it is the only non-social science course required in the *entire* AICTE Computer Science and Engineering curriculum.

Environment and Ecology – Course Description

- General: Introduction, components of the environment, environmental degradation
- Ecology: Elements of ecology, Ecological balance and consequences of change, principles of environmental impact assessment
- Air Pollution and Control: Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures
- Water Pollution and Control: Hydrosphere, natural water, pollutants their origins and effects, river/lake/ground water pollution, standards and control.
- Land Pollution: Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes): their origin and effects, collection and disposal of solid waste, recovery and conversion methods..
- Noise Pollution: Sources, effects, standards and control

Figure 5.6: Environment and Ecology – Course Description

Source: (AICTE 2000a, AICTE 2000b)

In the second year, the curricula are quite similar as well. Both specify practical computer modules with laboratory work. However, while the CSE curriculum offers:

- Engineering Economics
- Strength of Materials
- Digital Circuits
- Discrete Mathematics

The IT curriculum offers

- Foundational modules in IT
- Organisational Structure and Management
- Management Account & Finance
- Mini Project (System Analysis & Design) (AICTE 2000a, AICTE 2000b)

The way the IT curriculum differs from the CSE is telling. In lieu of the more technical modules, the IT curriculum focuses on the business application of

Information Technology. This might not be surprising, but it does reflect a particularly instrumental orientation. This distinction is echoed in the third year where the CSE students continue with a broadly technical curriculum (although it is worth noting the module on Management Science) while the IT students focus on the business application of IT, with attention on 'Marketing', and 'Systems Administration'.

The module "Indian Business Environment and H. R. Management" deserves specific mention. It is the only module that has an explicitly Indian orientation. This is perhaps unsurprising, but worth observing, especially in light of the literature on IT for Development (see Chapter 2) that constantly alludes to the need for education to teach people to find local solutions to local problems. The curricula seem to have a global and cosmopolitan focus, with the exception of this one module: Indian Business Environment and H.R. Management". This global focus will be discussed further in light of other data. The two curricula are identical in the fourth year, where the focus is on the professional application of technology, again reflecting an instrumental orientation.

What is noteworthy about these curricula is the marked focus on technical content and the overwhelmingly instrumental orientation. It seems that the curricula are designed to address the needs of the current labour market, something heavily debated in the international academic literature (Banks 1994, Conlon 2000). Elective courses in humanities and social science disciplines seem perfunctory and represent a small fraction of the overall course content. Even the elective list is heavily slanted towards technical and instrumental courses.

AICTE Elective Lists (Both CSE and IT Curricula)	
Open Elective	Professional Elective
Enterprise Resource Management	Network Management
E-Commerce, Strategic IT Management	Enterprise Network Management
Technology Management	Distributed Computing
Decision Support and Executive Info. Systems	Client Server Architecture
Software Technology	Relational Database System
Knowledge Management	JAVA Programming
IT in Marketing Management	RISC Architecture
IT in HR Management	Object Oriented Database Systems
IT in Finance Management	Advanced Microprocessor Architecture
Project Management and Software Tools	Data Warehousing & Meaning.
Human Values	Image Processing
Science Technology and Society	Computer Vision & Robotics
	Real-time Systems
	CAD/VLSI
	GIS and Remote Sensing
	High Speed Network, Client Server
	Client Server Computing
	Mobile Computing
	Fuzzy and Neural Network
	Multimedia Application
	A.I. & Application

Figure 5.7: AICTE Elective Lists.
Source: (AICTE 2000a, AICTE 2000b)

The three curricula presented here – (CSE IIT Bombay, CSE AICTE, IT AICTE) are characteristic of the curricula reviewed for this study. However, there were some differences that merit some discussion. For example, the Computer Science syllabus at IIT Delhi has a greater social science content, especially in comparison to the AICTE curricula. IIT Delhi publishes their curricula in terms of credits, which is interesting in that it reveals the relative importance of different subjects.

Computer Science and Engineering Curriculum – IIT Delhi – Credit Distribution			
Undergraduate Core (UC)		Undergraduate Elective (UE)	
Category	Credits	Category	Credits
Departmental Core (DC)	66	Departmental Electives (DE)	24
Basic Sciences (BS)	24	Humanities & Soc. Science (HM)	15
Eng. Arts & Sci (EAS)	20	Open Category Electives (OC)	31
TOTAL	110	TOTAL	70

Figure 5.8: Curriculum at IIT Delhi – Credit Distribution.
Source: (IIT Delhi 2004)

This curriculum specifies that out of 180 credits, 15 must be from the Humanities and Social Science Department (8.3%). However, 31 credits are open elective which means students can raise this to as high as 46 credits (25.6%). This curriculum is much more flexible than the other three presented, although the modules are quite similar.

IIT Delhi – Btech (Computer Science and Engineering) Curriculum – Modules	
Departmental Core (DC)	Departmental Electives (UE)
Introduction to Computer Sc. & Engg	Independent Study
Discrete Mathematical Structures	Digital Hardware Design
Digital Electronics	Mini Project
Digital Electronics Laboratory	Introduction to Data Base Systems
Data Structures	Artificial Intelligence
Signals & Systems	Logic for Computer Science
Computer Architecture	Numerical & Scientific Computing
Probability & Stochastic Processes	Simulation & Modelling
Design Practices in Computer Science	Professional Practices
Programming Languages	Embedded System Design Laboratory
Analysis & Design of Algorithms	PG courses (if any)
Operating Systems	Synthesis of Digital Systems
Computer Networks	Compiler Design
Practical Training	Software Engineering
Colloquium	Foundations of Automatic Verification
Major Project Part 1	Theory of Computation
Major Project Part 2	Database Implementations
	Computer Graphics
	Digital Image Analysis
Basic Sciences Core (BS)	Engineering Arts & Sciences Core (EAS)
Introd. to Analysis and Differential Equations	Intro. to Computers & Programming or
Introd. to Algebra and Matrix Analysis	Introduction to Computer Science
Fields and Waves	Engineering Mechanics
Physics of Materials	Fundamentals of Electrical Engineering
Physics Laboratory	Graphic Science
Physical Chemistry	Manufacturing Practices
Chemistry Laboratory	

Figure 5.9: IIT Delhi – BTech Curriculum Modules. Source: (IIT Delhi 2004)

During the interview phase of data collection, Professors would routinely remark on how their curricula were modelled on that of MIT (Interview 2, 5, 6, 15, 17, 21).

While this is not a comparative study, such a finding begs a brief comparison of the MIT curricula for a BSc in Computer Science. The degree requirements are remarkably complicated, with some requirements specified in terms of ‘subjects’ others in terms of ‘units’. However, by making the assumption that a subject counts for 12 units – which is for the most part accurate, the following table summarizes the curriculum for the BSc in Computer Science at MIT.

BSc Computer Science at MIT – Curriculum (By Units)	
Subject	Units
Science	72
Humanities, Arts and Social Sciences	96
Departmental Requirements	69
Laboratory Requirements	12
Departmental Electives	96
Unrestricted Electives	48
TOTAL	393

Figure 5.10: BSc Computer Science at MIT – Curriculum By Units
Source: (MIT 2004b)

It is true to a significant degree the curricula are quite similar. Many of the modules are similar and the structures of the degrees are comparable. However, there are significant differences. First, the MIT curriculum is less instrumental. The online documentation stresses the “highly theoretical” (MIT 2004b) component of their programmes, while the AICTE documentation stresses the need to meet “today’s requirements (AICTE 2000b).” This is evidenced by the more theoretical courses that are on offer at MIT:

- Probabilistic Systems Analysis
- Information and Entropy
- Computer Language Engineering
- Automata, Computability, and Complexity
- Solid-State Circuits
- Feedback Systems
- Dynamics of Nonlinear Systems
- Convex Analysis and Optimization

Figure 5.11: Examples of Theoretical Modules offered at MIT
Source: (MIT 2004b)

Secondly, the MIT curriculum allows for far more flexibility than the Indian curricula mentioned above – both in terms of flexibility with the department, and also in terms of allowing students to take modules outside the department – e.g. in Humanities, Arts and Social Science. The following table serves as a useful comparison:

Comparison of Curricula – HSS Content					
University (Curriculum)	Computer Science Degree: Total Credits	Min Humanities and Social Sci Credits	Max Humanities and Social Sci Credits	Minimum as %	Maximum as %
IIT Bombay	295	24	30	8.1%	10.2%
AICTE CSE	250	9	17	3.6%	6.8%
AICTE IT	250	22	30	8.8%	12.0%
IIT Delhi	180	15	46	8.3%	25.6%
MIT	393	96	144	24.4%	36.6%

Figure 5.12: Comparison of Curricula – HSS Content

Source: (AICTE 2000a, AICTE 2000b, IIT Bombay 2004a, IIT Bombay 2004b, IIT Delhi 2004, MIT 2004b)

Computer Science students at MIT must follow a degree of which a minimum of 24.4% of the content comes from Humanities and the Social Sciences. This is almost 3 times as high as the proportion found at Indian universities. Likewise, students at MIT can increase this component to 36.6% if they choose, whereas students at the Indian universities researched for this dissertation can normally follow less than a third of that – IIT Delhi being a notable exception. As mentioned, this is not a comparative study, which is why more Western curricula have not been brought into this analysis, however, the interview findings begged a brief comparison with MIT. While a greater discussion of these and other curricula may be warranted, it is worth proceeding to the other data collected for this study to help corroborate and strengthen some of these initial findings. This will hopefully give a better indication of the curriculum discourse, and some of the institutional forces at play.

5.2.3 OTHER PUBLICATIONS

Before proceeding to the interview findings, other publications made available by the universities regarding their curricula such as preambles to syllabi and marketing materials etc. were also studied. In some ways these corroborated some of the initial

findings hinted at by the syllabi. An entire chapter could be devoted to such texts, however, a few examples should be able to reveal some relevant points.

The Dwarkadas J. Sanghvi College of Engineering is an undergraduate college affiliated with the University of Mumbai. They publish a graduate prospectus for prospective students. It contains information about the courses offered, tuition fees, and an overview of the college. The description of the college begins as follows:

With the advent of liberalization in the early 90s India opened the doors of her economy to foreign players. This influx of global players into the Indian market and their emphasis on using state-of-the-art technologies created a spurt in the demand for contemporary engineering courses in the suburbs of India's commercial capital of Mumbai. (Dwarkadas J. Sanghvi College of Engineering 2003)

This is characteristic of some other prospectuses from similar colleges. What is noteworthy about this passage is that it explicitly positions the globalized economy as the *raison d'être* for college's existence. This overt instrumentalism is found in similar Indian texts (IIT Bombay 2004c) but it is not as prevalent – if it is there at all – in Western prospectuses, especially from the universities so admired in India (MIT 2004b, Stanford 2004, University of Waterloo 2004). Similarly, this text reflects a global orientation of the Dwarkadas J. Sanghvi College of Engineering. Rather than focusing on local needs that are specifically Indian in character, the college is explicitly focusing on the opportunities that present themselves with the arrival of “foreign players”, thus reflecting a global orientation that will be discussed in more detail in the next section. The preamble goes on to say that the college was established

with prior approval from the University of Mumbai, the Government of Maharashtra, the Directorate of Technical Education and the All India Council for Technical Education (Dwarkadas J. Sanghvi College of Engineering 2003).

This passage reflects the way that colleges seek legitimacy by associating with respected authorities and converging to specified standards. This is noteworthy is the way it corroborates institutionalist thinking on higher education (DiMaggio and Powell 1991b, Meyer 1992b), in particular, notions of isomorphism, which will be discussed further in Chapter 6.

Pamphlets published by universities contain the usual propaganda and marketing language that is to be expected. However, the language in the prospectus for engineering schools is extreme in the way it deifies technology.

It's rightly said that most of the advances made in the world today are due to engineers. Throughout our history engineers have been our 'pilots of change' Engineers achieve great things! If people have built it, grown it, moved it, or launched it into space, you can be sure that engineering had something to do with it. Throughout history, engineers have developed tools and machines to help us survive, prosper, and celebrate... At RAIT we see ourselves catalyzing tomorrow's scientific renaissance. We intend to do so by mentoring a breed a 'civilization movers' who will *engineer the future for us*. [sic] (RAIT 2004) [emphasis added]

This overtly rational text should be taken with a pinch of salt since it is marketing material, but the fact that such text is published by a serious and respected institution is telling. It is telling not only in that it reveals how the university perceives itself, but also how it chooses to position itself to appeal to potential students. It is reasonable to assume that this pamphlet was targeted to address a particular attitude within the Indian middle-class. Thus, this text reflects not just the attitude of the school, but possibly a prevailing attitude in middle-class society in general.

In the prospectus for IIT Bombay, there is a brief history of the institute. This history is interesting not just in terms of the story, but it is also revealing in the way it places importance:

A high-power committee of Govt. of India recommended in 1946 establishment of four higher institutes of technology of the level of their counterparts in Europe and United States to set the direction for the development of technical education in the country. These institutes were designed to provide the necessary dynamism and flexibility of organization in the light of expanding knowledge and changing socio-economic requirements of modern society... In 1961, by an act of Parliament, the Institute was declared an institution of national importance and was accorded the status of a university with power to award its own degrees and diplomas [sic] (IIT Bombay 2004c).

First, it is worth noting the origins of the institute. The IITs were explicitly setup as "counterparts" to schools in Europe and the United States. That this was mentioned in the very first sentence of the history is telling. Firstly, it reveals a global focus that was established very early on. Secondly, it locates the focus in Western countries, particularly "Europe and the United States." Asian universities were not part of this

discourse. Thirdly, it may hint at a certain elitist character of the Institute; only four of these institutes (IITs) were initially created, a tiny number in the Indian context. These institutes in particular, “were designed to provide the necessary dynamism and flexibility of organization in the light of expanding knowledge and changing socio-economic requirements of modern society.” In particular it is worth noting that in 1961, IIT Bombay was declared “an institution of national importance.” Potentially, all centres of education could be declared institutes of national importance. It is revealing that this designation was implied to a few select institutes whose focus was on technology and the global economy. This merely hints at an elitist quality, it does not confirm it, although this argument will be re-visited in subsequent sections.

Finally, as previously mentioned, the AICTE oversees technical education in India. Their documentation outlines their purpose as well and their mandate.

The economic progress of a country is strongly linked with the quality of education. It is therefore, necessary for our technical education to undertake periodic review of the curriculum and subject content of the technical programmes to ensure that they are up to date not outmoded or obsolete and effectively fulfill the technological requirements of the country (AICTE 2000a).

Again, the economic rationality is explicit. Technological education must be up-to-date in order to enable economic progress. Also, there is explicit mention of the “technological requirements” of India. This is not explained more fully, but one can gather that it related to economic factors and the current labour market, thus suggesting an instrumental focus.

... For economic growth and prosperity, the need is to produce highly professional and competent engineers. This could be achieved by imparting quality teaching to students. Towards this, some norms and standards of engineering education need to be laid down so as to educate the students with appropriate skills suitable for a rapidly changing industrial scenario (AICTE 2000a).

This paragraph seems to imply that a necessary condition for growth and prosperity is professional and competent engineers. One might see this as being unsurprising, however it is important to note that this is in marked contrast to the ICT for Development literature (see Chapter 2) that argues for the importance of other, more social, factors. The above passage also makes clear that what is meant by “appropriate

skills” are skills that are “suitable for a rapidly changing *industrial* scenario. (emphasis added).” This passage further indicates a preference for an instrumental orientation, a preference that is again alluded to in the following passage.

... To make the India’s industries internationally competitive, the frontier technologies have to flow from the R and D institutions to the industries and also be continually infused in the engineering curriculum. Thus, it is pertinent that educational institutions, industries, and research institutions which are at the three vertices of a triangle should converge at some nucleus through coordinated research in both conventional and emerging fields *catering to the need of the industry*, which will be transferred to the industry and also amalgamated in the engineering curricula (AICTE 2000a) [emphasis added].

The preamble lists the following four objectives.

1. Greater emphasis on design oriented teaching, teaching of design methodologies, problem-solving approach.
2. Greater exposure to industrial and manufacturing processes.
3. Exclusion of outmoded technologies and inclusion of the new appropriate and emerging technologies.
4. Greater input of management education and professional communication skills. (AICTE 2000a)

The explanation of point 2 is particularly revealing:

2. Exposure to practical field

In the industrially advanced countries of the world, there exists a long tradition of close partnership between academic institutions and industry in promoting technical education and research. In our country, despite a growing awareness of the importance of forging linkages between universities and industry, the interaction between them is still rather limited. Although both sides realize that this gap needs to be bridged, most of the initiative towards such bridge-building have come from educational institutions, hitherto with little success. The result is that education has remained stagnant while industries have advanced. The curriculum must aim to provide to the student greater exposure of actual industrial processes. Students projects should be related to actual problems identified with the help of practicing engineers. Greater stress should be laid on the practical training of engineering graduates and sandwich programmes should be encouraged wherever feasible (AICTE 2000a).

The implication seems to be that participants from industry are invited and *encouraged* into the formal curriculum development process, something that is highly contested at Western universities (Banks 1994). The underlying assumption seems to be that this link is a necessary condition to become an advanced industrialised

country. Finally, the explanation of point 4 reveals that while other (non-engineering) modules are deemed important components of the curriculum, they too are to have an instrumental focus.

4 Management Education and Professional Communication Skills

Engineering includes a systems approach to solving problems involving management of persons, machines and materials. To work with people from different backgrounds, the engineer has to have some training in behavioural Sciences, Industrial Psychology etc. Also communication skills are as important as management and engineering skills. The engineering curriculum therefore needs to include courses on communication skills along with economics, finance and marketing. Group discussions, seminars, symposia should also be a part of the curriculum (AICTE 2000a).

Besides this passage being overtly rationalistic, there is no mention of Arts, Languages or Social Science. Only instrumental problem solving skills are recommended. The texts mentioned above, together with the actual syllabi hint at certain characteristics of the curriculum discourse. The characteristics become clarified through interviews with Indian academics.

5.3 MAJOR FINDINGS – INTERVIEW DATA

It was during the interview stage that the three major findings of this study were identified. It was found that within the ICT curriculum discourse there was; 1) a deep focus on the West and the Western-led global economy; 2) an epistemology that clearly gives preference to technical, positivistic knowledge and denigrates social science; and 3) a large industrial footprint.

5.3.1 FOCUS ON THE WEST AND THE GLOBAL ECONOMY

What was remarkable upon seeing the curriculum, and then upon further discussions with academics, is that it revealed a deep, unashamed reverence for the West and specifically America; American institutions, American curricula and American forms of knowledge.

Professors would routinely state proudly that their curricula were modelled on that of MIT, or if not MIT, then Stanford or Wharton or Carnegie Mellon (Interview 2, 5, 6, 15, 17, 21). Moreover, they were equally proud that their graduates could go and excel in American corporations. One respondent reported that the ethos of IIT Bombay was to produce “tough engineers who could compete in the global economy” (Interview 3).

This emphasis on the global economy often comes at the cost of neglect for local projects. IIT Bombay once developed a ‘Center for Technology Alternatives in Rural Areas’ (CTARA) that started several interesting initiatives including a machine that recycles cow dung into energy. The centre started with 8 faculty members but after a school-wide budget review, all faculty were encouraged to work on projects that bring in revenue. Slowly, the number of faculty at the CTARA was reduced from eight to one; the machine that recycles cow dung has been left to rot near the university canteen (Interview 10). ‘Bring in revenue’ is interpreted throughout IIT Bombay to mean ‘generate research for global industrial clients’. CTARA found no political support at IIT Bombay. However, when the dot-com boom arrived in America the institute was quick to respond with curriculum changes, adding courses on Computer Networking and E-Commerce (Interview 3).

A professor at Jawaharlal Nehru University offered a dichotomy that was particularly revealing. He opined that universities were either “relevant” or “excellent”. A little probing revealed that an excellent university adhered to Western standards, a relevant university solved local problems (Interview 28). The implications of this categorization are clear: a university that inquires into local problems could never be excellent. A university that does not meet Western standards, likewise, could never be excellent. Some might find this categorization disingenuous or even offensive. It was remarkable that a senior academic could view higher education in this way.

