

A Gift from the Gods? Components of Information Technological Fatalism, Determinism in Several Cultures

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Introduction

When you think of information systems, do you think of them as “natural”, “god-given” or the work of the devil? Do you think of them as a source of good things for society and the world or as a source of trouble? Do you think that information systems’ growth and seeming pervasiveness is spurred by our inherent human talents or by specific economic and social forces?

For those of us teaching and doing research in information systems/technology¹ these are salient questions not merely because students come to us from a variety of backgrounds and arrive with fresh prejudices at the start of each academic term. In fact, we play a strong role in creating and maintaining these beliefs through our teaching and research. No doubt an overwhelming majority of us see information technology as a natural extension of human creativity, a (n eventual) source of good things for society, heavily spiced with a range of problems, and - at least in the case of Ecommerce - a potent social and economic force. It’s important that we understand in a critical sense where our beliefs are coming from so that we don’t run the risk of alienating many in our primary constituencies (students and colleagues). It’s no joke that many in business believe this primary tenet, a corollary of Systemantics (Gall, 1986): “If you see someone coming at you with the obvious intention of doing good, run away as quickly as possible”.

This paper explores a complex of beliefs held about the causal relationships among information technology and aspects of society. It begins with an analysis of these relationships as special cases of those with technology in general. It then details research performed in Thailand and South Africa and plans to extend the research to other countries such as the USA among undergraduate business students. The implications that the findings would have for instruction, cross-cultural application of information technology and marketing are then discussed. The paper ends with additional research questions to be explored.

Exploring the Relationship between Technology and Society

Three aspects become important in determining our relationship with any technology:

- a. Where does technology come from? How did it get to be so important to us? Will it always be so pervasive?

¹ I no longer attempt to distinguish these two terms. Many associate the term “information technology” with the boxes and wires that provide a place for software to live and operate and “information systems” to refer to the complex of things, applications, and people that create and deliver the value, but at the risk of oversimplification, I’ll refer to all of this with either term.

- b. What does technology cause or influence? Are these influences for our good? For better or worse?
- c. What causes or influences technology? Do particular cultures or societies develop or use particular technologies? Do they use them better than other societies?

The first aspect is covered by a set of beliefs concerning the existence of technology as an aspect of our lives and is called here “fatalism”. The second aspect is termed “determinism”. The third aspect is called “particularism”. These three sets of beliefs are best seen as ways of coping with issues illustrated in the model (Figure 1) below.

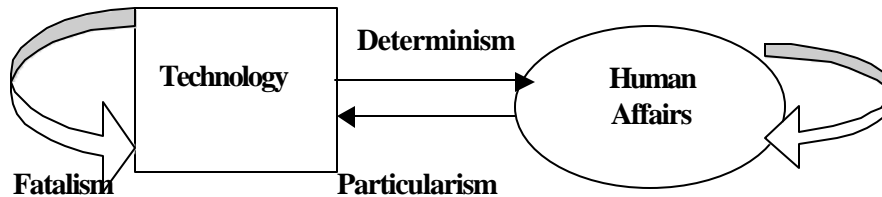


Figure 1: Beliefs about Influences on Human Affairs

This diagram, of course, presents specific simplification, as would any snapshot. For example, it fails to draw in other specific influences on these relationships such as political or religious systems of beliefs. Furthermore, by separating fatalism (what’s going to happen) from particularism and determinism (how things get to be the way they are), it introduces an arbitrary distinction while failing to note the mutually reinforcing nature of their interrelationships.

For example, even if one believes technology drives itself, one might well ask how technology got to be independent and might discover a deeply felt belief that people created technology to be just like that. Is this true fatalism then? Or is this only a variety of fatalism or particularism.

Finally, the model is neither normative nor ethical in the sense of emphasising what either **should** be or what is **right**. That is because we are not concerned here directly with *attitudes towards (information) technology*. While these attitudes are indeed important, compared with the situation even ten years ago, the trend is fairly clear: people, particularly consumers and business people, value the chips and the services the chips can bring. Our research is aimed at understanding the components of deeply held beliefs about how technology works with society. We will return, however, to the issue of positive and negative evaluation of technology later.