The reverence for the West was also manifested in research projects. As one respondent reported, India has chronic electricity shortages and was always in need of low-power research – studies on more efficient uses of power. The West never really

had a need for low-power research until the development of mobile phones and mobile computing. Now that this type of research is common in the West, low-power research is legitimate in India (Interview 10). Indian academics are rewarded for publishing papers in Western (especially American) journals (Interview 9, 21). Moreover, grants are given overwhelmingly to projects that address a leading-edge global problem rather than a locally based social need (Interview 11). The reverence for the West is particularly entrenched at the IITs and it is found in many aspects of university life. Even the organizational structures of the schools resemble Western hierarchies with a Vice Chancellor, Senate House, and various Deans of Departments. One might surmise that this apparent isomorphism (DiMaggio and Powell 1991a) is a colonial legacy. In fact, IIT Bombay was started in 1957 with a large grant from the USSR. Initially, the language of instruction was Russian, causing immense difficulties (Interview 7). While IIT Bombay started with a strong Soviet influence, over time, Western modes of organizing began to dominate. Today, the influence of the West is embedded in the structures, processes and taken-for-granted assumptions that make up IIT Bombay. Western modes of organizing are also in the minds of Indian academics, many of whom have studied in the West. When there are differences between standards from various Western countries, it is the American standards that seem to dominate. Indian universities used to offer 3-year undergraduate degrees, similar to the British format, but increasingly they are moving to 4-year degrees – already in place at the IITs – expressly because *only* 4-year undergraduate degrees are considered legitimate when applying for admission to graduate school in America (Interview 25). According to one respondent, the respect for ‘things American’ is particularly well-entrenched (Interview 33).

To be sure, some academics do work hard to find solutions for local problems, but the ethos of the university is to address global needs. One respondent estimates that at least 80% of the work is done to this end (Interview 10). IIT Bombay sits on a large campus surrounded by a re-enforced concrete wall. All students and almost all faculty and support staff live within the campus wall. Just outside are some of Bombay’s notorious slums that cover an area much larger than the lush IIT campus. Nevertheless, academics consistently commented on how Indian companies are

world-class, how India produces state-of-the-art technology and how Indian graduates dominate NASA and Silicon Valley start-ups (Interview 12, 13, 19, 24). These members of the Indian elite do not see India as a developing country. In fact, some seem proud of the way the elite has distanced itself from the masses. One respondent spoke brazenly about how India is a diverse country with 2 worlds, the elite and the masses. According to him, the two worlds will never come together. India must follow global trends and meet global needs. Social issues are important but daunting. It is far more rewarding to stay within the walled campus and generate world-class products and knowledge at cut-throat prices (Interview 11). One respondent said quite candidly that even if academics wanted to help the poor, they are clueless as to what they should do (Interview 21). As will be shown in the next chapter, the indifference of the upper-classes to India's poor is well-documented.

These findings are not only applicable to the IITs. The apparent isomorphism with Western standards and Western forms of knowledge were also found at smaller, less renowned schools. The director of the National Institute of Industrial Engineering (NITIE) stressed that the Indian economy is modern, industry is at the cutting edge and Indian products are world class. Tellingly, he believed that there is no difference between Indian problems and global problems. He said "If your TV is not working right, is that a local or global problem? It's the same thing." (Interview 12). This exact point was made in another interview using the example of mobile phones (Interview 29). Of course, one might point out that some Indians have bigger problems than a malfunctioning television or a broken phone. It is interesting to note the number of senior academics who view these problems as outside the remit of Indian universities – or at least their respective departments.

The University of Mumbai oversees the operations of over 100 affiliated colleges in the state of Maharashtra. It is heavily subsidized by the government and one might surmise that its mandate would be different from that of the private institutions that produce graduates for the global economy. Even at the University of Mumbai, local programmes are ignored in favour of meeting Western standards. Professor Mantha sits on the curriculum development committee. When he was asked about whether the

University should focus on local or global problems, he mentioned that while the University is primarily focused on *degree* programmes, some colleges also offer *diploma* programmes. In his view, the diploma programmes may focus on local problems but degree programmes must meet the global standards (Interview 17). The gap in legitimacy between a degree programme and a diploma programme is indicative of the relative importance between local and global problems.

Evidence for the reverence of Western forms of knowledge was also found in the reading lists of the various courses offered. The All India Council for Technical Education (AICTE) loosely oversees technology education in India. They publish model curricula in which the majority of the recommended textbooks are from Western publishers. One might suspect that there would be a movement in India to use Indian textbooks, in fact the opposite is true. Academics routinely responded that they should use *more* Western books (Interview 7, 11, 14), some saying Western books are better written, or reflective of current research (Interview 15, 17). Others admitted that Western books are simply more legitimate (Interview 10). India clearly has a book publishing industry but Indian academics prefer to use Western publishers, both in finding an outlet for their work and in forming the reading lists for their courses.

There was no evidence of a push to use Indian books, simply a need to use the best books available. This frequently meant Western books. According to Professor Mantha, “the nationality of the book is of little importance, for a course such as Digital Systems, the book teaches Digital Systems or it doesn’t, it makes no difference if it’s Western” (Interview 17). However, for someone who believes that Information Systems are social systems, this is questionable. The fact that Western books are consistently chosen over Indian books suggests that technology such as digital systems are repeatedly presented in a Western context, presumably with Western examples and Western applications. This is clearly a topic for future research. What is interesting is that this presentation of technical material embedded within a Western context is not opposed by Indian academics, in fact, it is enthusiastically encouraged. The evidence from this study suggests that the preference to use Western textbooks is

because Indian universities and academics perceive themselves as a part of the global, West-driven, economy, removed from the “other” India, right outside their campuses.

At the campuses visited, occasionally there was some evidence of initiatives to address local Indian needs, but academics consistently reported that they would prefer if their universities met global standards rather than solved local problems (Interview 8, 9, 11, 13, 21). In the case of the CTARA, one academic reckoned that it was kept alive so that it could be mentioned in university pamphlets, giving a veneer of altruism to an otherwise business-focused institution (Interview 10).

The link with the West – and in particular America – is undoubtedly strengthened by the exclusive use of English in ICT-related programmes. In the Indian literature on higher education, one can find a lively debate on the subject of language (Chitnis 1993). Some argue that education must be delivered in local Indian languages in order to develop an Indian identity and to make higher education widely accessible. The counter argument is that English is a global language and affords India several advantages. Despite the debate in the academic literature, there was no evidence for a lively debate on the issue of language in the Computer Science and Technology Management departments of India. Contrariwise, there seems to be agreement that English should be the medium of instruction. At this point it seems fully institutionalized. Most academics would have done their degrees in English (in the West), they publish in English and the textbooks are in English. One respondent commented that in primary and secondary schools, mathematics and English were the most important subjects. When asked “what is the least important”, he responded “Mother Tongue” (Interview 25).

To be sure, local Indian languages have a place in Indian universities. Most conversations in the corridors take place in local languages and during office hours students are free to converse in the language of their choice (Interview 20). Universities seem to function in many languages and this is done without much anxiety or hand-wringing. But it certainly seems the case that the use of English as the

formal language of instruction has strengthened the bonds with the West and therefore increased the legitimacy of Western forms of knowledge.

In many interviews, the academics went to great pains to present India as a world-class country, and certainly one that is on the rise. The perception of India in the West was a very sensitive issue. Criticism of India by a foreign researcher was seen as a subversive activity (Interview 20). As will be discussed in chapter 6, many respondents were explicitly trying to influence the findings and paint a positive picture of India (Interview 8, 9). It was imperative that foreigners were made to understand that India was no longer a country of “snake-charmers and elephants” (Interview 13, 25). The reverence for Western standards and Western forms of knowledge is one of the major findings of this study. This will be discussed in more depth in the next chapter.

5.3.2 PREFERENCE FOR TECHNICAL KNOWLEDGE

The second major finding was that even for technology degrees, the syllabi at Indian universities contained an overwhelmingly large number of technical courses. In this sense, it must be acknowledged that they differ somewhat from the Western universities that are so admired. As mentioned, Computer Science curricula at Indian universities tend to allocate around 8% of their content to Humanities or Social Science disciplines. This is in comparison to 25% - 35% which are often found in Computer Science courses in the West (MIT 2004a).

Only a minority of respondents were willing to categorize this imbalance as a weakness. One respondent, expressing the minority view, stated that the curriculum was too technical. There were not enough liberal arts programmes and low levels of intellectualism. She again stressed the ethos of IIT Bombay, which was to produce macho – read arrogant – engineers (Interview 3). Several respondents reported that the Humanities and Social Science modules do not carry the same respect in this intellectual climate (Interview 6, 29, 33). One respondent believed strongly that there is a need for more humanities modules but that such a move would be resisted by both

faculty and students. Students resent the compulsory nature of humanities courses and the respondent reported that students would prefer it if they were removed from the curriculum altogether. Moreover, faculty are entrenched in the ethos of the institution and many would see an increase in social science courses as a *weakening* of the curriculum (Interview 10). He believed that there are members of staff who would support an increase in humanities but they would be in a minority.

The respondent gave an example to show the relative importance of the Humanities and Social Sciences department at IIT Bombay. The institute funds faculty members to go on academic conferences, however first their papers must meet the approval of a committee that judges their academic merit. Naturally, engineering papers are evaluated by a panel of engineers. However, humanities papers are *also* evaluated by a panel of engineers. Thus, engineers are the final arbiters on a paper's academic worth, no matter what the subject matter is, and control what research the university supports (Interview 10). This indicates the relative importance of the various faculties.

One respondent suggested that in some sense, this preference for technical, positivistic knowledge reflects Brahminical epistemology (Interview 3). Science had value if it was rigorous, and quantitative data was valued much higher than qualitative. Of all the humanities modules, Economics has been given particular importance and it has been made compulsory as part of the IIT curriculum. She added that when Indian students take an MBA they tend to opt for the finance option, reflecting an Indian bias towards quantitative mathematical study. This will be explored further in the next chapter.

This study found that there was overall support to keep humanities courses at roughly 8% of the curriculum. Even Professor Bhat, the Head of the Department of Humanities and Social Sciences at IIT Bombay said he was happy with the representation of humanities in the IIT curriculum (Interview 2). Professor Sarda, the Dean of the Academic Program agreed and would not support a move to increase the number of humanities courses (Interview 7). At IIT Bombay, students take

approximately 80 courses to fulfil a 4-year Bachelor's degree, only 4 are social science courses.

One might suspect this is reasonable from IIT Bombay, an expressly technology-based institution. However, this view is also found at other campuses, in fact, it should be noted that the only dissenting views were expressed by academics at the IITs. The academic registrar at the D. Y. Patil University extolled the virtues of the technical curriculum, "it increases the chances of employment upon graduation and therefore meets the students' needs" (Interview 16). One respondent was quite blunt. Referring to a 3-year BSc degree at the University of Mumbai, he stated plainly "three humanities courses are sufficient." (Interview 17).

Professor Mantha helps develop the curriculum for the University of Mumbai and its affiliated colleges. He said there is just not sufficient time to teach humanities and social science courses. He said very clearly "Sociology yes, but not at the cost of Engineering Drawing." Subsequently, he proposed that social science courses could be taken by students as *non-credit* courses (Interview 17). This clearly reveals their importance to faculty and students alike.

Interesting are the social science options available to undergraduate students. Out of the 4 humanities courses taken by students at IIT Bombay, economics is compulsory, the other 3 can be chosen from a wide range of electives including: Western Philosophy, Sociology, Gandhian Philosophy, and English Literature. The choices seem similarly wide at the University of Mumbai. However, as one respondent made clear, the purpose of humanities courses is to prepare students for the workforce, it is not for intellectual attainment. He said that humanities courses are for the following purpose:

- Develop communication skills
- Learn behavioural science, corresponding to industrial needs
- Development of personality (Interview 17).

The purpose of the humanities courses are made clear at the Narsee Monjee Institute of Management Studies (NMIMS). They are proud of their social science courses, which are Microeconomics, Macroeconomics, Corporate Social Responsibility, and Environmental Management (Interview 8, 9). Clearly these courses are chosen with their industrial application in mind, thus deviating from Western notions of “social science”. One may argue that social sciences are denigrated in the West as well, but the contrast in India is much starker. The second major finding of this study is the tremendous emphasis on technical courses to the detriment of humanities and social science. This is associated with the large footprint of industry in Indian higher education.

5.3.3 HEAVY INDUSTRIAL FOOTPRINT

The third major research finding of this dissertation is the large influence that industry has in the development of university curricula in India. This was manifested not only in the attitudes towards curricula but also in the process of curriculum development. It was found that this process is slightly different at the various institutions studied. At IIT Bombay, curricula tended to be reviewed every 4-6 years. The various departments would hold meetings with members of faculty, and Senate House would give final approval to curriculum changes. Senate House is made up of Professors from various departments within the university (Interview 2, 7). At smaller schools such as NITIE and NMIMS faculty meet and discuss curriculum changes. Curriculum changes do not go through the same vetting process, however interestingly, at NMIMS, university alumni and industry experts are brought into the discussion (Interview 8).

The process that takes place at the University of Mumbai is particularly revealing. Unlike the other schools mentioned here, the University of Mumbai is not autonomous, it is run under the directorship of the Ministry of Human Resource Development (MHRD) and their technical courses are run under the guidance of the AICTE. Subsumed under the University of Mumbai are least 100 affiliated colleges

throughout the state of Maharashtra, which are beholden to the university on matters of fees, research directives, exams, degrees and curricula (Interview 17).

Thus, the curriculum development process has wide impact, and many people are brought into the process. A Board of Study that interestingly, consists firstly of members from industry, initially decides the curriculum. The decisions then must be ratified by the academic council, consisting of 10 members from the faculty of the various colleges. Next, there is the management council that examines the curriculum logistically and assesses its ability to be administered. Finally, there is the University Senate that is represented by various eminent members of society. If the University Senate is undecided then the decision ultimately rests with the Vice Chancellor. In this highly bureaucratic process one might think that there is a lot of inertia preventing significant changes. In fact, Professor Mantha, a member of the Academic Council opined that roughly 50% of the curriculum is considered “core”. He said that all are agreed that the core courses are not to be touched, and suggested (somewhat implausibly) that the core courses have remained the same for 75 years (Interview 17).

What is noteworthy about these processes, particularly at the University of Mumbai and at the Narsee Monjee Institute of Management Studies is that *industry* is given formal representation on the committees that develop curricula. One might expect that at the University of Mumbai there would be mandate to teach a more broad-based intellectual education, as compared to the private institutions. However, it is here where representatives from industry make the *initial* proposals for curriculum changes, thus giving industry a crucial voice in curriculum development.

At the IITs, the influence of industry is not as explicit, but as one respondent argued, IITs comes under the directorship of the Ministry of Human Resource Development (MHRD). While the MHRD does not influence curriculum development directly, they preside over the university’s budget, determine how much the institute can charge in fees and how much subsidy they will receive. With control over the finances, it is reasonable to assume that the interests of the MHRD – and the end goal of human

resource development – are taken into account in the process of curriculum development, however indirect and informal (Interview 24). It is instructive to note that in India, higher education is placed under a ministry whose remit is the development of *human resources*.

Moreover, there is further evidence that even at the IITs, industry influences curriculum development informally, yet significantly. Many respondents who were queried on this matter asked the rhetorical question, “what is the purpose of technology?” and responded, “the purpose of technology is to be used by industry.” (Interview 10). One might dispute this point vigorously, arguing the technology may also be used in the public sector or for research purposes. For many academics surveyed, the primary purpose is industrial (Interview 11, 12, 29). Given the ethos of IIT Bombay, much interaction seems to take place between faculty and members of industry. In fact, many faculty members have previously worked in industry (Interview 12, 24). This point was raised in several interviews – not just their involvement with industry, but that they were overwhelmingly educated in Western institutions. This undoubtedly influences the process of curriculum development, if only subtly.

Some courses – such as E-commerce – have developed expressly based on the needs of industry. Interestingly, no academics seemed to have objections to the involvement of commercial interests. In fact, it is welcomed. This is interesting in light of the great debate on the purpose of education (Conlon 2000). Indian academics, from various institutions, overwhelmingly ascribe to the instrumental rationality for education. This is contested fiercely within the academic literature and for good reason – the instrumental rationality has obvious weaknesses, however what is surprising is the consistent support for this view found at Indian universities.

Occasionally there was a rare dissenting view. One respondent implied that the industrial footprint was too large at IIT Bombay. He thought it skewed the evaluation mechanism (Interview 10). For him, the insistence that professors bring in money has the potential to retard the growth of productive research. But he never critiqued the

taken-for-granted assumption of the instrumental rationality for education, an assumption that seems to go wholly unquestioned in India.

The directors of the technology management programme at the NMIMS spoke proudly that they listen not only to members of industry but also to alumni as to what elements are required in the curriculum. However, this too speaks to the ethos of the institution; “University students ultimately go to industry, that has to be in the front of our minds” (Interview 8).

The strong relationship between universities and industry is source of pride for many academics. Dr. Mitra was unequivocal. “The curriculum is technology-driven, it should be *more* technology driven. Industry comes to IIT for R&D and we find an outlet for our research, it’s a win-win situation” (Interview 11). Professor Tapan Bagchi took a more sober approach but left no doubt where his beliefs were. He repeatedly expressed pride in the position of Indian industry; state-of-the-art manufacturing that produces world-class products. He spent 17 years in industry before becoming the Director of NITIE. It should be noted that he does not see curriculum as having a vocational purpose, setting graduates on a particular career path. He wants the curriculum to develop basic science and engineering skills, while stressing that in the final-year project, students must solve some industrial need. However, it is clear that he sees the mandate of the school to produce graduates to fuel Indian industry (Interview 12).

The curricula were not found to be strictly vocational. There were no courses on SAP or similarly specific technologies. However, the instrumental view was echoed in nearly every interview. Prof S. K. Mukhopadhyah stressed that “graduates must become useful and employers come from industry.” (Interview 15). This presumes a link between one’s usefulness and their immediate employability – a link that should be questioned and debated. It is noteworthy that this view is held so consistently by very senior members of Indian academia. One respondent argued that 20 years ago there was a debate about whether to allow industry into higher education but now it

has disappeared, partially because people realized the distance between industry and academia was far too large (Interview 20).

To be sure, one cannot classify education into two camps, liberal and instrumental. However, it seems quite clear that in India, higher education leans sharply to the instrumental side. While there are some voices of critique arguing that education must develop a wide-range of skills, these voices are drowned out by the repeated calls for close industry-university interaction and for curricula to address the present and pressing needs of India's commercial sector. The footprint of industry is large in Indian higher education, both in the attitudes of academics and in the formal process of curriculum development.

To summarize, the three main findings of this study are that:

1. Technology-related higher education in India is clearly focused on the global economy and it is worthwhile to note – the *American-led* global economy. There is a tremendous reverence for Western – specifically American – standards and forms of knowledge
2. An exception of this reverence that stands out is that Indian curriculum is overwhelmingly technical, to the detriment of the social sciences which clearly have second-class status.
3. The footprint of industry is quite large, reflected in the attitudes of academics and in the formal curriculum development process. Thus, betraying a particularly instrumental view of higher education.

These findings will be analyzed further in the following chapter.

Chapter Abstract

This chapter analyses the empirical findings described in chapter five. The main arguments derived from this analysis are first, neo-Institutionalism is an appropriate lens with which to interpret the findings. Several theoretical constructs are useful in making sense of the data. In particular the framework from Hasselbladh and Kallinikos is useful in categorizing institutional forces. Moreover, the notion of an organizing vision has particular relevance for this study. While the findings are not consistent with theories of Development, they are remarkably commensurate with the theory of the New Barbarians. Finally, Indian and Western institutions are mutually reinforcing and generate powerful feedback loops which lead to hyper-modern curricula as evidenced in chapter five.

Chapter Contents

6.1	INITIAL NEO-INSTITUTIONAL ANALYSIS	169
6.1.1	Major Concepts	169
6.1.2	Theories and Propositions.....	171
6.1.3	The Categorisation Framework.....	173
6.2	ANALYSIS OF INSTITUTIONS WITHIN THE INDIAN CONTEXT	174
6.2.1	Historical and Traditional Institutions.....	175
6.2.2	Micro institutions	180
6.2.3	Macro Institutions	183
6.3	ANALYSIS USING SECONDARY THEORIES	188
6.3.1	Rejection of the Discourse of Development.....	188
6.3.2	Rise of New Barbarians.....	190
6.3.3	Summary Arguments.....	201

The following chapter presents an analysis of the empirical findings outlined in chapter 5. The first section analyses the data using neo-institutional theory. It cross-references the findings with neo-institutional vocabulary and presents a description of the subject of interest in terms of this theoretical lens. The second section presents a deeper analysis of the findings. An inquiry is made into the underlying institutions underpinning the empirical findings using neo-institutional theory as well as contemporary Indian literature. It will then seek to build an argument on how institutional forces shape university curriculum, and in turn the idea of ICTs. Finally, section three will present an analysis of the findings in terms of secondary theories – such as theories of Development and Nietzsche’s New Barbarians – outlined in Chapter 2. The third section outlines an analysis that might be radical, but offers the potential for the greatest contribution.

6.1 INITIAL NEO-INSTITUTIONAL ANALYSIS

As mentioned in Chapter 3, studies of education lend themselves to analysis with neo-institutionalism. As will be shown, the language and propositions are particularly well-supported by systems of higher education. However, neo-institutional theory is also limiting. Its language and vocabulary delineate general theories that prohibit a penetrating contextual analysis. For this reason, while this section cross-references the findings against neo-institutional concepts, the following sections of this chapter bring in other theories in an attempt to generate a richer understanding of the phenomenon of interest and to provide a deeper analysis. Institutions in this case are interpreted as taken-for-granted assumptions that act as informal rules and confer legitimacy on those who conform (DiMaggio and Powell 1991a) as opposed to large political, legal or social organizations that exert influence more explicitly (North 1990).

6.1.1 MAJOR CONCEPTS

It is perhaps first important to observe that within the findings there are clear neo-institutional concepts. Clearly, curricula in India have converged to some extent with those in the West. In part, this is due to an explicit attempt to gain legitimacy. This

was one of the primary motivators for adopting Western curricula, using Western textbooks and publishing articles in Western journals. This process not only granted legitimacy to Indian curricula and Indian academia, but also strengthened the Western institution in the process, thus creating a particularly strong mutually reinforcing feedback loop.

However, the quest for legitimacy is not the sole reason for this institutional convergence. It was quite apparent that in the discourse surrounding curriculum, the reasons for adopting Western structures, Western course content and Western textbooks were not only for the rubber stamp of legitimacy but also because it was perceived that this would lead to better graduates who were better suited to meet industrial needs. In that sense, the findings do not seem to support directly Meyer and Rowan's (1991) argument that the structure of the education enterprise gets decoupled from the task of instruction, or it might be more correct to say that in India, the structure seems more tightly coupled with instruction than what Meyer and Rowan found in the American context.

Nevertheless, the findings do suggest that Indian higher education is very well conceptualized by neo-institutional theory. It is remarkable how similar the curricula studied were to each other and to their Western models, both in form and content. In some sense, this begs a further analysis of the Western curricula. To be sure, there were some differences. At IIT Bombay for example, electives were offered in Gandhian philosophy. However, it must be said that electives were also offered in English literature and other humanities subjects that are standard fare in Western technology curricula (MIT 2004a).

One might be tempted to argue that the findings are in line with Lippi's (2000) theory of allomorphism. Her central argument being that the process of institutionalisation is imperfect. Institutions tend to be adapted and customized at the local level. However, this rather weak conclusion, while certainly correct, does not do justice to the findings.

The differences certainly exist – and the dominance of technical courses in the Indian context is conspicuously different – however upon further reflection, what is remarkable is the ubiquity of the similarities. This is manifested in so many ways; the organizational structure of the university, the breakdown into faculty and departments, the form of the university curriculum (modules organized into semesters), the courses themselves and the reading lists used. It is only because of the prevalence of these similarities that minor differences – such as a module on Gandhian philosophy or a cow roaming the campus – seem significant.

6.1.2 THEORIES AND PROPOSITIONS

In many ways, these findings support DiMaggio and Powell's (1991b) propositions of institutional isomorphism.

1. The greater the dependence of an organization on another organization, the more similar it will become to that organization in structure, climate, and behavioural focus.
2. The greater the centralization of organization A's resource supply, the greater the extent to which organization A will change isomorphically to resemble the organization on which it depends for resources.
3. The more uncertain the relationship between means and ends, the greater the extent to which an organization will model itself after organizations it perceives as successful
4. The more ambiguous the goals of an organization, the greater the extent to which the organization will model itself after organizations that it perceives as successful.
5. The greater the reliance on academic credentials in choosing managerial and staff personnel, the greater the extent to which an organization will become like other organizations in its field.
6. The greater the participation of organizational managers in trade and professional associations, the more likely the organizations will be, or will become, like other organizations in its field.

Figure 6.1: Propositions of Institutional Isomorphism.
Source: (DiMaggio and Powell 1991b)

Points 3, 4 and 5 are well supported by the findings. Universities have ambiguous and conflicting goals, especially in the Indian context as described in chapter 3. Likewise, when the ends are uncertain, the means are similarly unclear. As DiMaggio and Powell (1991b) proposed, universities in this case would emulate similar organizations that they perceived as successful. The universities studied clearly had an external orientation. They consciously and explicitly modelled themselves after the respected universities of the West. Regarding points 1, 2 and 6, this study did not look directly into the professional organizations or structure of the government on whom the universities depend – so there is no evidence to support or refute points 1, 2 or 6. However, it is worthwhile to probe a little deeper. As will be shown later in this chapter, India is infused with a philosophy of aspiration. Those interviewed for this study are brimming with self-belief, not just about themselves but also about the inevitable rise of their country. To the extent that Indian universities are dependent on Indian society for resources and legitimacy, Indian universities mimic this philosophy of aspiration.

DiMaggio and Powell (1991b) also theorized that higher education organizations would respond to three kinds of pressures; coercive, mimetic and normative pressures. In this study, there was no evidence for coercive isomorphism although it should not be ruled out. Reverence for Western institutions and forms of knowledge were found to be particularly strong. It is not inconceivable that some universities were under coercive pressure to adhere to these standards. However, the findings suggest that it is more likely that the isomorphism happened due to mimetic and normative pressures. A large number of academics at Indian universities did their doctoral work at Western institutions and many have experience in industry. It is likely that mimetic processes were at play in the convergence of institutions between these various spheres. Secondly, the reverence for the West and the underlying motivations behind curriculum development point to strong normative pressures to conform to Western standards, thus precipitating institutional isomorphism.

Moreover, there appears to be support for Meyer and Rowan's (1992) theories on how organizations respond to institutional forces. Organizations – in this case universities

– incorporate societal rules to maximize their legitimacy and increase their chance for survival. As an organization conforms to institutional myths, it acquires more legitimacy and takes on more formal or modern forms and structures, thus adhering to further institutional rules. This creates a mutually-reinforcing feedback loop which will be discussed at more length later in this chapter.

6.1.3 THE CATEGORISATION FRAMEWORK

It is worth considering the findings in terms of Hasselbladh and Kallinikos’s (2000) theory of institutionalization. This present dissertation does not concern the process of institutionalization, rather it looks at institutional forces and their impact on ICT curricula. However, the paper by Hasselbladh and Kallinikos (2000) is relevant because it presents categories of institutions depending on their strength and characteristics:

Ideals	Discourses	Techniques of Control
Oral	Written	Formal Codification
“work control”	Discourse on Human Resource Management	Systems of classification and measurement
High semantic Richness		Low Semantic Richness
Low Precision		High Precision

Figure 6.2: Categorisation Framework:
(Adapted from Hasselbladh and Kallinikos 2000)

Ideals are communicated orally, have high-semantic richness but low-precision. Discourses are written and if they gain strength and legitimacy, they become techniques of control that are formally codified. Hasselbladh and Kallinikos (Ibid.) give the example of the labour contract. It began with the ideals of making human effort exchangeable, payable and measurable. This ideal became translated into a discourse during the early industrial period where spot-contracts gave way to legal practices and relations. But they note, significantly, that these discourses gave no guide for action. It was only with wage-setting, recruitment and monitoring that the labour contract became a technique for control.

This categorization is particularly interesting given the findings from this study. Several institutional forces have impacted higher ICT education in India. Some

institutional forces such as the culture of aspiration in India and the preference for technical epistemology are best categorized as ideals. However, others such as the assumptions codified in the IIT admissions process can be seen as techniques of control. These forces are analysed extensively in section 6.2 and then categorized using the framework of Hasselbladh and Kallinikos (2000). Thus, the forces at play in the development of curriculum at Indian universities are well theorized by neo-institutional concepts. This in turn gives some credence to neo-institutional theory, or at least demonstrates its relevance in the arena of higher education.

This study is primarily concerned with the institutional forces that influence ICT education. The manner in which Indian curricula have converged with Western curricula cannot be solely explained away as Indian universities adopting Western standards to gain legitimacy. There are institutional forces within Indian society and Indian civilization that aided and abetted this process, but also coloured and shaped it in unique ways. These forces can be teased out of the research findings, but not solely with neo-institutional theory. An analysis of these forces, using a blend of theories and perspectives is the subject of the next section. In some sense, global and Indian institutional forces have collaborated and conspired to shape university curricula how into they are today.

6.2 ANALYSIS OF INSTITUTIONS WITHIN THE INDIAN CONTEXT

This study concerns the institutional forces that influence the curriculum development process at Indian universities. It stands to reason that some of these forces would exist within Indian society. Indian society is very complex and notoriously difficult to capture, nevertheless, in this section an attempt will be made to outline the major institutions that seem to have a role to play in the process of curriculum development, particularly as they relate to the major research findings mentioned above. These institutions will be discussed in three sections; historical and traditional institutions, micro institutions and macro institutions.

6.2.1 HISTORICAL AND TRADITIONAL INSTITUTIONS

As we have seen, while the technical curricula bears a remarkable resemblance to similar curricula found in the West, one marked difference is a dearth of humanities and social sciences courses found at Indian universities. One reason for this difference lies in traditional Indian forms of knowledge. As will be shown, traditional Indian epistemology gives primacy to numerate and positivistic forms of knowledge. The focus on numeracy and categorization are particularly well-suited to technical computer science courses but less well suited to interpretivistic social studies.

It is acknowledged that the arguments put forth here are contestable and alone might not convince the reader that traditional Indian forms of knowledge have influenced the curriculum. However, taken together, they make a reasonable case that certain unquestioned assumptions about knowledge in India give primacy to positivism and 'hard' science.

Firstly, a strong argument is made in the literature that Indians are particularly numerate, reflecting a strong inclination towards quantitative, absolute and mathematical forms of knowledge. Scholars believe that even around 2500 BC, the Indus valley civilization exhibited knowledge of the decimal system (Varma 2004). It is also claimed that the zero was invented in India and reached the West through Arabs who called mathematics 'Hindsat', the science of India. While these claims may be disputed, what seems to be true is that India definitely has a rich mathematical legacy and as Pavan Varma (2004) writes:

It is not unreasonable to infer that a part of this rich mathematical legacy would have percolated to the skill banks of ordinary people, particularly since the study of mathematics was linked to areas like astrology, of interest to the common man, It is likely too that the educational curriculum gave some degree of importance to a basic proficiency in mathematics. Over the centuries, a bias in favour of competence in mathematics could have been internalized at the level of the people at large (Varma 2004).

Dhruv Raina (2003) has also argued that in the historiography of Indian epistemology, mathematical knowledge and scientific rigour were given primacy – thus, establishing

early on an assumption regarding various forms of knowledge that goes unquestioned today.

Secondly, Indians seem to have a particular propensity for discrete classifications of knowledge. The depth of this propensity is made clear in a passage from Varma (2004) and so it is worth quoting at length.

Indians traditionally have a mania for classification. While accepting the ultimate unity of both matter and spirit, they proceed to break it down into finite categories in a manner that has few parallels anywhere. Everything is meticulously – even relentlessly – classified. Matter is segregated into *five* gross elements: earth, fire, water, air and ether. A person's nature is broken down to *three* constituent elements: *sattvaa*, *rajas*, and *tamas*. Flavours are subdivided into *six* kinds: salty, sweet, sour, sweet-sour, bitter and spicy. There are *nine* kinds of emotions: wonder, terror, disgust, humour, pathos, anger, love, heroism and peace. Human health depends on *three* kinds of humours: phlegm, gall and wind. Women are of *four* basic types: *padmini* (lotus-like), *sankhini* (conch-like), *hastini* (elephant-like) and *chitrini* (variegated). Men too are of *four* essential categories: *anukula* (sincere and devoted), *dakshina* (one who distributes his affections equally), *satha* (cruel) and *dhrishta* (shameless). There are *sixty-four* ways to make love, and men are categorized as hares, bullocks and stallions, and women as gazelles, mares and elephants in accordance with penis length and vagina depth. Life has *four* principle goals ... People belong to *four* castes... (Varma 2004).

Varma continues and makes a very convincing argument. “The essential point is that the Hindu seems to have a congenital inclination to differentiate the database around him.” (Ibid.)

This quote is presented in order to demonstrate the extent to which objectivism is present in Indian thought. One may certainly argue that this is a gross simplification of Indian philosophy whose considerable depth and breadth extend well-beyond this research project. This argument is accepted, however it is posited here that Indian forms of knowledge are compatible with positivistic thinking and the type of analysis required in modern technical Computer Science courses. Similarly, Indian forms of knowledge might be less compatible with constructionist or subjectivist thinking that may be well suited for the social sciences.

Through a collection of essays, Raina and Habib (2004) looked at the way modern science was appropriated and manipulated in India in the late colonial period, 1890 – 1912. Their volume, *Domesticating Modern Science* shows that science found a

particularly hospitable home in India. It was perceived as *exact* and *value-neutral*. And even though it may have contained a Christian flavour, it was secular in the sense that it was not overtly spiritual and was removed from local religious debates. As many authors have argued, as a colonial power Britain was opposed, but as a vibrant democracy, with free speech and advanced technology, it was respected, particularly by the middle and upper classes (Deshpande 2004, Gill 2004, Raina and Habib 2004, Varma 1999). Any predisposition that India had to positivistic and technical knowledge was legitimized and *magnified* by the colonial experience. This not only arose out of admiration for the occupying power, but it became part of the nationalist discourse as well.

Modern science was introduced into India during the last decades of the eighteenth and early decades of the nineteenth century, through the efforts of the Indian intelligentsia, Christian missionaries and British educationalists associated with the East India Company. The efforts of the avant-garde among the Indian intelligentsia were catalysed by an appreciation of science and technology as effective agents of societal transformation. Towards the end of the nineteenth century, this Baconian optimism came to be enshrined as an essential ingredient of the nationalist struggle, as well as the concomitant programme of cultural redefinition of reformism. By the 1850s, the Indian intelligentsia was tailoring the discourse of science in secular forums to articulate its politics of change (Raina and Habib 2004).

Thus, science and technology became domesticated in India not only because of its merits but also because it suited the agenda of the elite and the intelligentsia. According to some, this was the continuation of a centuries-old tradition. Legitimate knowledge in India was always elitist and detached from everyday concerns.

Indian intellectuals were heirs to one of the most elitist intellectual traditions of the world. The Brahmins of the post-Vedic era in India enjoyed exclusive intellectual distinction in principle, and the caste system confirmed their elitism in practice. Increasingly, ... Brahmin elitism became a hallmark of Indian intellectualism. The search for knowledge, and in turn the entire realm of ideas, was detached from the everyday concerns of the rest of society (Tharoor 2000).

In the West, a distinction is made between pure knowledge and applied knowledge. Pure knowledge being the product of laboratory work and detached theorizing, applied knowledge arising from the use of pure knowledge in the real world (Smith 2001). What seems clear is that in Indian history, pure knowledge was given priority over applied knowledge. Legitimate knowledge was of the type that was elite and

detached. This perhaps contributes to the attitude present in the curriculum discourse today where social science knowledge is considered second-class knowledge. It is often referred to pejoratively in India as “liberal arts” education.

These arguments are in themselves circumstantial, however taken together, they build a relevant case, especially in consideration of one of the major findings of this study. In the discourse surrounding technology curriculum in India, one finds a clear reverence for Western forms of knowledge. However, one noted exception seems to be the relative unimportance of humanities and social science courses in the Indian context. If one looks for explanation in Indian history and society, a reasonable case can be made that pure knowledge, technical knowledge, positivistic knowledge have traditionally been given more legitimacy than applied knowledge, social knowledge and interpretive knowledge – while this is not necessarily so in everyday life, it appears to be so in the realm of higher education and intellectual pursuits. Thus, as an institutional force, traditional forms of knowledge act as taken-for-granted assumptions that have influenced the development of ICT-related curricula. The preference for positivist (hard) epistemology and the traditionally elitist character of Indian education are institutions that have influenced ICT education. Using the Hasselbladh and Kallinikos (2000) framework, they can best be classified as discourse.

The reader may at this point sense a contradiction. One of the main findings of this study is the influence of industry in the curriculum discourse. One would assume this makes the curriculum applicable and relevant by focusing on applied knowledge. However, it is argued that Indian notions of intellectualism give primacy to knowledge that is detached from everyday concerns, therefore pure knowledge. Clearly, there is tension in this regard within Indian higher education and the contours of this debate merit some discussion.

It seems that the debate on rigour versus relevance is lively within Indian higher education, with most respondents acknowledging the debate and suggesting a middle-ground (Interview 28). However, in the Western literature there is also a debate about

the very purpose of education (Conlon 2000), with some arguing that higher education must be tuned so that graduates can fill some existing need within society (instrumental education). Others argue that education is meant to fill some higher purpose – to allow graduates to attain intellectual excellence (liberal education).

This debate is conspicuously absent in the Indian discourse on ICT-related curriculum development. There is no debate because everyone seems to agree on the answer: “education must be instrumental”. However, even given this assumption, interesting decisions are made – one being the denigration of the social sciences. One may certainly posit that a solid social science education is a necessary component in an instrumentalist education. However, in India, this is eschewed for more technical content.

Every university system has to deal with the trade-offs associated with the aforementioned dilemmas:

- Pure knowledge vs. applied knowledge
- Rigour vs. relevance
- Instrumental vs. liberal education

as well as the many other dilemmas of form and content in the curriculum development process. One can imagine some interesting permutations of the above parameters, what seems have developed in India is an educational system that is primarily instrumental – where everyone agrees that universities must firstly produce employable graduates. However, perhaps paradoxically, pure technical and scientific knowledge is given primacy over applied social knowledge.

This is an oversimplification, but the point to be made is that in India, education is given an overwhelmingly high instrumentalist orientation despite the focus on pure knowledge. The reasons for this are many and some are previously mentioned such as the influences of the West and traditional Indian epistemology. However, institutions within Indian society also play a significant role.

6.2.2 MICRO INSTITUTIONS

One major institution that cannot be ignored is that of family and its associated taken-for-granted assumptions. Familial bonds are strong in India and obligations run in all directions. Parents often make a large sacrifice to send to their children to university. Consequently, they are heavily involved in their children's education. University websites frequently have a special section for parents and orientation week events are usually designed for students and parents to attend together (Interview 22). For the parent who makes this sacrifice, the return on investment is that their child will get a good job and help support them in old age. This *quid pro quo* seems to be well understood by the student and also by the university. This understanding undoubtedly contributes to the instrumental orientation of Indian universities and the prominent place that industry is afforded in the curriculum development process.

The situation is exacerbated by the gender imbalance. In Computer Science programmes, there is often a 7:1 ratio (or greater) of boys to girls (Interview 3, 29). The gender ratio of academic staff is similarly skewed. This seems to contribute to a certain 'masculine' character of IT education, expressed explicitly by one respondent, one of only 2 female academics in the department of Computer Science at IIT Bombay (Interview 3). Traditionally, masculine forms of knowledge get higher status over feminine forms, contributing to an overwhelmingly technical education to the detriment of a more balanced curriculum with social science and arts courses. It has been written that India has in some sense a schizophrenic attitude towards modernity (Lal 2003); and this is very much in evidence on university campuses. While the reverence for the West and for Western forms of knowledge is abundantly clear, relations between male and female students are still infused with notions from traditional Indian society. Boys and girls live in separate hostels. Arranged marriages are still common in India and IIT degrees are used as a sales pitch in the matrimonial market (Interview 22). Thus, it should be acknowledged that while Western modernity seems to be revered in the discourse on curriculum development, it is not embraced in all aspects of Indian society, or even campus society. This is noteworthy in light of

neo-institutional theory, which emphasizes the isomorphic tendency of institutions. Gender roles are a distinctly Indian institutional force that influences ICT curricula. Part of the reason why there is a dearth of humanities courses in India is because the discourse on curriculum development is heavily infused with masculine forms of knowledge. This is because:

1. Gender roles in India, even on Indian campuses are quite distinct.
2. The population of Indian universities, particularly ICT-related courses, is overwhelmingly male – both in terms of faculty and students

Another micro-institution that bears mentioning is the admissions process that is used for technology related programmes. There are seven IITs in India and they are considered among the most advanced and high-ranking institutions in the country. In a survey by AsiaWeek (1999), they were ranked as seven of the top twenty schools in all of Asia. The IITs have a Joint Entrance Exam (JEE) where 250,000 students apply for admission to all 7 schools. Approximately 5000 students in total are accepted, 500 – 1000 per school (Interview 22, 25).