These and other issues will be discussed in turn below as we develop an instrument to measure the three aspects.

Some Definitions

First, we need to define a few terms. “Technology” is defined as those enacted artifacts of a society (both physical as well as procedural, including rites and rituals and ceremonies) that are intended to produce results (usually objects but also intellectual and emotional outcomes) considered valuable by that society. The artifacts of interest are also things or products, generally tools. An enacted artifact is one that is put to use through appropriate sanctioned and learned procedures.

By this definition, technology is quite broad, including the use of scissors to cut hair, magical stones to bring rain and information technology to disseminate knowledge via an intranet. We will leave this definition purposely so broad because we are interested in the

“object orientation” method of understanding our environment. While technology can be narrowly defined as simply tools (objects) or techniques (procedure) such definitions inevitably leave out aspects of interest to us. For example, a tool orientation would overlook the actions necessary to employ those tools, the procedures to guarantee effective use, and the cadre of individuals who employ these tools expertly and teach their “appropriate” use. Focusing exclusively on procedure would leave out the aspects of technology as a cultural object or icon with a local stamp, appearance or feel. At the risk, therefore, of too broad a definition, we define technology as both the tools to do something as well as the procedures through which the tools are used.

Information technology is a particular kind of technology devoted to creating, moving, and using information in its myriad forms (such as text, but also video, sound, images, pure procedure and mixed forms, too). With the long-promised convergence of digital processing and communication technologies, it is increasingly difficult to separate the two, especially given the commercial interests involved and the very recent history of dot-com growth and demise and cross-industry mergers and strategic alliances. For the purposes of this research, we’ll also adopt a broad view of IT, which matches the view the mass media seem to take.

A Look at Mythology

Mention of the media brings to mind the role of myth in the development of a culture. Most societies of some long standing have origin myths, generally involving gods, god-knowledge, some miracles and perhaps some tools. The myths don’t have to be shrouded in the mists of long ago; even modern societies have such myths. Americans, for instance, have myths about agriculture (the Indians teaching the Pilgrims how to grow corn, Johnny Appleseed, Paul Bunyan) that go back scarcely 400 years. Even with regard to modern inventors such as Thomas Edison, the Wright Brothers, and the early developers of computers, mythology has grown up about them and the “age of invention”.

What mythology does is to bring together into a neat story the origins, purpose and validity of a society’s major consolidating ideas. Why are we here? Where did we come from? Why are we different from other people? Why do we do things in a particular way? What’s special about us? While these may be and they frequently are approached as anthropological and historical questions, most societies also feel comfortable with their particularisms. In fact, the emergence of what might be termed “global culture” is a unique series of events, promising everyone that they can be the same, accessing the same conveniences and services, while retaining comfortable and useful local optimisations. In a sense, this research is about the interface of culture and technology, exploring how a set of artifacts developed in one place rather rapidly in the late 20th century interact with another set of artifacts developed slowly over generations.

Fatalism

Our first concept is fatalism, the feeling that things run themselves without our control. A true fatalist is willing to accept the notion that he or she has little or no control over the course of events. Some fatalists have accommodated to this feeling; others resist it. There are positive fatalist who welcome the inevitable and negative fatalists who see the future pessimistically. This concept is illustrated in Figure 2.

Technological fatalism (TF) may be related to the F-scale (Adorno, 1950) in which belief in the power of science and technology play such an important role in the authoritarian personality. Fatalism might also arise because people *do* sometimes feel powerless and thus desire a relatively benevolent and strong force to provide salvation. Technological fatalism could therefore be the flip side of a human desire to conquer nature, but through outside help.

In a confusing world in which religious beliefs might be playing a seriously reduced role, technological fatalism could provide a pillar to lean on, especially if combined with technological particularism (see below) that guarantees that although the technology might be taking over, at least, by golly, its *our* technology!