The IITs have a tremendously difficult task in handling so many applications and the JEE certainly has merit in this regard, but it has weaknesses as well. Students are self-selecting, thus the 250,000 who sit the JEE are already some of the most capable. However, the students who do particularly well are the ones who take a review course to prepare for the exam. The review courses vary, but many are several weeks long and are quite extensive, often requiring 12 hours a day of study. This introduces three biases. Firstly, there is an urban bias since the review courses are typically held in urban centres where the market is the largest. Secondly, there is a wealth bias since only wealthy families can pay for their children to attend these review courses. Finally there is a male bias – parents who find the preparatory courses to be a financial burden will likely pay for their boys to attend but not their girls. Likewise, the emotional burden that arises from putting a child through such a difficult process is endured for male children but not female (Interview 29). Thus, the JEE contributes to the masculine orientation of the IITs (Interview 23).

Boys in particular are expected to get jobs and support their families, whereas girls may be more free to pursue a liberal education (Interview 22). This pressure on the male students to get jobs, and the overwhelming majority of boys that fill seats in technology-related programmes increases the demand for the higher education system to focus on industry and 'employability'. Thus ICT education and the curriculum discourse take on a distinctively masculine orientation. While familial bonds and gender roles can be classified as ideals, the JEE is a technique of control that is formally codified and prescriptively influences higher education in the manner described above.

It must also be said that India is still a poor country, although Indian academics do not discuss it as such. Students in this condition are understandably concerned with finding good jobs upon graduation, both to ameliorate their own situations and to repay their debts to their families. These factors not only open the door to industrial involvement in the curriculum development process but also set the gaze of Indian students towards rich countries, Western countries and in particular, America. Thus the adoption of Western standards and Western forms of knowledge are done not just to acquire legitimacy, but also because it is perceived as a way to get rich.

This view is given credence by the large Indian diaspora. Everyone has a close family member who is working in the West (Interview 13). While Indians have achieved success in many fields around the globe, it is those that have made it in IT that are the most famous. Bookstores are littered with books that contain fawning biographies of the Indian 'heroes' of the IT industry, such as Arup Gupta and Azim Premji (see Kshatriy 2003). The diaspora acts as a vehicle for the transmission of technology, ideas and money, enhancing the links between India and the West. Thus, the modern project that is being undertaken in the West is easily seen, admired and appropriated in India.

6.2.3 MACRO INSTITUTIONS

A second group of societal factors are macro factors that apply to India at large. One of them is the institution of secularism. After independence, India consciously attempted to create a secular society (Lal 2003). This stemmed from the policies of Jawaharlal Nehru, India's first Prime Minister, who himself was decidedly agnostic, but it was also a useful way of building a country that was incredibly diverse and had a history of religious tension (Tharoor 2000). Nehru tried to push religious superstition to the background and welcomed the modernist ideals of science and technological rationalism. As John Gray (2003) wrote, secularism was one of the fundamental pillars of Modernism, and although India's secularism was quite different from the secularism of the West (Tharoor 2000), it still had the effect of reducing the importance of religion, and creating a fertile soil for the rise in stature of science and technology.

The notion of secularism has interesting political connotations today. The Congress Party is the party that established India's secular credentials. The party recently surprised pundits by winning a national election from the Bharatiya Janata Party (BJP). The BJP was markedly un-secular, espousing policies of Hindutva, or Hindu fundamentalism. Secularism, which is considered to be divinely inspired by the founding fathers opens the door to religious tolerance but also seems to have negative effects as well. One respondent commented that whenever someone tries to start an ICT initiative that takes into account local India culture, it is resisted and considered "un-secular" or BJP-inspired (Interview 22). This is significant as it shows how ICT has been politicised in India. Secularism, although it may be weakening (see Malkani 2002) still has teeth. Western standards, Western forms of knowledge and Western applications of technology are legitimate not just because they are perceived as successful, but also because they are not religious.

Another factor is the issue of language. As mentioned previously, English has been institutionalized as the language of instruction. This taken-for-granted assumption has opened a floodgate of Western influences, from teachers to curricula and in particular

textbooks. This undoubtedly has strengthened the bonds with the West and Western forms of knowledge, while at the same time making it easy for global industry to move into India, thus strengthening the bond yet again.

This particular legacy of British colonialism is perhaps unintended - another is the system of government. The British left India with a system that was well-suited to modernist ideals. The British created a system of government that operated to their benefit. It was designed to be efficient, primarily a tool of administration rather than governance. Education was designed as a way to create efficiently the clerks and workers necessary to run the British system of administration (Chandra *et al.* 2002). As a completely unintended consequence, the British Raj left India with a system of governance that was strict, procedure oriented, and highly rational. In short, it was appropriate for the modernist project. Thus, the technical-rational assumptions that underpin much of the curriculum in India have a rich institutional history in India, started at least as early as the British colonial period, strengthened by Nehru's secularism and then made stronger still by the many links with the West.

These bonds with the West are even further strengthened by Indian notions of power and a healthy appetite for enterprise and success. Varma (2004) argued that although the caste system has been declared dead, "the mentality of a stratified society is very much in evidence in everyday life." He paraphrased Alan Roland in saying "Indians have a radar-like sensitivity to the relative importance of a person." (Ibid.) Thus the hierarchy of global society is of keen interest and so the West is looked upon with an inquisitive gaze.

Indians are extraordinarily sensitive to the calculus of power. They consider the pursuit of power a legitimate end in itself, and display great astuteness in adjusting to, and discovering, the focus of power. They respect the powerful, and will happily cooperate or collude with them for personal gain. In the game of power they take to factionalism and intrigue like a fish takes to water...In spite of recent changes. Indians are exceptionally hierarchical in outlook, bending more than required before those who are perceived to be 'superior' and dismissive or contemptuous of those accepted as 'inferior' (Varma 2004).

Nicholson and Sahay (2001) added:

Norms of hierarchy often seen in Indian family relations and the caste system are structural conditions that can be interpreted as being drawn upon by Indians both implicitly and explicitly in developing agency. The caste system has contributed to value systems relating to status, power and relationships. Partly as a result, social relations are often seen to be hierarchical amongst Indians and people show status consciousness (Nicholson and Sahay 2001).

Varma uses many examples from modern Indian society and traditional Hindu texts to show that Indians are extraordinarily intrigued with hierarchies of power. Indian sensitivities to power relationships have undoubtedly contributed to the intrigue with which they view the West, in particular America. The hierarchy of power that is so well respected in India undoubtedly strengthens the institution in the process.

Varma also argued that Indians have a respect for success and a healthy attitude to entrepreneurship.

They hanker for the material goods that this world has to offer, and look up to the wealthy. They pursue profit more tenaciously than most. They make shrewd traders and resourceful, even ingenious, entrepreneurs. Their feet are firmly on the ground, and their eyes fixed on the balance sheet (Varma 2004).

This attitude is also prevalent in Hindu texts. Varma quotes a remarkably blunt passage from the Ramayana, a text that is widely revered. “Acquire wealth. The world has its roots for wealth. There is no difference between a poor man and a dead one” (Ibid.).

This argument is corroborated by the sheer number of small business owners in Indian cities, the ingenious and unconventional ways of making a living and the propensity to improvise creatively. Recent work on the offshore software industry has shown that Indians workers will go to great lengths to satisfy foreign managers, even if it means promising work that cannot possibly be delivered (see Nicholson and Sahay 2001). The software industry in itself has become an institution, perpetuating an entrepreneurial and successful conceptualization of India that is echoed in the popular literature and national conscious (Varma 2004), despite the evidence suggesting that the benefits are only being realized by a narrow segment of the population (D'Costa 2003). Varma makes a powerful case that Indians have a particular knack for enterprise. This keen business sense is definitely at play in the discourse on

curriculum development where the instrumental education is always monitored against the current needs of the commercial sector. It is likely that the healthy Indian attitude to enterprise is one of the reasons why industry is given such a prominent voice in the curriculum development process.

Finally, there is a mood in India, a sense that India is on the rise and that in the near future, it will achieve “superpower” status. This is not an institution in the traditional sense but it has certainly become a taken-for-granted assumption. Bookstores are full of books on how India will surpass America (Kalam 2002, Padmanabhan 2004). Academics speak confidently of India on the rise. As one respondent commented, India is one of the few countries with a genuine “reach-for-the-top” culture (Interview 23). Television is full of shows depicting smart, brainy children (StarTV 2004). Bollywood films increasingly depict India as a strong military power (Khan 2004). Indians are very cognizant of their role in the world and of the potential of India. Comparisons with China have become endemic in Indian newspapers and in the general literature.

Within this comparison with China, it is the English language, the strength of the diaspora and the success of the IT sector that always gives the edge to India (Interview 22). The sense that India is on the rise permeates the discourse on curriculum development. It contributes in part to the instrumentalism prevalent in Indian higher education and also helps create a perspective that is particularly outward-looking.

The reverence of the West in the curriculum discourse clearly opens the door to certain Western institutions. However, it is not quite correct to say that these institutions were all imported. There are many institutions associated with Western modernity: technical rationalism, secularism, managerialism, the nature of work as employment, the importance of industry, the reverence for technology, etc. Some of these have been introduced to India because of extensive links with the West. Others have developed in India independently. Clearly, there has been some institutional isomorphism, where Western ideas and taken-for-granted assumptions about

curriculum have manifested themselves at Indian universities. However, this seems to have been aided by a process of institutional collaboration. Taken-for-granted assumptions within Indian society have collaborated with Western institutions to form what might be considered hyper-modern technical curricula. The characteristics of these hyper-modern curricula are that they are unabashedly shaped by the needs of industry and have an overwhelmingly dominant technical content that far supersedes the modern curriculum from America, on which they are based.

These institutional forces can be loosely classified using Hasselbladh and Kallinikos's framework.

Ideals	Discourses	Techniques of Control
	Positivist epistemology and the preference for hard science	
Respect and intrigue of Power – inquisitive gaze on the West		
Desire for wealth, escape from poverty and a penchant for entrepreneurship.	Desire for wealth, escape from poverty and a penchant for entrepreneurship.	
Family Roles and the sense of duty towards one's parents		
Gender roles and the masculine character of technical education		
Secularism (rejection of religion in favour of science and technology)	Secularism (rejection of religion in favour of science and technology)	Secularism (rejection of religion in favour of science and technology)
Elitism within higher education – detachment from social concerns	Elitism within higher education – detachment from social concerns	Elitism within higher education – detachment from social concerns
	Discourse of Modernism – perception of technology as a panacea	
		Entrance Exams – codified procedures which determine student populations
		Use of English as the medium of instruction – perpetuating elitism
Diaspora – the ideal of becoming rich enough to join family members abroad	Diaspora – the discourse institutionalizing the spirit of success	Diaspora – successful IT barons abroad are codified in popular culture as 'heroes'
India on the Rise – Philosophy of aspiration, passionate self-belief	India on the Rise – Philosophy of aspiration, passionate self-belief	India on the Rise – Philosophy of aspiration, passionate self-belief

Figure 6.3: Summary of Institutional Forces (adapted from Hasselbladh and Kallinikos 2000).

To be sure, this categorization is flawed to some extent as are all categorizations. Thus, table 6.3 is not presented as the culmination of this analysis, but rather as a useful tabular presentation of the institutional forces found in this study.

It is particularly worthwhile to consider the findings in light of Zucker's (1988b) theory on the maintenance of institutional patterns and Swanson and Ramiller's (1997) theory of an organizing vision. However, the contribution towards these theories can only be made in conjunction with the secondary theories outlined in chapter 3. Thus, the discussion of these aspects of neo-institutional theory will resume in section 6.3.2.

This initial analysis shows that neo-institutionalism is an appropriate theory to study the findings of this project. However, because it is so general and because it is a theory of inertia, neo-institutionalism can only generate a limited analysis. Other theories need to be employed in order to gain a richer understanding of the phenomenon of interest, thus this discussion continues with the secondary theories outlined in chapter 3. In doing so, the neo-institutional analysis becomes richer.

6.3 ANALYSIS USING SECONDARY THEORIES

Since a major departure point for this research was the "ICT for Development" debate, it is worth analysing the finding using theories of Development. In doing so, interesting phenomena are revealed which beg a further analysis using the theory of the New Barbarians, first written of by Nietzsche (1968) and expanded upon by Angell (2000). The following section seeks to interpret the research findings in light of these theories.

6.3.1 REJECTION OF THE DISCOURSE OF DEVELOPMENT

In consideration of theories of Development outlined in Chapter 3, what is interesting to note is that the findings of this research project are not consistent with the contemporary discourse of Development. While the discourse surrounding higher ICT

education is tremendously Western-oriented (see chapter 4), it has not subscribed to the Development discourse, and does not in any way characterize the Indian poor as a problematic. The moral framework seems quite distinct.

This is noteworthy, particularly in light of some viewpoints in the literature. As mentioned, Aseneiro (1985) characterised Development as the “dominant organizing myth of our epoch”. The findings from this study suggest that is simply not the case for higher ICT education in India. The dominant organizing myth for higher ICT education in India has much to do with business, wealth accumulation and competition. This finding is significant. As the dominant organizing myth changes, it must change the way “ICT for Development” is conceptualised.

Not only does the discourse of higher ICT education reject the notions of helping the poor and egalitarianism – central to the idea of Development – it also rejects the colonial or Orientalist undertones of Development (see Cohen and Shenton 1996). While it is true that India does copy the Western curricula to some extent, it appears that this is done not as a kowtow to the colonial/imperial power, but rather an attempt to beat the West at its own game. Indian universities keep the content they like and jettison those parts (such as Social Science modules) that they deem unimportant. This is all underpinned by a philosophy of aspiration that seriously anticipates India’s ascension to the rank of the most powerful nations.

Of all Development theorists, it is Escobar (1995), whose findings are corroborated by this research. Escobar called for a rejection of the discourse of Development, and these findings suggest that those involved with higher ICT education in India have done exactly that. Yet, Escobar still called for grassroots activities to reduce social inequalities. These findings suggest that grassroots initiatives still remain outside the discourse of higher ICT education.

The findings of this study appear to be consistent with many of the ideas from neo-institutional theory, and as will be described in the next section, they also appear remarkably consistent with Angell’s (2000) theory of the new information age.

However, while these two theories seem to fit the findings, various theories of Development do not. Theories of Development do not quite fit with the way higher ICT education is conceptualized in India. The ethos is not one of basic needs, or capability building. It is one of aspiration, opportunism and pragmatism. It can perhaps best be described as “New Barbarianism.”

As summarised by the following diagram, the findings from this study fit well with Neo-Institutional theory and Angell’s (2000) New Barbarian theory, but not various theories of Development, for example, Basic Needs theory, Capability theory or Dependency theory.

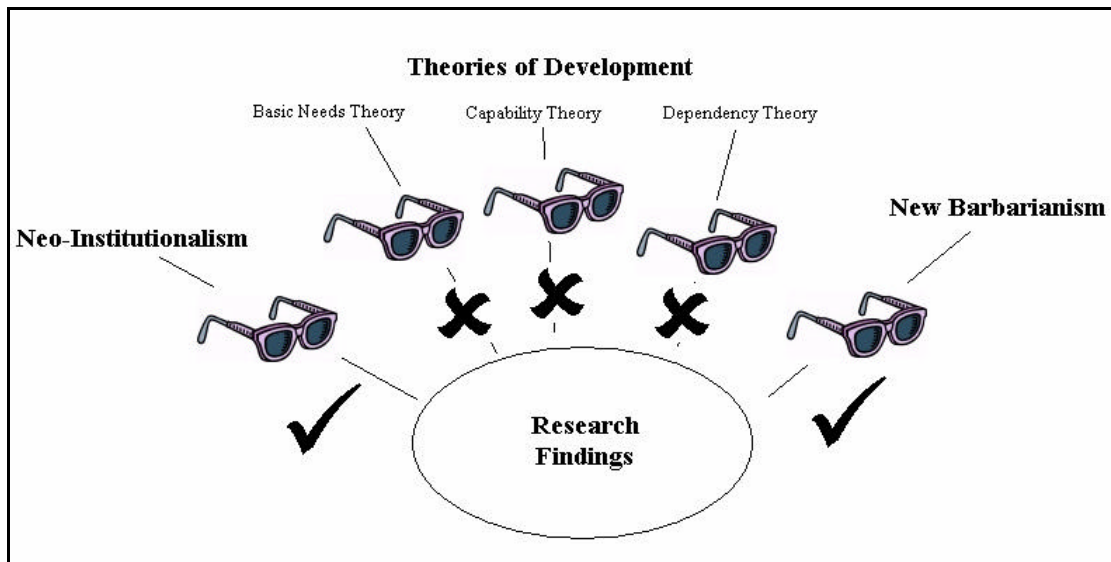


Figure 6.4: Theoretical lenses applied to the research findings.

6.3.2 RISE OF NEW BARBARIANS

The theory of the New Barbarians is remarkably commensurate with the research findings and provides worthwhile ornamentation to the central neo-institutional analysis. As mentioned, Angell’s (2000) theory of the new information age is a world divided into New Barbarians, Old Barbarians and the masses. Old Barbarians are those fighting to return to an imagined golden age through manipulation of the masses. New Barbarians are the elite, they are markedly global and move freely to the spots where they have the greatest advantage. By contrast, it is the rest who foot the

bill, those who are not members of the knowledge economy, whose jobs can easily be automated or outsourced. The theory is without any value judgements, it celebrates the amoral outlook of the New Barbarians.

Angell did not explicitly write his theory as a view on the developing world. However, it is remarkable how well-suited it is to the situation in India, particularly vis-a-vis those involved with ICT-related related higher education. These people are brazen, and unashamed New Barbarians. As was stated earlier, IIT Bombay sits on a lush campus surrounded by concrete fence topped with barbed wire. Inside, the faculty and students are generating world class knowledge and graduates at cut-throat prices, while outside are some of Bombay's most notorious slums. The indifference of the academy to those on the outside is remarkable.

Popular Indian literature is useful in demonstrating the prevalence of New Barbarianism in Indian society. In a system that has a rich history of rigid hierarchy, old habits die hard. As Varma (2004) wrote, it is expected that one would be "dismissive or contemptuous of those accepted as 'inferior'." The difference now is that IT has become an indicator of status, where those inside the gate are not only the New Barbarians, but the New Brahmins. It would not be true to suggest that there is a harsh new caste system in place, but those at the bottom are treated with remarkable apathy. The indifference of the middle classes to India's poor is well-documented.

This complete self-absorption [of Indians] is truly in evidence in their amazing tolerance of inequality, filth and human suffering. They are a pragmatic people, naturally amoral in their outlook (Varma 2004).

The lack of government welfare means that communities support each other but:

very few Indians have a broader sense of community than that circumscribed by ties of blood, caste affiliation, or village. (Tharoor 2000).

The indifference to the poor is also tolerated in a corrupt system (Varma 2004) that may afford advantages to the rich, crafty and wily (read new barbarians) but is detrimental for the poor who have no way to benefit from the black market bureaucracy but must nevertheless pay for it (Tharoor 2000).

The self-centeredness of the Indian rising class echoes the individualism of Angell's new barbarians. Similarly, India clearly has ambition and drive although this is denigrated in some circles. As Vinay Lal wrote, referring to the nuclear tests of 1998,

This macabre display of enlightened hyper-masculinity is only as grotesque as the pretensions of a nation-state that, while it has been grossly negligent in feeding, clothing, and educating its people, it nevertheless aspires to be taken seriously as a great power (Lal 2003).