Strong Form: Technology contains forces within itself that dictate the ultimate pervasiveness of technology (it has its own “motive” force)

Weak Form: Technology is inevitable, inherent in humanity (we control it)

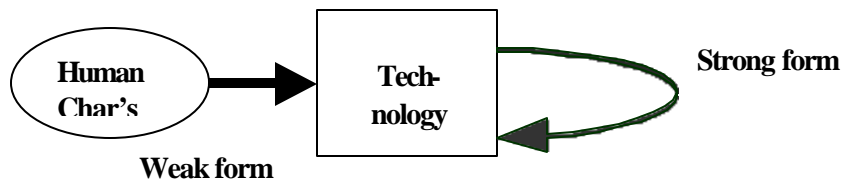


Figure 2: Technological Fatalism

Technological Fatalism (TF) in its strongest form is based on a deeper belief that technology has a life of its own. In a weaker form, technology is a “force” of nature, perhaps something unleashed through man’s curiosity or basic nature. Scientists might insist that *homo sapiens* is an inherently tool-making and using creature, a descendent or cousin of *homo habilis*. Theologians point out the central role that our tendency to use objects as instruments of our desire (such as the apple in the Garden of Eden story or the Tower of Babel story) shadows an inherent role of technology independent of society’s shackles. Certainly there are stories in the Western mythology and industrial history (the Dybyk, Luddism, etc.) pointing out folk beliefs in the power of technology, whether coupled with the Devil or operating independently.

Technological fatalism is often expressed in statements found in the popular press extolling the virtues of technological progress and technology² as unstoppable and running off an internal driveshaft not propelled by the typical institutions in society of church, state, education, voluntary societies, family, etc. (Clark, 2001; Smith and Marx, 1994).

Technological fatalism has a range of forms, but the two most prominently illustrated in the West are what I’ve termed the “strong” and “weak” forms. The strong form expresses the idea, often found in fears, that technology is in a sense unstoppable, that it generates its own dynamic and whatever the original sources of technology, these are long since forgotten and technology has taken over its own development. The weak form asserts that technology emanates from some human characteristic, that it’s natural for us to create and use technology, that our natural curiosity and creativity drive the increasingly complex world of technology.

Expressions of fatalism in a variety of forms are found in the media and books. For example “It’s the wave of the future”, “Get with the program,” and “Profit from the new Economy” all contain germs of the idea that certain aspects of computerisation, E-commerce, and informatics are inevitable, irresistible, and coming soon to a business near you. Whether to make a profit, excite or incite, media writers, publishers, and operators are finding at least

² A positive example would be information technology. But evidence of a negative nature is the coverage of genetically modified (GM) foods and cloning. There, at least one view holds that should something “get loose” in these experiments, the whole world would suffer because we couldn’t control the results. In truth, of course, the state of the world is that we don’t know what would happen, but the popular media often identify lack of knowledge with lack of control (one implies the other, but not the reverse) in the popular media. The recent outbreak of epidemic diseases in livestock in Europe is a case in point.

the contemplation of information systems as a major player in the future as inevitable and irresistible.

Is the “Information Revolution” inevitable and irresistible? Certainly if past history is any guide, information systems in their various guises will likely increasingly invade our commercial and daily lives, but that doesn’t mean that they are inevitable. And as some (granted temporary) glitches in the supply of critical chips powering computers have demonstrated, there might be some resistance after all. Also, PC sales are finally flattening and there is a shaking out of competitors in E-commerce and its support services, bringing about a fall in share prices and layoffs throughout the industry. Will this have any impact on the pervasive sense of *fatalism* about information systems?

Thus, there seem to be at least three dimensions of technological fatalism: automism (the power of technology to shape itself vs. being influenced by human action), inevitability (the probability that technological progress will continue) and irresistibility (the likelihood that technological progress will not be changed in some way). Each of these is a scalar sub measure ranging from 0 (no self-propelling power or impossibility) to 1 (completely self-powered or absolutely certain to occur).