Likewise they show remarkable proficiency at circumventing the formal system.

There is no notion of ultimate sin in Hinduism. Any action is justified in certain contexts, and gods are routinely bribed. Corruption has grown endemically because it is not really considered wrong, so long as it yields the desired result. If discovered, it provokes great moral outrage, in inverse proportion to the degree to which it is accepted. The concept of morality, and of high-minded principle, is dear to Indians as a theoretical construct, but largely ignored in real life as impractical (Varma 2004).

This attitude to power is evidenced not only by modern Indian society, but also through ancient Indian texts. Varma (Ibid.) builds an impressive case that this sensitivity to power is endemic to modern India and deeply rooted in traditions.

India's most well-known treatise on statecraft, the *Arthashastra*, written by Kautilya almost two thousand years ago, wastes little time on the moral underpinnings of power. On the contrary, it advocates a compellingly unsentimental recipe on how to seize power through means fair or foul. Power can be acquired or enhanced, Kautilya argues, by four principal methods of *upayas*. These are: *sama* (conciliation by negotiation), *dama* (gift or blandishment), *bheda* (sowing dissension in the enemy's camp), and *danda* (punishment or use of superior force). Of other expedients, especially useful is *asana* (sitting on the fence). Kautilya's essential thesis, which he states with clinical detachment, is that expediency is far more important than conventional morality in conducting affairs of the state (Varma 2004).

Angell (2000) might agree that Kautilya (1992) seems well-certified as a New Barbarian. This attitude is not solely found in Machiavellian texts on statecraft, but in religious liturgy as well. As Varma (2004) states plainly, "Hindu gods are benevolent, infinitely forgiving, easily mollified, and eminently bribable."

The essential point is that Hindu tradition has always allowed for a conveniently fractured response to the moral imperative. There are no uncontested definitions of right and wrong. The only concern is the end result. In the pursuit of the desired goal, morality is not so much disowned as it is pragmatically devalued... The consequence is a down-to-earth relativism, a flexibility of approach, a willingness to prune absolutisms in the interests of a larger purpose. Success, visible in terms of status, power and money, matters. It subsumes moral niceties (Varma 2004).

Given India's diverse population, many try to classify it into groups, based on language, caste, religion, etc. Economically, India gets broken down into 2 classes – below the poverty line and above (Interview 19), three classes – lower, middle, upper (Interview 13), or even 7 classes with further granularity (Tharoor 2000). However, when looking at the findings from this study, one finds the classification into New Barbarians and the rest particularly appropriate.

At graduation ceremonies at IIT Chennai, grandparents and parents are sometimes moved to tears because their children have graduated not just with a degree, but into the rarefied world of global industry and New Barbarianism. Sometimes this creates incredible cleavages within Indian societies, where students cannot communicate what it is they study, and live an existence far removed from that of the older generations (Interview 23). However, it is more common that New Barbarianism perpetuates itself. As mentioned earlier, the Joint Entrance Exams for the IITs strongly favours urban male students from rich backgrounds, thus making the distinction between New Barbarians and the masses more pronounced.

The mobility and cosmopolitanism of India's academics is worth noting and reinforces these distinctions. India is a poor country, yet academics frequently make short trips to conferences around the world in amazingly distant places such as Seattle or Sao Paulo. Many have worked in industry in the West for several years and supplement their income with lucrative consultancy practices. They fit the definition of the New Barbarians, and this attitude is clearly evident in the ethos of various Computer Science and Technology Management departments, and in the discourse on curriculum development.

One might have contempt for the neglect of India's poor, particularly by the technically literate sector. However, it should be acknowledged that the New Barbarian attitude has in part encouraged an entrepreneurial class that is world-renowned. Similarly, the "flexible" bureaucracy seems to encourage a certain resourcefulness or adaptability that is necessary in the modern age, and is particularly well suited to the Indian personality. Referring to the major economic liberalization that took place in 1991, Varma (2004) wrote:

Given the number of poor in India, state policy *ought* to have retained its bias for the poor... But such as *ought* ran squarely against the Indian *is*, the proclivity to pursue personal well-being with little thought of any other social priority. The options, in terms of policy formulation, were thus very narrow. Socialism, or even a widely spread out welfare state, was doomed to failure. And only that kind of capitalism could succeed that was socially insensitive. An active concern for the deprived and the suffering is not a prominent feature of the Indian personality (Varma 2004).

Some might lament the neglect of the worse-off. However, in the Nietzschean sense, this is *Beyond Good and Evil* (Nietzsche 1990). In fact it could be an advantage. The theory of the New Barbarians stresses that during times of uncertainty, it is the New Barbarians – free to experiment on margins, unconstrained by ritualised myth – who will prosper. In times of uncertainty, every country is a developing country. Those countries that are referred to as "developed" are simply yesterday's winners. However, past success does not presage an unbeatable future.

New Barbarians are not constrained by the morality of yesterday's winners – they see that morality as merely the prejudices of yesterday's powerful, being used to excess as that group's power drifts slowly into decline. "Values and their changes are related to increases in the power of those positing the value" (Nietzsche 1968). To the New Barbarian there is no true and false, no good and evil, no morality except as social construction and ritualized delusion. "There are no moral phenomena at all, only a moral interpretation of phenomena" (Nietzsche 1990). New Barbarians, on the other hand, do not overlook the fact that "the victory of the moral ideal is achieved by the same 'immoral' means as every other victory: force, lies, slander, injustice" (Nietzsche 1968).

“New Barbarians” is an appropriate characterization of the rising class in India that drives the growth of ICT, including academics developing curricula at India’s elite technical institutions and industrialists with their eyes firmly on the west. However, an important mention must be made of the threat from the Old Barbarians. Threats to the New Barbarianism are emerging from several directions. Some evidence suggests that the mass of the population may be beginning to doubt the promises of technology and the Information Age. This doubt creates an opportunity for Old Barbarians collectivists, to re-organize and gain followers in their quest to return to an idealized past. In the 2004 Lok Sabha elections, the UPA coalition led by the Congress Party promised a redistribution of wealth from New Barbarians to the masses. The UPA won the election and have enacted a policy pledging at least one hundred days of employment per year for at least “one able-bodied person in every rural, urban poor and lower-middle class household” (PMO India 2005). Hence the discourse of Development still has teeth within India from those who call for collectivism and for India to withdraw from the global economy (Rajgopal 2002). These internal threats are compounded by others from abroad. Legislators in America are increasingly concerned with the “outsourcing of jobs” (Economist 2004a). Furthermore, India is facing competitive challenges from New Barbarians in China and other hotspots around the globe (McKeough 2004).

It must be observed, that not all individuals working in the IT sector in India can be classified as New Barbarians. Some might long for a return to an idealised past (Old Barbarians); others might be too timid or too risk adverse to question assumptions in the manner of the New Barbarians. In fact, “hierarchical structuring is so ingrained in India that it is often easier to work in a superior subordinate role than as equals on contractual terms (Sinha 1988)” (quoted from Nicholson and Sahay 2001). There is evidence that this deferential or submissive attitude is prevalent among Indian programmers, particularly when interacting with Western managers (Nicholson and Sahay 2001, 2004). However, this may be because they perceive it as the safest course of action in a competitive and unstable supplier-customer relationship (Nicholson and Sahay 2001). Some evidence exists that the behaviour would be different in the more familiar Indian context:

Our programmers' behaviour changes when they come to Britain, they tend to be submissive even if they are authoritarian at home. ('Eron' Project Manager quoted in Nicholson and Sahay 2001)

To be sure, there are many attitudes and values within India and Indian IT workers. However, the dominant discourse of this burgeoning sub-class may be appropriately characterised as a "New Barbarian" discourse. By continuing the argument to its logical conclusion, it suggests that those individuals involved directly or indirectly with the IT sector in India are well-placed to carry the torch of the Information Age, not because they are smarter or because they charge less, but because they are free thinkers in the Nietzschean sense. However, since this study is primarily concerned with the development of curricula, these conclusions can be made only tentatively. The future of the Information Age is beyond the scope of this project and therefore sits as a topic for future research.

What is certainly true is that findings from this study are rejection of the discourse of Development; a significant result given that the ICT for Development debate was a major departure point for this project. Rather than Development, it seems that the discourse of the New Barbarian is most appropriate to characterize these findings.

Yet, the use of New Barbarianism is ornamentation to the central analysis, based on neo-institutional theory. So it is worth returning to the neo-institutional analysis now that the New Barbarian argument has been made. Zucker (1988b) has proposed a theory on the maintenance of institutional patterns. It was first presented as figure 3.5, and is reprinted below for convenience. The influences at the top of the diagram tend to increase the stability of a system, which in turn strengthens the institutionalization and increases the overall coherence. The forces at the bottom tend reduce the stability and coherence of the system and cause the weakening of institutions.

It is interesting to theorize the case of Higher ICT education in India using Zucker's model particularly in the context of the looming battle between Old and New Barbarians (Angell 2000). The findings from this study suggest that in contemporary India, the forces of stability and coherence are stronger than the forces of decay and

volatility. For example, the contagion of legitimacy and the impersonal character of outside world characterize much of the New Barbarian attitude found at universities in India. There was no evidence of institutional decay. Instead, the institutions were found to be getting stronger as a result of mutually reinforcing feedback loops. Nevertheless, Old Barbarians have the potential to create macro/micro incongruity by pitting the interests of the peasants against the interests of a “rising” class.

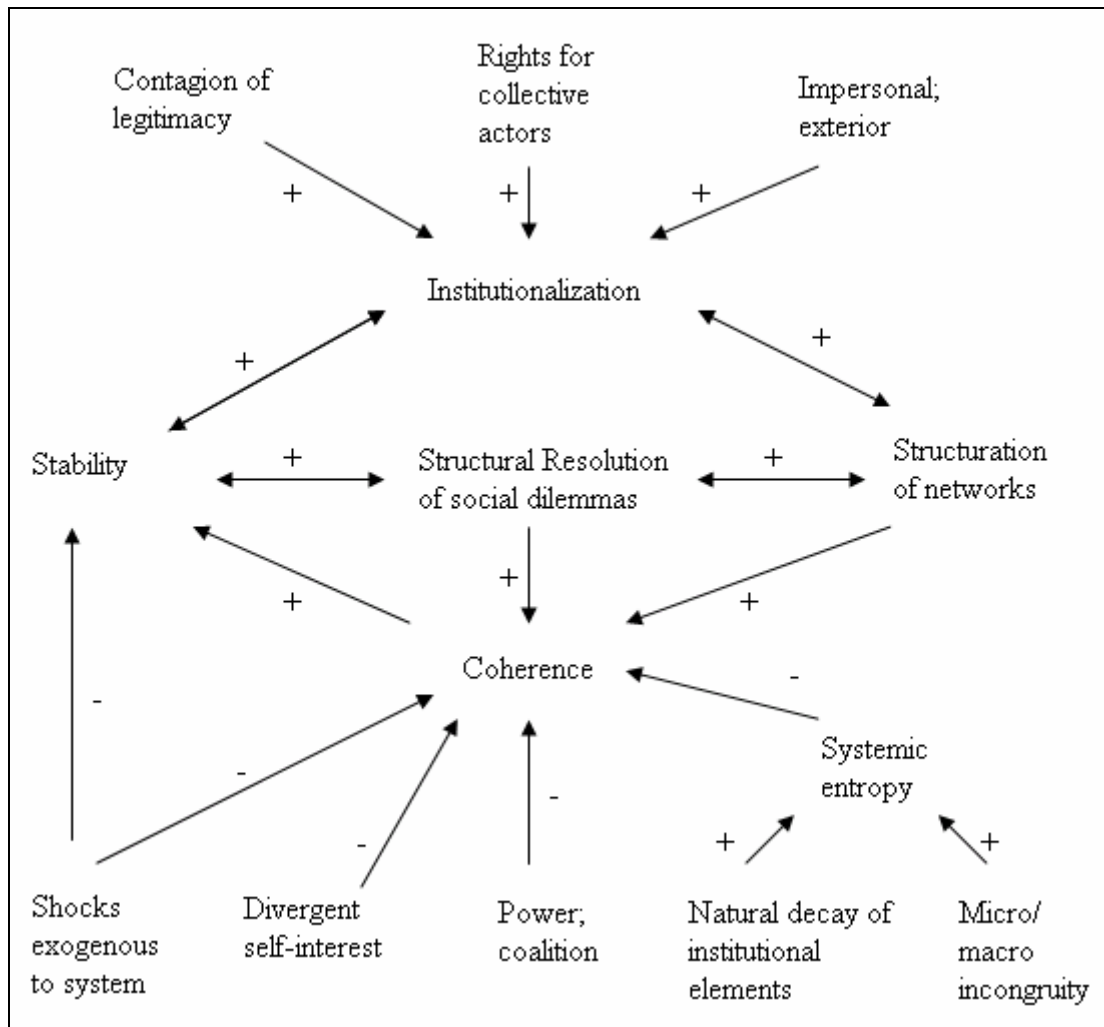


Figure 6.5: Origin and Maintenance of Institutional Patterns
 Source: (Zucker 1988b) (Figure 3.5 reprinted for convenience)

While the applicability of Zucker’s theory to the situation in India might be limited, Swanson and Ramiller’s (1997) theory of an organizing vision has remarkable relevance to this study.

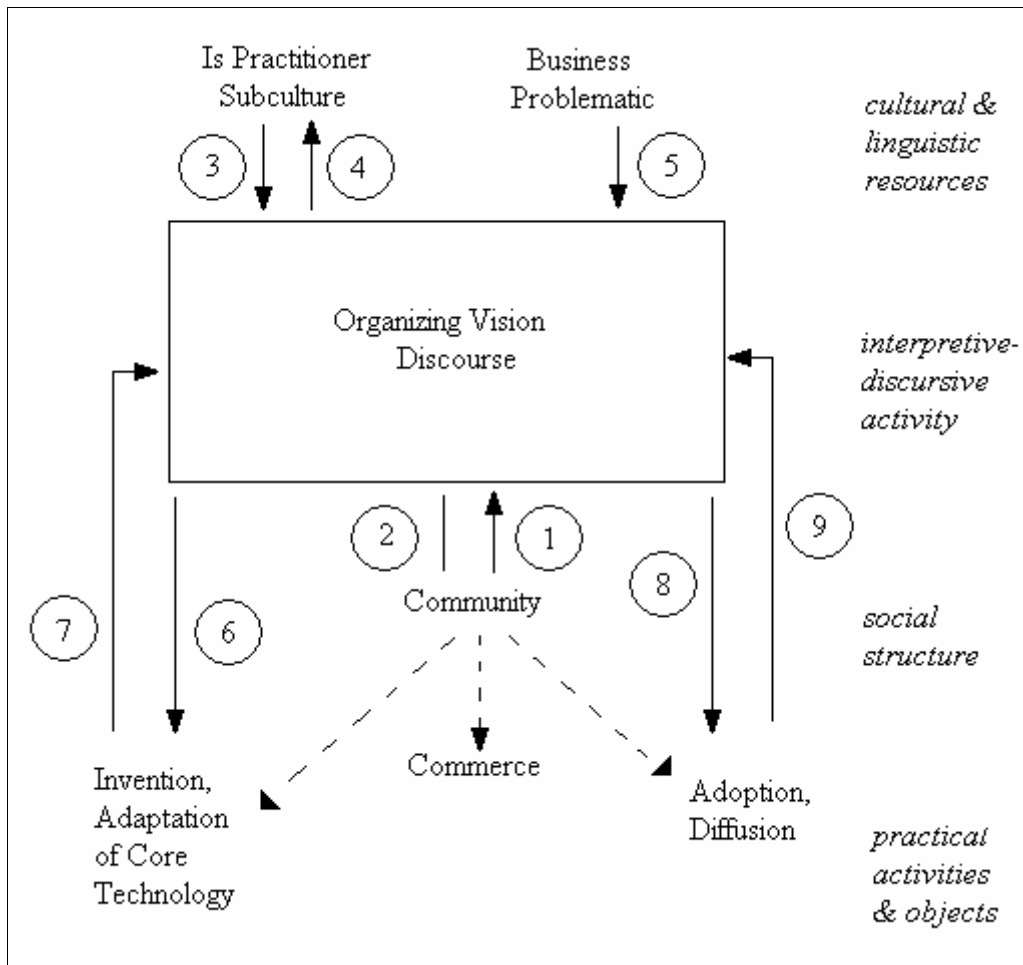


Figure 6.6: Organizing Vision in Information Systems Innovation
 Source: (Swanson and Ramiller 1997) (Figure 3.6 reprinted for convenience)

As discussed in chapter 3, an organizing vision is an overall narrative that facilitates the interpretation, legitimation and mobilization of resources for a successful innovation. An organizing vision is the discourse that shapes how the innovation can be used, how it is to be discussed and therefore perceived. Swanson and Ramiller wrote their theory in relation to *IS innovation*. However, it is clearly relevant in a much wider context. The discourse surrounding ICT is very closely related to the idea of ICT, the main subject of this study. Swanson and Ramiller argued that the discourse of an ICT innovation is shaped by a combination of social, economic, political and technological factors. Likewise, this study revealed that the idea of ICT is shaped by a similarly broad range of factors. This study reveals that Swanson’s and Ramiller’s notion of an organizing vision applies on a macro level as well.

The notion of an organizing vision is an appropriate conceptualization for the discourse surrounding technology and the idea of ICT. In that sense, this study extends the notion of an organizing vision and makes a contribution to theory in this regard. An organizing vision is not only required for a successful IS innovation. It is also required to create a coherence of purpose for the New Barbarian class to reshape the playing field in the information age.

The case of India indicates that an organizing vision for the New Barbarian class could be theorised as follows:

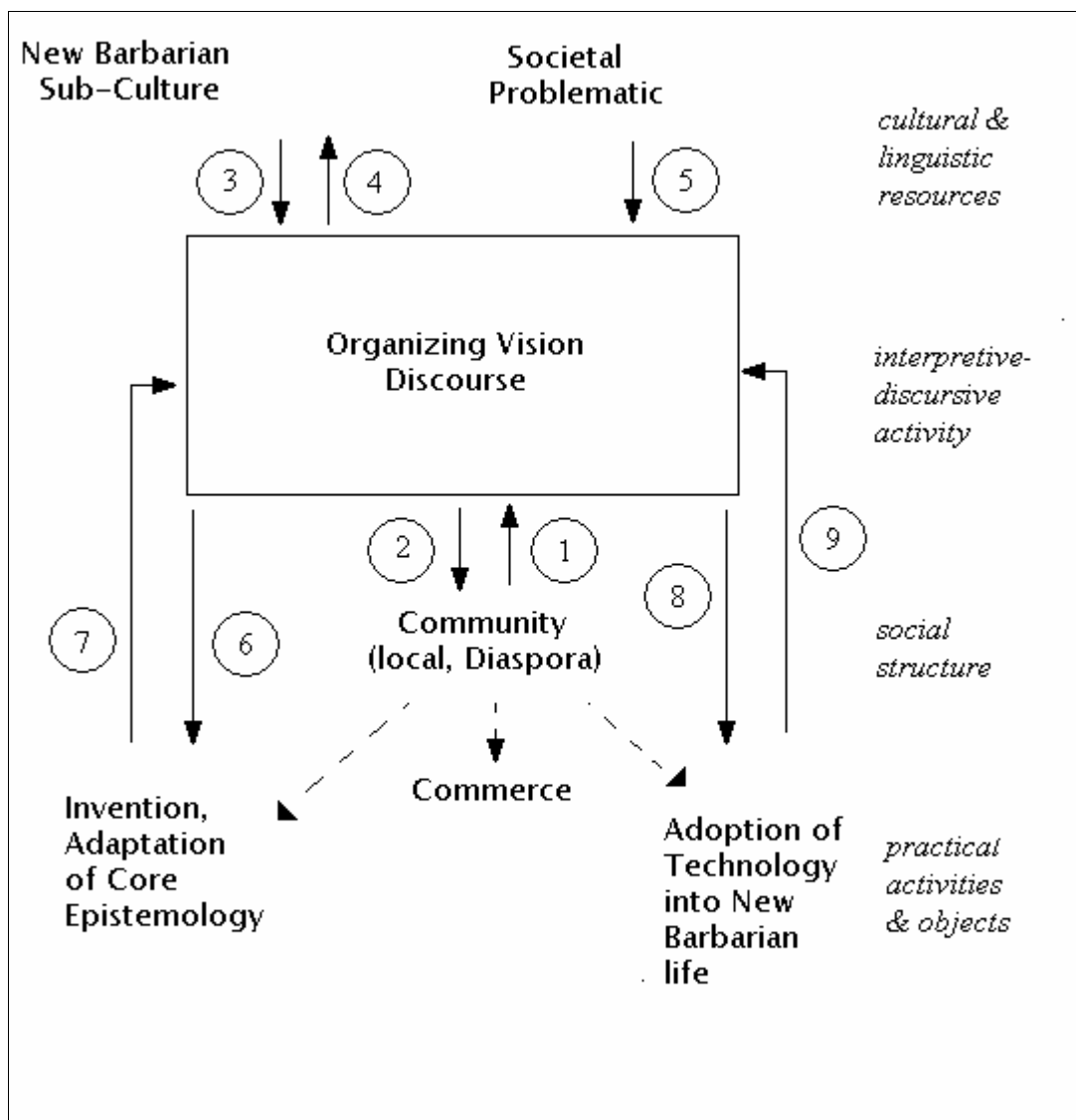


Figure 6.7: New Barbarian Organizing Vision of the Idea of ICT
Adapted From: (Swanson and Ramiller 1997)

The community – which comprises of not only the local community, but also the international diaspora – initiate the discourse (arrow 1) with their own notions of culture, gender and family relations and their layered and diversely interpreted history. This discourse then impacts the community through a reflexive (arrow 2) and structurational process (see Swanson and Ramiller 1997). The discourse is then influenced by the dynamic, risk-taking class, what Angell conceptualized as the New Barbarians (Angell 2000). The New Barbarian class infuse the discourse (arrow 3) with aspects of their subculture, the quest for power, attitudes towards wealth and desire for international recognition, to name a few. Similarly, the discourse on the idea of ICT influences the New Barbarians (arrow 4). The discourse is then further influenced by the societal problematic (arrow 5), which could be “Development” but in the Indian case, seems to be conceptualized more as ascension or wealth creation. Finally, the discourse continuously interacts with the evolving epistemology (arrows 6 and 7) and the applications of the idea of technology – such the introduction of outsourcing enterprises – into the New Barbarian life (arrows 8 and 9).

While this conceptualization needs to be tested further, Swanson and Ramiller’s work – which shows how an organizing vision is required for a successful IS innovation – has remarkable applicability here. For a New Barbarian class to form, an organizing vision is also required in order to give the movement a coherence of purpose, a means of interpretation, a source of legitimacy and the power to mobilize resources. This enhancement to the notion of an organizing vision is one of the main contributions of this study.

6.3.3 SUMMARY ARGUMENTS

To conclude, the three main arguments derived from this analysis are:

1. Neo-Institutionalism is an appropriate lens with which to interpret the findings from this study, and the notion of an organizing vision characterises the coherence of purpose found in India.
2. The findings are a rejection of Development and suggest a new interpretation based on the theory of the New Barbarians.
3. Indian and Western institutions are collaborating. They are mutually reinforcing and generate a powerful feedback loop.

It is instructive to note how useful Neo-institutionalism and its main concepts are in describing these findings. The ideas of the “legitimacy imperative” and “institutional isomorphism” characterise much of these findings. However, the general character of neo-institutional propositions makes it difficult to perform a contextual analysis based on local factors. To accomplish this task, other theories need to be employed. Moreover, one of the main weaknesses of neo-institutional theory is that it is a theory of inertia and fails to account for change. This weakness was manifested in this research project as neo-institutionalism failed to describe some of the fundamental differences between Indian and Western curricula, notably the differing attitudes towards the social sciences. However, the strengths of the theory are considerable. The vocabulary was useful in describing the findings and the framework of Hasselbladh and Kallinikos (2000) provided a useful categorisation for the institutional forces (see figure 6.3). Neo-institutional thinking pervaded this analysis and the theory forces one to seek out taken-for-granted assumptions. It was this type of thinking which resulted in the analysis summarised here.

The rejection of Development and the validation of the theory of the New Barbarians is the argument that makes the first claim towards a theoretical contribution. Much research is being done towards answering the question: “How can ICT help developing countries?” The attempt to answer such a question always centres on

“Development” as the “organizing myth of our epoch” (Aseniero 1985), leading researchers inevitably to prescribe solutions in an Orientalist vein. New Barbarianism gives an entirely different answer. It suggests that ICT can help developing countries by creating a climate of uncertainty in which old ways of thinking will no longer suffice. Those in developing countries, on the periphery, not constrained by the dogmatic principles that have led to yesterday’s winners, are in the best position to develop the new ways of thinking required in the new age. Thus, New Barbarianism leads to a radical answer to the question of how IT can help developing countries, and makes a real contribution to the theory of “IT for Development.”

Finally, the central argument of this thesis is that of institutional collaboration. This argument, which builds through section 6.2, answers the research question: “how do institutional forces influence the ICT-related curriculum discourse at Indian universities?” The argument can be briefly summarized as follows. The assumptions at the foundation of university curricula stem from traditional Indian epistemology, which give primacy to pure and positivistic knowledge. This preference affords more legitimacy to technical programmes over the social sciences. Links with the West are established and strengthened because of the large diaspora, the use of English, secularism, sensitivity to hierarchy and status, and a healthy attitude to enterprise and entrepreneurial activity.

As IT professionals become successful at home and abroad, the mutually reinforcing feedback loop is closed. Western standards and forms of knowledge gain even more legitimacy. Academics and graduates who work in the Western-led global economy make the bonds even stronger. These bonds, together with a respect for wealth and a poor population that wants to get rich, welcome Industry into universities and strengthen the instrumentalist orientation of Indian higher education

The visible and much-heralded success of those caught up this feedback loop (the New Barbarians) further legitimates the system and in particular the epistemology. The primacy of technical, positivistic knowledge is strengthened and strengthened again by gender imbalances.

Thus, Indian and Western institutions have collaborated – successfully. The institutional field is at the moment, so stable and coherent, that it can reasonably be theorized as an organizing vision. These institutional forces are mutually re-enforcing, yet they have unwittingly conspired to create a decidedly rigid institutional field where assumptions go unquestioned and feedback loops are particularly difficult to break. The result is hyper-modern ICT curricula that are far more technical and rationalistic than the Western curricula on which they are based.

7 DISCUSSIONS AND CONCLUSIONS

Chapter Abstract

This chapter outlines the contributions made by this dissertation; practical, theoretical and methodological. It also discusses the limitations of this study in terms of generalisability and arising from theory and methodology choice. The findings are wide ranging and have the potential to contribute to several ongoing debates. Finally, this chapter will outline some future directions, both in terms of testing the findings presented here and extending the theories developed in the analysis.

Chapter Contents

7.1	CONTRIBUTIONS.....	ERROR! BOOKMARK NOT DEFINED.
7.1.1	Practical Contributions	Error! Bookmark not defined.
7.1.2	Contributions to Theory.....	Error! Bookmark not defined.
7.1.3	Methodological Contributions	Error! Bookmark not defined.
7.2	LIMITATIONS AND REFLECTIONS.....	ERROR! BOOKMARK NOT DEFINED.
7.2.1	Issues of Generalisability	Error! Bookmark not defined.
7.2.2	Limitations Due to Theory and Methodology	Error! Bookmark not defined.
7.2.3	Reflections of the Author as a Researcher.....	Error! Bookmark not defined.
7.3	SUGGESTIONS FOR FUTURE RESEARCH.....	ERROR! BOOKMARK NOT DEFINED.
7.3.1	Testing the Findings	Error! Bookmark not defined.
7.3.2	Exploring Various Issues Raised in the Dissertation	Error! Bookmark not defined.
7.3.3	Indian Ascent and the Information Age.....	Error! Bookmark not defined.

The arguments developed in this dissertation centre around the notions of institutional collaboration and “New Barbarianism” and how they interact in contemporary Indian society. These arguments have interesting implications, both for theory and practice. The following chapter outlines the major contributions of this thesis and is followed by a discussion of limitations, reflections and suggestions for future research.

7.1 CONTRIBUTIONS

The contributions of this study are many and particularly timely. As discussed in chapter 2, much has been written about the impact of ICT in developing countries. However, the thinking has been based on old notions of Development. The industrial revolution demonstrated that the introduction of new technology opens the door for new means of interpretation (Mitch 1999). The contributions of this research arise because it is an exploration of the idea of ICTs as it has emerged outside of its birthplace. India is not where Information Technology was incubated, however Indians have leveraged ICTs in ways that have generated much interest (Economist 2004b, 2005a). Many developing countries look towards India as the exemplar of how they can “develop” through ICTs (Bhatnagar 2000). Thus, a study of the idea of ICTs in this torch-bearing country is particularly generative and timely.

7.1.1 PRACTICAL CONTRIBUTIONS

To begin, this dissertation makes practical contributions for three main groups. First, for those who seek to understand the relationship between ICT and Development. As described in chapter 2, education is given an exalted position in the ICT for Development literature but the issues are never fully explored. Robin Mansell (2002) has stressed the...

need for citizens to acquire new capabilities for assessing the value, veracity and reliability of information if they are to participate effectively with the fabric of a global society (Mansell 2002).

However, the issues and obstacles in acquiring these capabilities are never fully discussed. Other prominent writers in the field such as Castells (1996, 1999, 2001), Heeks (2002), Avgerou (2002) and Sen (1997a) discuss education in the same way. The importance is almost taken-for-granted, but the issues are never fully addressed. This is not a criticism of those authors who have made a significant contribution to the field of ICT and Development. Rather it is an observation that in much of the literature, education is given great importance, but is treated superficially, almost “in passing”.

This thesis demonstrates that treating education “in passing” is problematic. The idea of ICTs is influenced heavily by the curriculum at schools and universities. An understanding of this process, and the institutional forces involved, has a real potential to inform our understanding of how ICTs can impact developing countries. Thus, the first contribution of this study is towards our understanding in this regard. In the particular case of India, higher education creates an organizing vision of ICTs that is heavily based on the agendas of the New Barbarians. Any prescriptions for the implementation of ICTs in India that do not take into account this organizing vision are disingenuous. Moreover, it is reasonable to assume that education plays a similar role in influencing an organizing vision in other contexts. Education has a central influence on the idea of ICTs and therefore it must be examined and re-examined in order to gain a better understanding of how ICTs can impact developing countries.

The empirical findings indicate that technology-related higher education in India is clearly focused on the West and the American-led global economy. Social sciences are denigrated in favour of technical epistemology and the instrumental education is preferred over liberal education. This is true even at the elite universities where industry is enthusiastically encouraged to influence curricula. This makes a practical contribution for those who wish to implement ICTs in India, particularly with Developmental goals in mind. There is much good work being done in India to help the very poor (see Lancaster 2003), but it runs against the current mood and way of thinking about ICTs, perpetuated at India’s universities. Projects to help the poor happen despite higher education, not because of it.

Secondly, this thesis makes a contribution for those engaged in the business of IT in India. Much has been written about the success of the Indian software industry and the degree to which technical work is being outsourced from the West to India (Economist 2004b). In the academic literature, there is sophisticated work being carried out on the political and cultural issues surrounding offshoring activities (Heeks *et al.* 2001, Nicholson and Sahay 2001, 2004). The long-term viability of these offshoring arrangements is of interest to many, and the findings from this dissertation suggest that Indian expertise may be narrowly focused, perhaps creating some limits to offshoring in the future. This is not to suggest that India will be limited to cyber-coolie work, there is some evidence that the IT work being done in India is increasing moving up the value-chain. However, it remains technologically-focused.

This study demonstrates that the institutional forces that influence attitudes to technology in India are powerful, multi-faceted and mutually-reinforcing. These forces include: traditional Indian epistemology, family relations, and the influence of the diaspora as well as aspects of Indian culture. Some government documents suggest that it is a priority to develop a more diverse economy (PMO India 2005). However, the current emphasis on technology is well-entrenched in the education system. The process of institutional collaboration outlined in the previous chapter describes institutional forces that are so aligned, it would take tremendous time and effort to dissolve them. In that sense, India will likely remain technology-focused for at least the foreseeable future. If one believes that Information Systems are social systems, then one might surmise that the future applications of technology, the ones with the greatest impact on humanity will not be *solely* technical. The findings of this study suggest that India is not well-placed to develop these *socio*-technical applications. The marked emphasis on technology in India is underpinned by powerful institutional forces that are multi-faceted and mutually-reinforcing. This indicates that Indian businesses will continue to excel in technology. However, the country may face difficulties in developing innovations that incorporate *both* technological and social aspects.

This leads to the third practical contribution related to the future of India. It must be acknowledged at this point that this study is narrowly focused on curricula at ICT-related universities. Thus, a broad discussion of India's future is beyond the scope of this study. However, the popular press, as well as industry publications, are littered with articles discussing the rise of India and China (A.T. Kearney 2004a, Economist 2005a, Goldman Sachs 2005, Morgan Stanley 2004). In consideration of this broader discussion, it is worthwhile to ask whether this study can make a tentative contribution.

It is argued here that Indian elites have adopted a morality that is profoundly different from Western morality; in fact, referring to their philosophy as a morality is disingenuous. It is more correct to say the Indian elites are amoral in the Nietzschean (Nietzsche 1990) sense. They are hard-working, opportunistic and very pragmatic. It is this new way of thinking that may give India an edge. Their determination and ruthlessness, combined with world-class technical knowledge, suggests that the many predictions for the rise of India are very plausible. However, there are two weaknesses that are very relevant. One is the focus on technology that was addressed in the previous section. This could ultimately prove to be a weakness if human developments progress in other disciplines. Similarly, Indian students may be poorly equipped to discover interdisciplinary innovation. The second weakness is more pertinent.

The Indian New Barbarians are successful partially because of their self-centred outlook. As demonstrated in the previous chapter, many Indian authors have shown that while Indians are loyal to their tribes and families, they do not show the same consideration for the masses (Lal 2003, Tharoor 2000, Varma 2004). The evidence from this study indicates that the Indian elites have a promising future. However, the benefits are likely to remain in the New Barbarian class and not reach the poor (see D'Costa 2003). The excellent work done to improve the condition of the worse-off in India is commendable; however, it runs against the philosophy of the elites. As argued previously, any effort to use ICTs to help the poor occurs *despite* higher education, not because of it.

This raises some difficult questions – namely how will the needs of the ever-growing masses be resolved when they are in conflict with the aspirations of the elite. Old Barbarians are those who try to exhort the masses to resist the amorality of the rising elite and return to an idealized past. They often invoke tradition and religion, and in many cases are yesterday's New Barbarians (Angell 2000). This battle is being played out today in India. Religious fundamentalism is on rise and animosity towards the rich is also prevalent.

However, despite the stirrings from the Old Barbarians, the findings from this study suggest that the New Barbarians are also significant. This study reveals that there is a discernible philosophy of aspiration in India of which ICT is at the centre. India is gripped by a tremendous optimism of which the rising elite are the torch-bearers. The success of the diaspora is contributing to this self-belief, not only because their success is visible in India, but because they contribute with money and ideas into ventures back home. The film and television industries are increasingly promoting a reach-for-the-top culture in India.

The future of India can be expressed as a battle between New and Old Barbarians: World-class, amoral pragmatists who compete with the best and win; against moralists who try to exhort the masses to return to an idealized past. The findings from the study suggest that in the near-term, the New Barbarians better represent the mood in India. However, their long-term success depends in part on their ability to manage dissent within the masses and the contradictory influence of the Old Barbarians. It is possible that with economic growth, and a related increase in societal improvements realized through Indian democracy, the masses will also reap the benefits of Indian ascension. It is beyond the scope of this project to make such definitive predictions about the future, however this study can make a contribution to the way the discussion is framed on the future of India. The findings of this study suggest that predictions of India's ascent are very plausible; however, it is likely that inequalities could widen and that the poor will remain poor. A battle looms that can best be theorised as a clash between Old and New Barbarians. The long-term future of

India will depend on the ability of the rising classes to respond effectively to the demands of the masses and the moral exhortations of the Old Barbarians.

To re-iterate, these claims are only loosely related to the core research question of this project however, they are worth making, if only tentatively, given the broader discussion on Indian ascension. To return to matters more directly related to the core of this project, an assessment of the contributions to theory follows.

7.1.2 CONTRIBUTIONS TO THEORY

One of the main goals of this dissertation is to propose a theoretical framework that is commensurate with empirical reality, as determined through the research methods outlined in chapter 4. Since this is an interpretive study, it does not claim that there is a *right* way to conceptualize the field of study. Rather, one theoretical interpretation is proposed and the justified based on empirical findings.

The initial theoretical stance was based on neo-institutionalism. This theory was chosen because of its usefulness in the field of education (Meyer *et al.* 1979, Meyer and Rowan 1992). However, after considering the empirical findings, it was found that neo-institutionalism alone only provides a limited understanding. A more appropriate theoretical framework is constructed by incorporating theories of Development and Angell's (2000) theory of the New Barbarians. Thus, this dissertation attempts to make a contribution to these three theories. Naturally, the data gathered here is very sensitive to context; it was gathered from a specific time and place and it is acknowledged that data gather from a different setting might make a different contribution. Nevertheless, the data and subsequent analysis bring out some interesting points regarding the three aforementioned theories.

It was found that neo-institutionalism provided an excellent starting point and useful vocabulary for interpreting higher ICT education in India. In particular, papers by certain authors such as DiMaggio and Powell (1991b) and Hasselbladh and Kallinikos (2000) outlined useful propositions and frameworks with which to interpret the

empirical findings. However, many authors have argued that neo-institutionalism has considerable weaknesses and this study indicates that those weaknesses are very real. It has often been said that neo-institutionalism is a theory of stability and does not account for the significant amount of change that we observe (Diermeier and Krehbiel 2004, Zucker 1988a). Indeed, in the Indian context, there are aspects of the higher education that cannot be explained solely through neo-institutional concepts. The focus on technology is due in part because of a quest for legitimacy but also because of material concerns and well as other factors. As demonstrated in chapter 5, Indian universities claim that their curricula are modelled on that of MIT, but in fact, the curricula are quite different because of unique aspects of the Indian context.

Thus, a minor contribution of this dissertation is to observe that the already stated weaknesses of neo-institutionalism are real and while the theory reveals many aspects, it hides others. Like all theories, neo-institutionalism is a way of seeing and a way of not seeing (Walsham 1993). However, this dissertation attempts to make a contribution beyond simply confirming what others have said. This study researched the way institutional forces influence higher ICT education. It was found that the curricula:

1. tended to be focused on global issues over local
2. gave primacy to technical disciplines over social science, and
3. strongly favoured instrumental over liberal education.

The interpretation suggested by the theories used is that these curricula are highly influenced by several institutional forces that all seem to be self-reinforcing, they tend to push in the same direction. Indeed, they seem to strengthen each other and confer legitimacy in ways that the institutions on their own could not. This process is summarized in chapter 6 and is referred to as institutional collaboration. The interplay of institutional forces is particularly interesting and worthy of further study. It is very much conceivable that in some situations, institutional forces could be in direct conflict. Perhaps future research will show that Indian higher education is peculiar given its coherence of purpose. Or perhaps future research may show that institutional

collaboration is common and forces frequently converge and influence a field of study in similar ways. A contribution of this study is to raise the importance of the interplay of institutional forces.

The question guiding this research was: “how do institutional forces influence the ICT-related curriculum discourse at Indian universities?” The answer to which is a major contribution of this study and a contribution to neo-institutional theory. The construction of the idea of ICTs at Indian universities is influenced by a process of institutional collaboration. Several distinct forces are impacting education in common ways, creating hyper-modern curricula and a marked emphasis on technology. The *interplay* of institutional forces is significant. A better understanding and framework of analysis for the interplay of forces would likely be generative and ought to be included in neo-institutional theory.