Determinism

Our second concept is determinism, the role that technology is playing in determining how things go in our lives. A determinist seeks order, causality, and reason in life and is willing to attribute more to known, visible, perhaps understandable causes than a non-determinist, who might see or even welcome randomness everywhere. Technological determinism recognises the role that technology plays in business, economic affairs, daily life, education, politics, etc., attributing to specific technologies or technology in general a power to shape events.

If the holder of the belief is rational, this power must be seen as arising from the strength of the technology in the hands of specific users, but there are more emotional or mystical forms that see technology *per se* as a force. This isn’t so far-fetched. All of us are used to talking about systems such as “the economy” or “politics” or “society”. None of these have eyes, ears, brains or hands to cause anything to occur, but we employ the metaphor and to some varying degree believe that these systems are capable of independent causal action. “He lost his job on account of the economy.” “She was promoted purely on office politics.” “It’s society’s fault.” These are common complaints and reflect no merely superficial beliefs in - or casual metaphorical reference to - the motive forces of unseen systems.

Similarly, technological determinism (TD) is related to our feelings that at least some of the order or systematic nature of our lives is due to the tools and procedures we employ to live them. Our tolerance for ambiguity is limited, indeed, and our tools have always helped us bring about order. The order can be physical (a filing system), intellectual (political platforms) or emotional (psychotherapy, for example). This concept is illustrated in Figure 3.

What aspects of our lives does technology in general bring order to? The most likely institutions and activities include the military, education, and business. These deal with chaotic behaviour, minds, and competition. It is no coincidence that modern business and third-world countries look to information technology to reduce complexity, increase competitiveness and guarantee governance in a variety of areas.

Strong Form: Technology determines the shape of our economy, society, etc.

Weak Form: Technology is one of the forces determining the shape of our economy, society, etc.

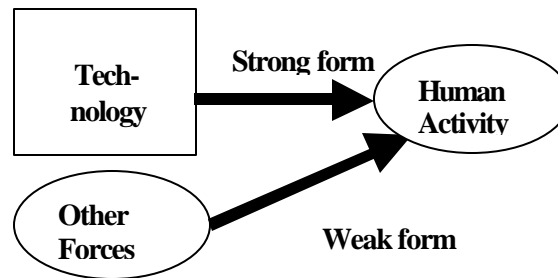


Figure 3: Technological Determinism

Technological determinism goes further than fatalism in its attribution of power to technology. A strong form of TD preaches that technology has important implications for human activity. Without doubt the use of technology has reshaped our world over the course of human history. The popular press points out the real and feared effects of a wide range of current technologies such as genetically modified foods, cloning, freon, telecommunications, cellphones, VDTs, etc. While our beliefs about the inevitability of technology have their origins in our insecurities about our human helplessness, our beliefs about the *pervasive* power of technology could stem from our beliefs about the *relative* powers of ourselves as free agents and those of our creations. We'd rather think that technology is a tool of our will rather than an independent shaper of our social, political and cultural environment (Mesthene, 1970; Chandler, 2000; Kipris, 1989; Pejlic et al., 1992; Rodenacker, 1998; Rudi, 1995).

Beliefs about technological determinism range from weak ones, in which technology is merely one (perhaps small) player in determining human activity, to strong ones, in which technology becomes a major -- if not *the* major or even *only* such -- force. A second dimension of technological determinism is the limitations such beliefs put on areas in which technology can determine. For example, some would say that technology can determine our actions but not our thoughts, shape our social institutions but not our social relations, influence our political process (as per the recent Presidential election in the US) but not our political affiliations, have an effect on economic well-being without, perhaps, strongly influencing what we spend our money on. These limitations come from an underlying complex set of beliefs about how society is constructed and influenced by a number of external forces. Other than the gods, after all, there are a limited number of such forces available to choose from.