This study proposes one such enhancement. The notion of an organizing vision has been shown to be particularly relevant for IS innovation (Swanson and Ramiller 1997). This study indicates that it might be relevant as well in theorizing the emergence of a broader discourse on the idea of ICT within a particular community. This study was concerned with the rising class – New Barbarians – and the following diagram depicts the organizing vision for the New Barbarian discourse on the idea of ICT. It was first presented as figure 6.7 and is reprinted below for convenience

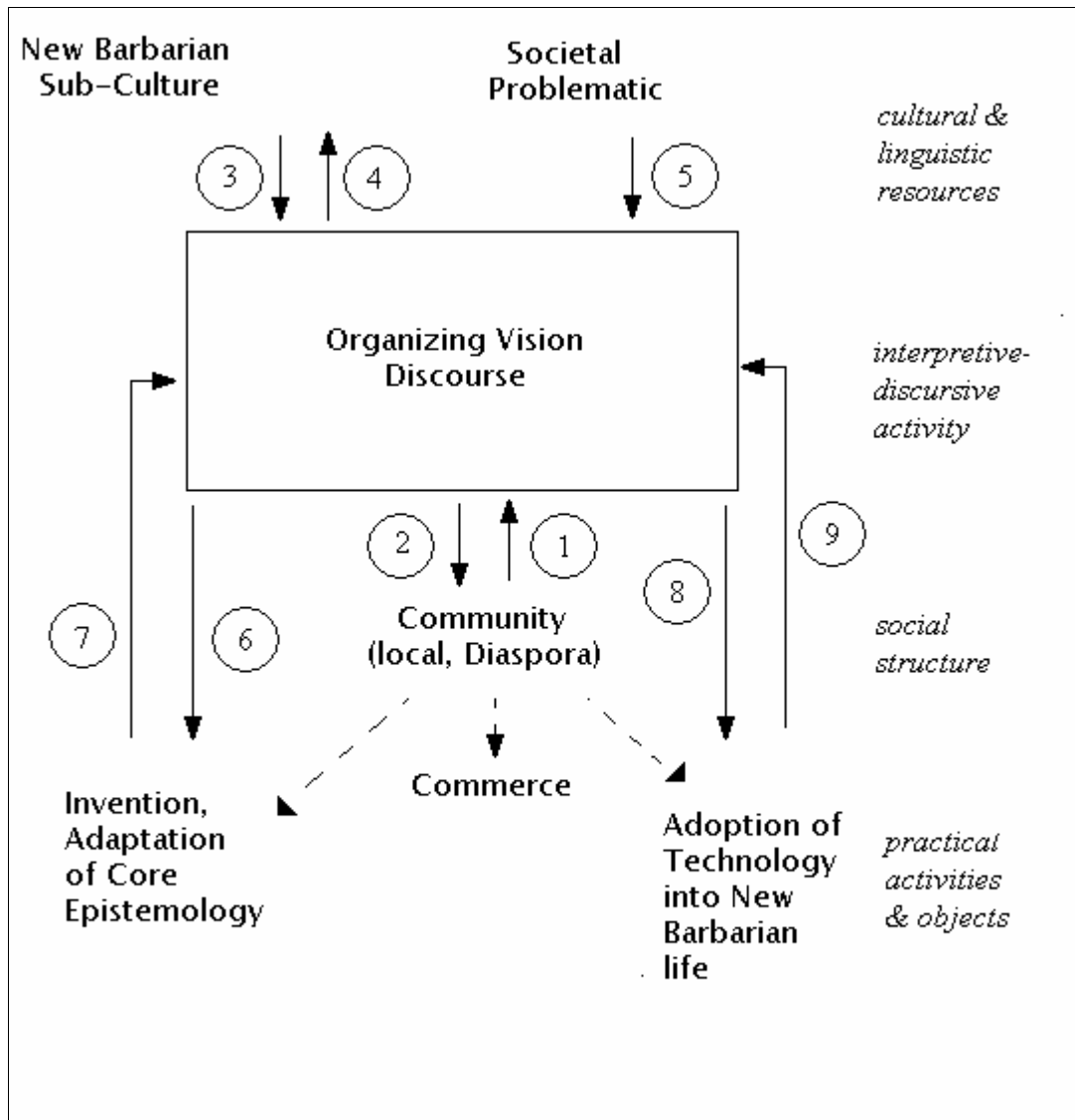


Figure 7.1: New Barbarian Organizing Vision of the Idea of ICT
 (Figure 6.7 reprinted for convenience) Adapted From: (Swanson and Ramiller 1997)

A second contribution to theory arises in relation to theories of Development. As mentioned in chapter 6, the findings of this research project point to a rejection of the Development discourse. The discourse surrounding higher ICT education in India does not in any way characterize the Indian poor as a problematic or accept the colonial/Orientalist undertones of Development (see Cohen and Shenton 1996).

The idea of Development is predicated on certain categories – in particular, that of developing and developed countries. The findings here support Escobar (1995) in rejecting the notions of Development that are not only patronizing and Western-centric but also no longer appropriate. Recent research has shown that Indian firms

are re-outsourcing work to subsidiaries in Canada (A.T. Kearney 2004b). This raises difficult questions, namely “which is the developing country?”

To be sure, some countries are richer than others – and within countries there are inequalities as well. However, the findings from this research suggest that it is disingenuous to conceptualize these differences in terms of the ideas surrounding Development. To do so forces the developing country to adopt Western moralities and modes of thinking. The underlying assumption behind the notions of “developed” and “developing” countries is that if the “developing” countries want to be successful, they must emulate the “developed.” This conceptualisation is explicitly rejected by the discourse of higher education in India.

Certain notions of Development are less Western-centric, such as Sen’s (1997a) conceptualization of Development as Freedom. However, despite the advancement in theory, Development is still inscribed with the notions of particular problematic than can be addressed through expertise (Banuri 1990). Escobar has called for a complete rejection of this line of thinking. What is remarkable is the way that his call has been heeded by the Indian rising class. For better or for worse, they do not conceptualize the poor as a problematic. This is a significant finding and suggests that in the Indian context, new theoretical constructs may be required. Notions of Development may be inappropriate in the contemporary age. India selectively adopts aspects of Western society and rejects the rest. They do not attempt to succeed by emulating Western moralities and modes of thinking. Escobar’s criticisms of Development and calls for new conceptualizations are made real by the New Barbarian class in India.

Finally, as ornamentation to the neo-institutional analysis, the findings give credence to New Barbarianism, a theory that sees the world as harsh and unforgiving where it is the amoral pragmatists that survive (Angell 2000). Global competitive pressures are rising, and it is no longer reasonable to assume that everyone will compete using the same rules of the game. Angell’s categorization into New Barbarians, Old Barbarians and the masses seems particularly appropriate in the information age, especially in light of these findings from India. Technology raises competitive pressures while at

the same time, opens the door to new moralities and organizing visions. The theory of the New Barbarians is a useful way to interpret the battles that will take place under these changing conditions.

To conclude, this thesis makes several contributions to theory. It affirms the relevance of neo-institutionalism to the study of the idea of ICT, and argues for an enhancement in this regard. The notion of an organizing vision was constructed for IS innovation but it can be extended to apply more broadly to the idea of ICT within a particular community. This thesis also makes contributions to Development by suggesting that it does not lend an appropriate categorization to discussions on higher ICT education in India. The theory of the New Barbarians is a more appropriate way to conceptualize the current context and the battles that loom in the future. The final contributions are based on the methodology carried out for this study as described in chapter 4.

7.1.3 METHODOLOGICAL CONTRIBUTIONS

A combination of methods was employed in this study to collect a variety of data on higher ICT education in India. It is true that such an approach opens the door to criticism based on the rigour of the research methodology. However, this approach is well-justified by philosophers of science (Feyerabend 1993), organisational science academics (Weick 1996), and the most respected Information Systems scholars (Ciborra 1996b, 2000). As these authors have suggested, an overly rigorous approach to methodology reduces the relevance of the research (Feyerabend 1993) and impinges on the ability of the research to solve the problem at hand (Weick 1996). These views are corroborated by this study. The analysis, which is varied and draws upon many data sources, could not have been developed with a dogmatic approach to methodology. Such a rigorous approach limits the ability of the researcher to follow the data and identify the real underlying causes/factors/forces influencing the phenomenon of interest.

Nevertheless, the guiding methodological principle of this study was not *anarchy* as Feyerabend (1993) provocatively called for. Rather, significant consideration was

given to methodological questions before the data collection stage, and several decisions were made at this point, such as the decision to study curricula and Indian universities. More specific decisions were also made, but these were inevitably altered, adapted and subjected to improvisation as was necessitated by the exigencies of daily research in India. Thus, it is a minor contribution of this study to affirm the methodological position of Feyerabend (1993) and others (Mingers 2001), however with caveat that a rational methodology is worth striving for even if it is never to be achieved. A further discussion of this point follows in section 7.2.3.

The major methodological contribution of this work comes from the use of curriculum analysis as an overarching methodology. Much has been written about methodology in the broad Information Systems literature (Cukier *et al.* 2004, Fitzgerald *et al.* 1984, Jenkins 1984, Wagner *et al.* 2004). However, while numerous methods are proposed and employed, curriculum analysis is not acknowledged. This is likely because Information Systems research has traditionally been focused on the implementation of technology in organisations (Avgerou 2000). However, as the mandate of IS becomes broader, issues such as attitudes towards technology and the *idea* of technology become increasingly relevant.

In the academic discipline of education, the methodology of curriculum analysis has already achieved considerable legitimacy – to the extent that “curriculum studies” has now become a sub-discipline in its own right (Blades 1997, Goodson 1994). As discussed in chapter 4, curriculum analysis is justifiable because to some extent, it is a reflection of the ideological preoccupations of elites, power relationships within society and epistemological preferences (Goodson 1994, 1998b). While curriculum analysis has earned its position in the field of education, it has yet to do so in Information Systems. As the remit of the Information Systems widens, more research methodologies are necessary. Curriculum analysis can be particularly useful and as this study has shown, can be generative in Information Systems research.

Thus, this study makes several contributions; to practice, theory and methodology. These contributions are summarized in the following table:

Summary of Contributions	
1	The ICT for Development literature often treats education “in passing”. This is problematic. Education has a central influence on the idea of ICTs and therefore it must be examined and re-examined in order to gain a better understanding of how ICTs can impact developing countries. In the Indian context, practitioners should be aware of the general thrust of higher ICT education and how it may enable or constrain their initiatives.
2 **	The three main empirical findings of this study are that: 1. Technology-related higher education in India is clearly focused on the global economy and it is worthwhile to note – the American-led global economy. There is a tremendous reverence for Western – specifically American – standards and forms of knowledge; 2. An exception of this reverence that stands out is that Indian curriculum is overwhelmingly technical, to the detriment of the social sciences which clearly have second-class status; 3. The footprint of industry is quite large, reflected in the attitudes of academics and in the formal curriculum development process. Thus, betraying a particularly instrumental view of higher education.
3 **	The construction of the idea of ICTs at Indian universities is influenced by a process of institutional collaboration. Several distinct forces are impacting education in common ways, creating hyper-modern curricula and a marked emphasis on technology. The <i>interplay</i> of institutional forces is significant and ought to be accounted for in neo-institutional theory. This dissertation proposes one such enhancement, the incorporation of an organizing vision to interpret the interplay of institutional forces and to conceptualize the discourse surrounding the idea of ICTs.
4	Notions of Development come with categorizations that are inappropriate in the context of higher ICT education in India. ICTs are being infused with a discourse that does not conceptualise the poor as a problematic. Successful ICT initiatives designed to help the poor are successful despite higher education, not because of it.
5 **	As ornamentation to the central analysis, it is observed that New Barbarianism may be an appropriate conceptualization of contemporary India and the conflicts that could emerge in the future. The rising elite are opportunistic, amoral and pragmatic. Technology raises competitive pressures while at the same time, opens the door to new moralities and organizing visions. The theory of the New Barbarians is a useful way to understand and interpret the battles that will take place under these changing conditions. Predictions of India’s ascent are very plausible, but the long-term future of India will depend on the ability of the rising New Barbarian classes to effectively respond to the demands of the masses.
6	As the remit of the Information Systems widens, more research methodologies are necessary. Curriculum analysis is a particularly useful methodology and as this study has shown, can be generative in Information Systems research.

Figure 7.2: Summary of Contributions
(** central)

7.2 LIMITATIONS AND REFLECTIONS

While this study makes some useful contributions in several areas, there are major limitations that must be acknowledged. The first are due to limited generalisability.

7.2.1 ISSUES OF GENERALISABILITY

While this study has significant relevance, there are limits to its applicability. The data was drawn from universities primarily in the Delhi and Mumbai areas. This obviously raises questions about the generalisability strictly *within* India. However, the evidence suggests that the findings are generalisable for *urban* India if not India as a whole. Most of the institutional factors that were uncovered were global or “Indian” in nature, and not specific to the local cities. Respondents were given plenty of opportunity to discuss the specific factors within Delhi and Mumbai that might influence their curricula, but there did not seem to be anything of particular relevance that pertained to the *local* context. It was very clear that the universities visited take in students from a ‘wider India’ if limited to an ‘urban India’.

This is not to deny however that there would be differences between universities in various parts of the country. It is likely that universities in rural areas that are less renowned, would focus more on local needs. However, a reasonable case can be made that the findings found here are generalisable to the *major* centres of higher education throughout India. The curriculum discourse was found to be primarily focused on the global context, and secondarily on the Indian context. There was no evidence that higher ICT education was fine-tuned to address local needs.

Nevertheless, a major limitation exists to the generalisability of these findings. This research was conducted solely on ICT-related undergraduate courses within Indian universities – primarily; Computer Science, Information Systems and Technology Management. The findings of this study relate narrowly to the attitudes and institutions that pervade only these ICT-related programmes, and thus they are not generalisable to the entire Indian higher education sector. In fact, some evidence was

uncovered that suggests within disciplines located in humanities and medical science schools, academics are much more focused on local needs and the global context is in the periphery.

Thus, it is necessary to state plainly that the major findings of this study – a reverence for the West, the primacy of technical knowledge, the explicit influence of industry – are only applicable to ICT-related courses and cannot be generalized to Indian higher education as a whole. Similarly, they should not be generalisable to Indian society. To be sure, there are many groups within Indian society who are locally focused and there are many IT initiatives designed to meet a local need. Not all of India seeks to emulate the West, in fact, India seems to have a schizophrenic attitude to Western modernity (Lal 2003). The global and Western orientation of India's technology academics seems to be in marked contrast to other groups within Indian society. For that reason, it is appropriate to see the technology academics as New Barbarians. They seem to share more in common with their colleagues around the globe than with their countrymen. Thus, the findings are mainly applicable to the academics and practitioners involved directly and indirectly with ICT-related curriculum at prominent Indian universities.

7.2.2 LIMITATIONS DUE TO THEORY AND METHODOLOGY

A second limitation exists due to the initial choice of neo-institutional theory. As previously mentioned, a weakness of neo-institutionalism exist in the way it narrowly assigns agency (DiMaggio 1988). Neo-institutionalism is as a very top-down theory, or one that focuses on deductive, rather than inductive processes within society. Institutions are seen as weapons of coercion that mitigate collective action, enforce agreements and structure relationships (Mulé 1999). By giving agency primarily to institutions, neo-institutional theory denies that impact of local actors that have been shown to be quite relevant in the arena of Information Systems.

Neo-institutionalism was the primary theoretical lens employed to study higher education in India. While this perspective is useful in seeing the influence of social

structures and taken-for-granted assumptions, it is blind to influence that may exist of individual actors. The great-man theory of history is much disparaged but never disproved (Angell 2000). Thus, it is acknowledged that a limitation of this study is that it fails to assess critically the impact of individual actors, because neo-institutionalism focused the inquiry onto taken-for-granted assumptions.

The hermeneutic research process is such that theory and data arise and are developed together. This project began with an initial theoretical stance using neo-institutionalism. This initial theoretical choice led to the limitation described above. Moreover, while neo-institutionalism helped guide the research in the initial stages, it proved inadequate as the data reached a critical mass. At that stage, the theory of New Barbarianism was incorporated into the framework because it seemed particularly appropriate. However, this was conscious choice and the findings suggest that other choices of theory may have also been beneficial.

Two examples should suffice here, the first is Feminist Theory. Issues of gender and family relations were found to play a significant role in the construction of the idea of ICTs. To that extent, an analysis using feminist theory (see Duraisamy 2002, Fountain 2000, Wilkinson and Kitzinger 1995) could have yielded interesting results. This is particularly so because feminist theory is often associated with discourse analysis – likewise with critical theory (see Giroux 1983, Lyytinen and Klein 1984). Issues of power were also prominent in the research findings. An analysis derived from critical theory would be generative in teasing out power relationships in more depth. Thus, the choice of neo-institutionalism and New Barbarianism as theories of analysis is appropriate, yet these theories come with their own limitations. By using these theories to guide analysis, other important aspects of the phenomenon of interest received less attention.

Other limitations exist due to issues that arose during the data gathering stage. The plan was to go to India and use three data collection methods;

1. Document Analysis
2. Life History, and
3. Interviews.

Document analysis proved to be useful up to a point. The orientation to the West was partially evident in the curriculum documents as were the primacy of positivistic knowledge and the footprint of industry. It was also interesting to see what was *not* in the documents, such as Indian-specific courses or any acknowledgement of the stratification in Indian society. Similarly, the documents and pamphlets published by the universities were also indicative of some of the institutional forces mentioned here. However, the usefulness of the documents was limited due to a variety of factors. First, despite considerable effort, the historical syllabi were rarely found. This may reflect a present and future orientation of India society – or at least in India’s technical universities – and made it difficult to identify curriculum changes over time. Second, the curriculum documents rarely revealed the motivations behind certain choices; this had to be teased out through interviews. Thirdly, the marketing materials were found to be quite superficial and narrowly emphasised employment opportunities over any other benefits that universities are commonly thought to confer upon their students (see for example Aggarwal 1995, Huff 2000). While this is a significant finding in itself, it limits the usefulness of this form of document analysis as a research methodology, at least as it pertains to this study.

Nevertheless, the interviews with Indian academics proved to be tremendously generative and informative. For the most part, the respondents were very helpful and almost excited that a researcher was asking them about their jobs, external pressures and office politics. It is likely that academics are by nature inquisitive and reflective and many were eager to share their thoughts on Indian higher education.

The initial moments of each interview were very significant in setting the overall tone for the discussion. Any appearance of criticism or even criticism of elements of the higher education system was matched with a palpable defensiveness. Respondents

would frequently begin listing India's strengths, insisting that India was as good as the West and in a position to dominate the West. As the interviews were conducted by a Western researcher from a respected Western institution, there was a risk that any appearance of a critical attitude towards India may elicit a response that did not necessarily reflect the real views of the interviewees. Narrative analysis based on semi-structured interviews contains an inherent limitation that is well-acknowledged in the literature on narrative methodologies: respondents can influence the findings subject to their own agendas (Czarniawska 1998, Personal Narratives Group 1989, Riessman 1993). It was clear that in several cases, respondents were trying to instil in their interviewer a respect for India and Indian institutions.

Over time, this was mitigated due to improved interview technique. Interviews were much more informative when respondents were presented with a statement rather than a question. One statement that proved especially useful in prompting a discussion was: "In England, there is a debate about whether Industry should be allowed into the curriculum development process, some say 'yes' some say 'no'."

It was interesting to note what the respondent then *chose* to talk about. Occasionally, respondent would still try to "sell" India, but most often, they were quite candid about its strengths and weaknesses. The most interesting findings were teased out by steering the conversation in a particular direction by mentioning a specific debate, not by asking specific questions. Specific questions often led to prejudiced answers. Thus, the interviews improved over time; however the ability of the respondents to influence the findings based on their own agendas remains an important limitation to this thesis.

The method of life history was of limited use. Some academics were quite eager to discuss their lives, while others seemed more reserved. When asked questions of how things were in the past, academics would often discuss the technical specifications of computers in the early 1980s, something which is not related to this study. It was also found that the senior academics that may have the richest life histories were the least willing to share their time, so it was more difficult to delve into the rich details.

Moreover, some academics gave a strong impression that the past was not really of interest and were much more keen to talk about the present and the future. It was possibly this attitude that resulted in the old curriculum documents being rubbished. Life history was particularly fruitful when a significant amount of time was available to build up trust. Several interviews exceeded 2 hours, and it was those where life history type questions yielded interesting answers. Thus, the limited time available for the data collection meant that it was difficult to build trust over several interviews, perhaps a necessary condition of life history. Therefore, this represents a methodological limitation of this study.

Throughout this study, assumptions were made about the ability of curricula to reflect values within society and the ability of curricula to influence the construction of the idea of ICTs. As discussed in chapter 4, both assumptions are well-justified however there are limitations. Curricula do not perfectly reflect forces within society, nor are they deterministic in influencing the idea of ICTs. Thus, a limitation of this study exists in that it stands upon the strength of these two assumptions. As will be discussed in the next section, it would be worthwhile to examine the idea of ICTs through means other than curricula to assess the validity of curriculum analysis as a methodology. Similarly, it would be worthwhile to research graduates of Indian universities to identify whether the attitudes and values that seem to be present in the curricula are indeed passed down onto the students. There is no reason to suggest otherwise, indeed the literature on curriculum research indicates that these assumptions are well-founded (Goodson 1994). However, until these assumptions are verified, they stand as a limitation to the applicability of the findings.

Finally, on the issue of the sample, it is acknowledged that the choice of respondents was made somewhat opportunistically. The goals were to read as much as possible and to meet with as many people as possible and to follow the data in the manner inspired by Feyerabend (1993). Mumbai and Delhi (and later Kolkata) were chosen because of the wide variety of forces that could potentially exist and because of the number of institutes of higher education. It took considerable effort to arrange appointments both through cold-calling and network building. After the ten week

period, nine campuses were visited and thirty-three interviews were conducted. On occasion, other people not directly involved with ICT education were met and their views were used to corroborate previous findings or to prompt investigation into new areas – but their responses were never used as primary data.

Thus, the combination of methodologies and data collection methods arose partially due to a considerable amount of initial planning. However, this process was adjusted and adapted to the data being collected and realities within India at the time. Thus, the research apparatus was borne out through an often-frustrating process of trial and error, but proved to be reasonably effective. As argued in chapter 4, the research model is coherent and the findings demonstrate its adequacy in revealing the institutional forces that influence higher ICT education in India.

There is an often-quoted paper in the systems development literature by Parnas and Clements (1986) called “*A rational design process: How and Why to Fake It*”. The authors argue that a completely rational process for software development is ultimately impossible due to changing requirements, incomplete information and bias. However, the process should be “faked” because it gives guidance when things go wrong, helps co-ordinate teams, provides legitimacy and conceptualizes an ideal process that can at least be strived for if never reached.

This research project benefited from initial methodological considerations, even though it was known *a priori* that improvisation would be necessary. In that sense, it was worthwhile to “fake” a rational methodological process for reasons similar to the ones Parnas and Clements identified. While the methodology employed in this study was malleable, it was not anarchic. It was reminiscent of Karl Weick’s (1996) famous call for researchers to be prepared to *Drop Your Tools* when necessary. Using an evocative example, Weick showed that methodologies that were appropriate in one context, may not be appropriate in another. (Ibid.).

Thus, while this study contains some significant limitations due to methodology, in some ways this proved to be advantageous. The flexibility in data collection was

inspired by Feyerabend (1993), and the results of this study are an affirmation of his work. Rigid adherence to methodology is not desirable. However, while flexibility is a virtue, it is worthwhile to fake a rational methodology, not only because it grants legitimacy but also because it sets an ideal standard that can at least be strived for if never achieved.

7.2.3 REFLECTIONS OF THE AUTHOR AS A RESEARCHER

The need for flexibility while conducting research is one of the lessons learned over the course of this research project. The following section, written in the first-person, discusses some of my reflections, both on the research process and on changes to myself, as a researcher.

One of the most important questions I pondered is “What is theory?” Initially, I saw theory as a regrettable component of my PhD, one which must be included to satisfy my examiners. I felt that I was meant to do some interesting research and then describe the findings using the vocabulary and concepts of a certain theory in order to make my thesis legitimate.

My view of theory has not changed substantially. I am apprehensive with the realist thesis of a world of causal mechanisms (see Smith 2006); instead, I prefer the underdetermination thesis (see Fuller 2003), arguing that any body of evidence can be explained by mutually incompatible theories. Yet in some ways, my respect for theory has grown. Learning about theory, developing theory, and using theory can pay immense dividends. It is quite possible that the problems one faces on ‘Monday’ can be solved as a critical realist, while the problems one faces on ‘Tuesday’ must be solved as an unrepentant relativist. Only researchers who understand theory, consciously or unconsciously, can be this flexible.

The underdetermination thesis poses immense challenges to a researcher. What should one do when faced with a body of evidence that can be explained by mutually incompatible theories? One answer would be to choose one theory in order to make

one's work legitimate. A better answer would be combine non-obvious theories to tell a good story, a story that is interesting and readable. In this way, research becomes an exercise in rhetoric, where it is more important to be convincing than right, but this is not to be lamented. Communication is a major aspect of the research enterprise. Research is an exercise in selling. Texts that are difficult, obscure, and incomprehensible deserve their fate – which is to be misunderstood, often referenced but rarely read. Good stories will result in new theories that can help us solve the problems we will face on 'Wednesday'.

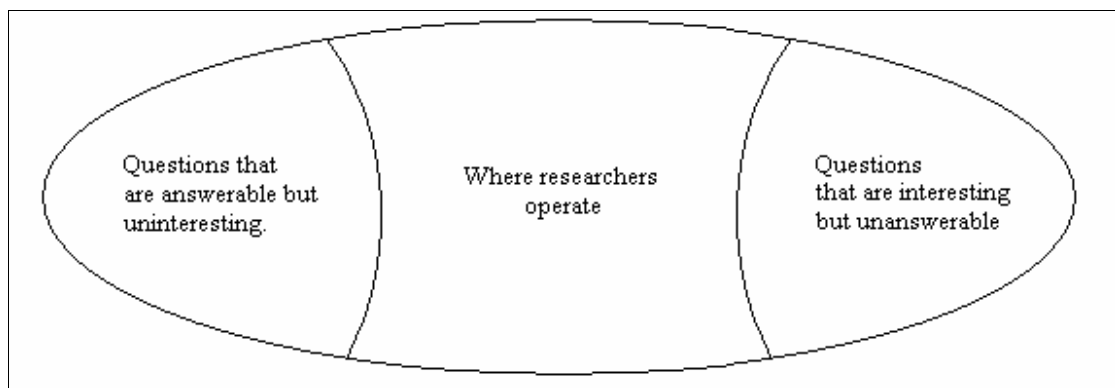


Figure 7.3: The Research Enterprise

My view of research has changed dramatically and can be described using the diagram above. Those who argue that there is no knowledge, no understanding, only description; tend to focus on the right side of the oval, dealing in questions that are worthy, but answered unsatisfactorily. Those that argue that knowledge *is* possible operate on the left and deal with questions that are answerable but with less applicability.

In my view, questions on the left can be answered by technicians. A greater contribution is made when creative researchers engage in the questions on the right. Since these questions are inherently unanswerable, the importance rests on their answers being convincing. They must tell good stories, be understood and persuasive. In doing so, they develop narratives that lead to new theories, which may be useful to somebody in the future.

I have come to believe that one of the major challenges for us as social science researchers is to decide how bold to be with our claims. Should we stick to the claims that are unambiguously proven by our research findings, or should we stretch as much as possible and attempt to answer wider questions, at the risk of over-generalising? Obviously, the answer lies somewhere in the middle, but I believe researchers should push to the right as much as possible.

We should engage the questions that are interesting but unanswerable, not the other way around. It is here that we can make a real contribution.

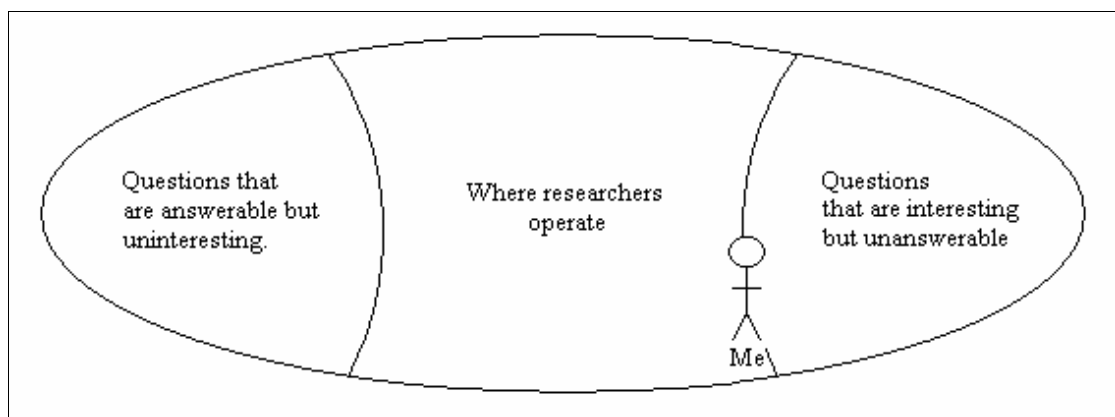


Figure 7.4: Myself in the Research Enterprise

Those who operate at this end of the spectrum will be criticized repeatedly for making unsubstantiated claims and for being methodologically weak. They will be labelled as polemicists, populists, and anti-intellectuals. Yet, it is worth it. Research that attempts to answer the unanswerable, that is widely accessible, that is relentlessly iconoclastic, can make the greatest impact. Upon reflection, this is where I hope to position myself in the research enterprise.

7.3 SUGGESTIONS FOR FUTURE RESEARCH

To conclude, it remains to discuss how this dissertation could guide future research. Many ideas for alternate research projects have occurred to me over the course of the study, and some effort was required to stay on-track. Regrettably, these ideas for alternate projects must remain for the time-being as suggestions for future research.

The following discussion is broken down into three sections, research to test directly the findings of this dissertation, research to explore further issues raised by this dissertation, and finally, research pertaining to the ascent of India and the Information Age.

7.3.1 TESTING THE FINDINGS

As mentioned in the previous section, there are limitations to this study based on the generalisability of the findings. Even within India, the research was narrowly confined to ICT-related universities in urban centres, primarily Mumbai and Delhi. It would be very much worthwhile to carry out a similar study of rural universities of India. Questions worth asking include:

- Do institutional forces influence curricula at rural universities India in a similar way as described here for urban universities?
- Are local issues similarly neglected or given more prominence?
- Are there institutional forces that are noticeably stronger or weaker in rural universities as compared to urban universities?

A second and related study could look at other disciplines such as arts or social sciences. Interesting questions could be related to the relative importance of global and local interests and the impact of various institutional forces. It would be particularly generative to investigate how the “instrumental/liberal” debate is played out in other disciplines and universities. Are history students similarly focused on employment options upon graduation? How do traditional epistemologies and gender/family relations influence the curricula for these subjects? Future research in this area would answer some pressing questions about the generalisability of the findings presented here.

Thirdly, it would be worthwhile to test the aforementioned assumptions related to curricula and to assess the adequacy of curriculum as a tool for analysis. It was assumed that the values written into curricula reflect those of society but it would be

worthwhile to investigate this further. This would be done by studying the idea of ICTs through other means. One option would be to examine how ICTs are conceptualised in the media and in the arts. Another would be to survey or interview members of society and ask them questions pertaining to ICTs in India. The purpose would be to understand the attitudes and values surrounding ICTs. It would be interesting to compare the idea of ICTs as revealed by the curricula studied here with the idea of ICTs that could be revealed by these other methodologies.

The other assumption related to curricula involves the extent to which the ideas inscribed within curricula are passed down to students. Some authors have identified the “hidden curricula” and have demonstrated how other pedagogical factors come into the play when knowledge is transferred in the classroom (NBEA 1992). It would be worth studying graduates to assess their interpretation of the idea of ICTs. This can be accomplished through interviews, surveys, ethnographies, etc., but of particular interest would be a longitudinal study that assesses how students’ attitudes to technology change over time – from the initial application for admission to graduation.

7.3.2 EXPLORING VARIOUS ISSUES RAISED IN THE DISSERTATION

Several institutional forces have been identified in this dissertation but not analysed in depth. All are worthy of further study. The historical preference for positivistic epistemology was identified by Varma (1999, 2004) and others (Raina and Habib 2004) and has been advanced by others who write on the topic of ICT in India (Gill 2004). However, this is worth investigating further. Perhaps it is a myth that technical epistemology has been favoured in India, a myth perpetuated by the optimistic and inspirational discourse surrounding ICT in India.

Moreover, some of the institutional forces mentioned here are derived from Indian culture, a culture that is multi-layered and often contradictory. Aspects of Indian culture such as the importance placed on power and wealth deserve further inquiry. In particular it would be worth giving further study to family and gender relations. Much

has been written about the schizophrenic attitude in India towards modernity and the West (Lal 2003, Tharoor 2000). One conspicuous example of this is the way Western technology is revered in comparison with the way Western notions of gender and family are rejected. An ethnographic study of how families and gender relations influence the uses of technology as well as the idea of ICTs would be especially illuminating.

The joint entrance exam (JEE) for the IITs was mentioned as a force that perpetuates certain biases in ICT education. It would be worthwhile to study this further, to investigate which groups of students choose to write the JEE, which ones pass, what sorts of knowledge the questions favour, as well as the discourse and modes of behaviour that are associated with the exam. Various respondents have claimed that the JEE is a tortuous process and creates many difficult situations for a family. Yet, for the students who pass, they acquire a marked arrogance because of the respect afforded to the exam. It would be beneficial to study this process in more depth to identify the ways in which the JEE influences higher ICT education within India.

Regarding theoretical considerations, as mentioned in the previous section, it would be worthwhile to analyse these findings using alternate theories; critical theory and feminist theory were given as examples. Moreover, the major aspect of the main argument here is that of institutional collaboration; which relates to the interplay of institutional forces. There is scope for much future research on this topic. Higher ICT education in India offers an example where forces are acting in concert. It would be worthwhile to study an example where institutional forces operate in conflict. Through such a comparison, interesting theories on how institutional forces interact could be developed, in conjunction with the broader principles of neo-institutionalism.

Finally, there is the very central point of the Indian diaspora. The diaspora was found to have central significance to the construction of the idea of ICTs – and this is not only true for the case of India. Heeks and Nicholson (2002) studied the software export industries in developing countries. They identified Israel, Ireland and India as “Tier 1” countries and listed among the many factors for their success, the influence

of their respective diasporas. Thus, this dissertation in conjunction with other studies (Heeks and Nicholson 2002) reveals the importance of international links in a globalized world. Research on the influence of diasporas, the character of diasporas and the modes of interaction between diasporas could be illuminating.

7.3.3 INDIAN ASCENT AND THE INFORMATION AGE

An aspect of contemporary Indian society that was found to have tremendous significance was the philosophy of aspiration. India seems gripped with a sense of optimism about the future. This is being fuelled by not only the success of Indian industry but also reports emanating from the West. Several major investment banks and consulting firms have produced reports discussing the rise of India (A.T. Kearney 2004b, Goldman Sachs 2005, Morgan Stanley 2004). The phenomenon may have tremendous significance in the coming decades and so deserves to be studied in more depth.

One form of study that could be particularly beneficial would be a comparison with other countries in history that were in ascent. An interesting question to explore could be: is the optimism in India today similar to that of America in the 1920s? or Britain in the 1850s? The findings from this study suggest that optimism can perhaps be theorized as a *resource*, as it leads to risk-taking, new ventures and possibly economic growth. It would be informative to study this in more depth. A similar but related study could compare education systems. For example, it was found that India's ICT education is highly instrumental. It would be worthwhile to ask if education was similarly instrumental in Britain or America during their respective eras of ascent.

Some non-historical comparisons could be worthwhile as well. Goldman Sachs (2005) has identified Brazil, Russia, India and China (what they refer to as the 'BRIC' countries) as the countries to watch in the coming decades. An obvious suggestion for future research would be a comparison of Indian higher ICT education with that of the other BRIC countries. An inquiry into the institutional forces at play could reveal important differences and similarities.

Finally, there is the relevance of New Barbarian theory. Angell (2000) explicitly argued that his theory was an appropriate lens on the “Information Age.” The findings from this study affirm this claim, at least in the case of India. The elites there are pragmatic, opportunistic and amoral and seem to follow the modes of behaviour outlined in the *New Barbarian Manifesto* (Ibid.). Obvious questions arise as to whether this lens is also appropriate to view other countries, particularly China, Russia and Brazil. There are many implications of New Barbarianism. Old modes of thinking will breakdown, moralities will be heavily contested and on the periphery, new powers will emerge.

This study suggests that Indian elites are forging ahead with a New Barbarian spirit that will, for better or worse, leave an indelible mark on the future. It is incumbent on academic researchers to understand this process in more depth, for if this characterization is accurate, it will be a driving force of change in the coming decades.

8 INTERVIEW LIST

1. G. Dhingra, Director, D. Y. Patil University, Mumbai, July 5, 2004.
2. Professor P.R. Bhat, Department of Humanities and Social Sciences (HSS), IIT Bombay, July 6, 2004.
3. Dr. V. Apte, Department of Computer Science and Engineering, IIT Bombay, July 7, 2004.
4. M.K. Patil, Assistant Registrar, IIT Bombay, July 7, 2004.
5. Dr. P. Banerji, Dean of Alumni & International Relations, IIT Bombay, July 7, 2004.
6. A. Dixit, Director of Public Relations, IIT Bombay, July 7, 2004.
7. Professor N.L. Sarda, Professor of Computer Science and Dean of the Academic Program, IIT Bombay, July 7, 2004.
8. Professor G. Kumta, Narsee Monjee Institute of Management Studies, Mumbai, July 7, 2004.
9. Dr. V. Seshadri, Narsee Monjee Institute of Management Studies, Mumbai, July 7, 2004.
10. Dr. S. Chakraborty, Department of Computer Science and Engineering, IIT Bombay, July 8, 2004.
11. Dr. S. Mitra, Department of Mechanical Engineering, IIT Bombay, July 8, 2004.
12. Professor T. Bagchi, Director, National Institute of Industrial Engineering, Mumbai, July 9, 2004.
13. Dr. N. Vivek, D. Y. Patil University, Mumbai, July 13, 2004.
14. Dr. L. Ragha, Faculty of Engineering, Ramrao Adik Institute of Technology, D. Y. Patil University, Mumbai, July 13, 2004.
15. Professor S. K. Mukhopadhyah, Principle of the Faculty of Engineering, Ramrao Adik Institute of Technology, D. Y. Patil University, Mumbai, July 13, 2004.
16. U. Shende, Assistant Registrar, D. Y. Patil University, Mumbai, July 13, 2004.

17. Professor. S.S. Mantha, Dean of the Faculty of Mechanical Engineering, Veermata Jijai Technological Institute, University of Mumbai, Mumbai, July 14, 2004.
18. L. Edwards, High Commissioner for Canada, Delhi, July 27, 2004.
19. Professor M. Mukhopadhyah, Joint Director, National Institute for Educational Planning and Administration, Delhi, July 28, 2004.
20. Professor M.P. Gupta, Department of Management, IIT Delhi, July 29, 2004.
21. Professor S. Banerjee, Department of Computer Science and Engineering, IIT Delhi, July 29, 2004.
22. Professor A. Srinivasan, Department of Humanities and Social Sciences, IIT Delhi, July 30, 2004.
23. L. Edwards, High Commissioner for Canada, Delhi, August 4, 2004.
24. Dr. A. Lynn, School of Information Technology, Jawaharlal Nehru University, Delhi, August 5, 2004.
25. Dr. E. P. Mukherjee, School of Information Technology, Jawaharlal Nehru University, Delhi, August 5, 2004.
26. V. M. Ganesh, Economic Research Unit, Joint Planning Committee, Delhi, August 5, 2004.
27. S. Dasgupta, Economic Research Unit, Joint Planning Committee, Delhi, Aug 5, 2004.
28. Professor R. Batabyal, School of Information Technology, Jawaharlal Nehru University, Delhi, August 5, 2004.
29. Professor M. Balakrishnan, Head of the Department of Computer Science and Engineering, IIT Delhi, Aug 10, 2004.
30. Professor D. Raina, Zakir Hussain Centre of Education, Jawaharlal Nehru University, Delhi, Aug 10, 2004.
31. T. Roach, Canadian High Commission, Delhi, Aug 11, 2004.
32. T. Sarbin, Vice President, Techna Institute, Kolkata, Aug 16, 2004.
33. Dr. B. Bagchi, Institute of Development Studies Kolkata, University of Calcutta, Aug 17, 2004.

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