Experiences of TD are ubiquitous. From the technological causes of global warming to problems and opportunities brought about by global communication advances (cell phones, TV, the Internet), the media revel in this new "force". *Is* technology and its influence overrated, though? Probably not. Much of our history, at least our recent history as taught in schools, is a parade of technology beginning with fire and the wheel through to chariots, roads, sailing ships, alphabets, ploughs, steam engines, electricity and so forth. The media have often speculated on the future of life in a technology-enabled world, with interest reaching a frenzied peak most often in jubilee years such as 1900, 1950 or 2000. In an increasingly market-oriented view of the future as shaped by E-commerce, the daily press is becoming a major player in creating new beliefs about the new economy and information technology's roles.

Other than this *direct* causality, there are also *indirect* forms of beliefs about determinism. The thought pattern goes something like this: “Even if technology has an influence on human activity, its influence is indirect, by giving us the tools to shape our environment. Technology doesn’t do anything without ultimately being directed by us.”

Thus, there are three important dimensions of technological determinism: strength, domain, and distance. Strength is a scalar measure (let’s say from 0, meaning no influence at all, to 1, meaning total influence); domain is a categorical measure of areas of influence and distance is a scalar measure (let’s say from 1, meaning one “hop” or direct influence, to $1/n$, where the influence is found among a network of n indirect relationships or hops, 0.5 being the most apt since technology is thought of generally as a tool of human desire).

Particularism

Yet all this technology has to come from somewhere so our final concept is technological particularism (TP), the idea that technological forms respond to a variety of human activities (see Figure 4). Just as fatalism arises in our need to explain powerlessness and determinism helps us make sense of our complex world, particularism is useful in fixing our bearings on the alienness of some force. A particularist is like a nationalist in wanting proximal, bold, concrete, explicit explanations rather than distant, abstract implicit ones. Particularism satisfies our intellectual and emotional needs to have explanations that we see and understand. Yes, my dog died, but it died of pneumonia caused by this particular bacterium rather than by the hand of God. OK, I understand that I’ve lost my job, but it’s comforting to know that it was because my particular manager was an idiot rather than just that the economy is going through a downturn. In contrast, “universalists” are satisfied with general explanations, abstracts and universal truths that are not local in nature but extend across boundaries of space, time, society, language, etc.

Particularists feel more comfortable with local explanations: our society, our bacteria, our computers make things happen. Technological Particularism is most likely when technology takes particularly local forms; they are more understandable, controllable. Even if not controllable, technologies seem to a technological particularist to be more responsive to local circumstances and forces, hence more benign.

Strong Form: Technology is determined by each society uniquely

Weak Form: Technology adapts to local situations

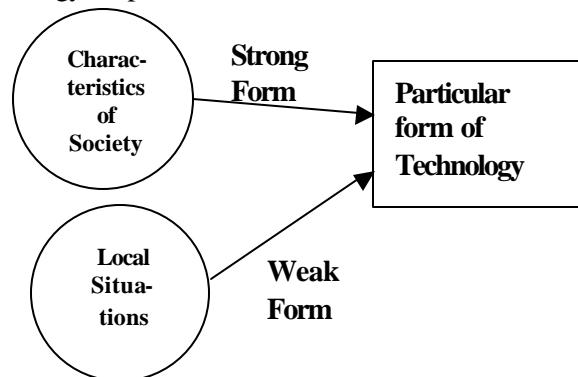


Figure 4: Technological Particularism

Technological particularism reverses the tables on technological determinism. As a set of beliefs it helps us understand how technology itself is shaped, used, and molded to our needs. How does technology come to look, feel, act the way it does? Do individual societies develop unique forms or uses of or approaches to technology? Is the kind of technology

employed or the way it is employed in a society or culture determined by the culture? Or is technology universal in nature as a human pursuit or tool?

There is no doubt that such beliefs are complicated by modern marketing and media. For example, PCs are ubiquitous, cellphones appear everywhere, and the trappings of modern working life would not be complete without cars, copiers, and facsimile devices. There is a sort of global culture that makes music and entertainment almost universal and the trappings of middle-class life (including kitchen appliances, furnishings and clothing) appear almost everywhere (a few societies excluded by fiat). Newspapers, magazines, and television, themselves ubiquitous, advertise these wares daily and effectively. Yet even in the face of such a global cultural onslaught, we are also comfortable with concepts such as Italian style, Thai cooking, and German efficiency, each an aspect of the employment of specific technologies in specific realms.

What underlies our thinking that cultures and their employment of technology might be unique? First, most societies *are* unique; they have unique languages, social institutions, architectures, diets, religious organisations, alphabets, political systems, and topographies. Why should technology be left out of this list? Second, some societies seemingly adopt technology differently from others, although this could be either a colonialistic relic, economic necessity, or just an artifact of advertising.

Third, some societies *have* created and employed unique technologies. As history teaches us, gunpowder and paper were invented in China, the automobile was first developed in France, broadcast television first appeared in the UK (along with the first computer, but let's not quibble), and the assembly line was first employed with great effect in the US. Quibbles aside, such inventions do not appear all at once everywhere. There must be something making specific technologies appear in specific places at specific times.

Furthermore, even where simultaneous or relatively contemporaneous adoption takes place, there are always subtle differences in how technology is adopted and used. Where technology is seen as a threat to the political system, it is guarded, rationed, registered, licenced, and policed centrally (as until recently in China). Where technology is expensive, it's adopted by elites in certain ways but not by the general population (such as private automobiles in much of the third world). Some countries become quite good at producing certain technologies (machine tools and cellphones in Scandinavia, for example and robotics in Japan). Others, such as Singapore and India, are very effective at using technologies. Singapore employed computers to modernise its transshipping industry. India has become a center for remote-control software development. Any beliefs we may have about cultural or social influences on technology are probably well based in fact.

There are, then, several dimensions of technological particularism. First, there is the *proximity* or nearness of the source (generated by individual culture or adaptation to individual culture from outside). Second, there is the *phase of adoption* (creation, adoption, use, adaptation). Finally, there is the effectiveness dimension (well vs. poorly). The first two dimensions are categorical (although phase might be considered a selection from an ordered set determined by time moving from creation through adoption to use to adaptation). *Effectiveness* is a scalar measure ranging from 0 (no effective use) through to 1 (as effective use as is possible).

Indicators of these various dimensions would be agreement or disagreement with statements such as the following:

Information Technology Values

As much as those of us in the field of information systems and information technology might object that our technology is different (and it is!), as a technology, IT must certainly have some of the characteristics of all technologies: a tool, a fabrication, a method, something

employed, “technical”, a trained elite of practitioners, etc. Thus it should be the case that general technological beliefs should specialise to information technological beliefs.

For example, it is likely that IT fatalists believe that information technology (through the label of “The IT revolution”) is fueling its own growth, that it is unstoppable, maybe that computers will take over the world (this is a component of technophobia, not explored here, but obviously related). IT determinists may feel strongly that computers and information systems are playing a major if not the major role in shaping particular institutions such as business, education, government and so forth. Finally, IT particularists may feel that specific aspects of information technology must respond to local as opposed to global needs and situations. The table below is an attempt to list statements that are consistent with extreme views on these nine dimensions.

Table 1: Information Technological Beliefs

Information Technological Beliefs		
Concept	Dimension	Sample Assertions of These Beliefs
ITF	Automism	Information Technology fuels its own growth
	Inevitability	Information Technology is going to continue to grow in importance
	Irresistibility	Nothing can stop the growth of information technology
ITD	Strength	Information Technology is the major influence in today’s society
	Domain	Information Technology is driving [field name]
	Distance	Information Technology has an indirect influence on everything
ITP	Proximity	Information Technology in use is shaped by local adaptation
	Phase	Each culture creates or uses information technology uniquely
	Effectiveness	Some cultures are better at creating or using particular information technology than others

Empirical Research

A twenty-question instrument (7-point Likert agree-disagree scales) was developed to measure each of the three dimensions of the three beliefs in ITF, ITD, and ITP. Two questions are asked about each of the nine factors in different ways. We also are collecting demographic information (country, home language, age, gender, university program (major), year in program and access to computers at home or residence). The questions were and are to be administered as part of a second-year course in Information Systems in universities in Thailand, South Africa, Canada, the UK, the US, Singapore and Japan.

Questions appear in a *subjective* fashion. Students are asked to rate their agreement with statements that asserted beliefs held by the student about information systems and the society within which they lived and studied. It is easier in a way to ask these questions projectively, but because these are personal beliefs, the questions pointed directly at the students themselves in a subjective fashion.

In addition, two additional questions were added. As mentioned earlier, in addition to these views concerning the dynamic relationship between society (or societal values) and information technology, there are also *normative* beliefs about what proper and good roles ought to be. These latter beliefs result in attitudes towards or against specific technologies or specific technologies in specific roles. Empirical research into beliefs has to control for these attitudes, as beliefs about the *power* of a societal “force” are inextricably tied up with whether individuals think these powers are benign or evil.

Two indicators of such normative values are *interest* and *value*. It would be unusual for individuals to have strong beliefs about something in which they have little interest. Furthermore, we would expect strong beliefs about the power of information systems to shape society to be correlated with strong positive *or* negative values held about that power. Thus, student respondents were asked to rate their agreement with statements that asserted (1) using IT is interesting and (2) IT is good to have in our society.

Implications

Data from Thailand collected in early 2001 indicates that views on Fatalism, Determinism and Particularism aren't very strong (mean values of 2.97, 3.55 and 3.32 out of 7) while interest and value are very high (1.91 and 1.72 out of 7, respectively). All respondents were Thai-speaking second year students (N=43) of which 8 were men and 35 were women; average age was 19.21. There was considerable variation in the components of fatalism (3.64, 1.75, and 3.51 for) and far less for determinism (3.03, 4.14, and 3.45 for) and particularism (3.45, 3.52 and 2.99). An interpretation may be that Thai students in this group see information systems "power" as inevitable, but not necessarily inevitable in itself, but rather as an implication of something else. Because they tended to believe that some cultures create and use IT better than others, it may be that the inevitability is related to the American leadership in IT development or other forces that might counter the inherent power in IT to change itself.

While we await results from other nations, it is worthwhile to ponder what the implications of IT fatalism, determinism and particularism are for teaching, especially at the undergraduate level. If we assume that students in different cultures have different beliefs about fatalism, then we must assume that an uncritical approach to teaching IT (what I call the "golly gee-whiz" approach) will be inappropriate in some cultures. Furthermore, students who are IT fatalistic might be so for reasons that would be harmful to learning about IT, learning in general, and subsequent use of IT. Surely it is worthwhile to show students ways to be critical of IT use, to channel IT use to appropriate applications, to justify IT expenditures, etc. If IT fatalism appears to be prominent in some societies and not in others, this would make teaching IT a different matter in these societies; students would be far more likely to accept uncritically almost any statement about the "power" of IT and the implications. Or, alternatively, they might become more emotional about needing to counter this power, especially if they are also highly deterministic. IT determinism beliefs may be specific to educational programs, too. This needs to be investigated. Finally, IT particularism is a concept that needs some study, since almost all IT concepts are deeply rooted in American business pursuits. Thai students don't seem to be particularly particularistic and it might be that by chance America has invented a field which is culture free, but that is highly doubtful. Applications are closely tied into the business culture and the technology has been fashioned around those applications (or vice versa, for the purposes of this argument, it doesn't matter). How particularist beliefs arise and what the implications are for teaching and system development remains to be seen.

Future Research

As mentioned above, we need to look more closely at the origins of all these beliefs and their interaction with culture in general. American culture is, in the popular myth, highly non-fatalistic, highly deterministic and unparticular (that is Americans think they can do anything, can build environments to meet any challenge and create universal truths). In fact, these are doubtful beliefs even for Americans. When these concepts are applied to IT, the implications for future users as learners are worth investigating.

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