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by James L. Morrison, Joel Barker, and Scott Erickson

Robert Merton's book *On the Shoulders of Giants* (1965, 1985, 1993) was required reading when I was a grad student. I was reminded of this book when I scheduled an interview with Joel Barker at the 2005 World Future Society conference in Chicago. Invariably in my own work as a planning consultant, I use Barker's video *Anticipating the Future: The Business of Paradigms* (1990) as well as a variant of another tool Barker has computerized, The Implications Wheel. Recently Barker co-authored a book with Scott Erickson, *Five Regions of the Future: A New Way to Think about Technology* (2005), that proposes a model for defining and understanding how technology can be utilized in the future. I was delighted to have the opportunity to interview Joel and Scott about this new way of thinking about technology and its implications for the future of education.

James L. Morrison [JM]: Joel, what do you mean by the phrase "Five Regions of the Future"?

Joel Barker [JB]: The Five Regions of the Future model consists of technological clusters that act like ecosystems. Each of the regions has a set of values that drives the clustering of technologies so that some technologies are excluded from each region. In other words, even if we wanted to add a particular technology to a region, that region might not accept it. The interaction of these various technological elements is very much like an organic environment that sustains some plants and animals but not others. In fact, we actually invented a term—"TechnEcology"—to signify a technological ecosystem.

Although I have detailed descriptions of these regions on my Web site, I can give thumbnail sketches here.

We describe our first region, Super TechnEcology, or Super Tech, with a simple slogan: "bigger is beautiful." This region presumes that resources are abundant, that human beings can overcome natural limitations through technology, and that technology can and should be exploited to its maximum capacity to satisfy individual needs and desires. Example: the Concorde supersonic transport or the new super jumbo airbus project.

In the second region, Limits Tech, the concept of planetary limits is foundational. Its slogan is "efficiency is beautiful" because it presumes that nature constrains technological growth, that resources are becoming more scarce over time, and that we therefore want to use resources on the planet as intelligently and as efficiently as possible. Example: a low wattage LED light bulb.

In the third region, Local Tech, values focus on scale and context. Whereas in Limits Tech one efficient technology may be used around the world, efficiency alone would not be convincing to stakeholders in Local Tech because the people in this region would not believe that this technology is customized enough to fit their needs. Thus the slogan of this region is "small and local is beautiful." Example: electrical energy produced by a wind generator.

The fourth region is Nature Tech, and its values may be described in the slogan "nature is beautiful." This region presumes that since Mother Nature has already created all the solutions to our problems, our job is to find those solutions and create compatible technologies. In contrast to Super Tech or Limits Tech, this region views nature and human beings as co-equal partners rather than adversaries; in contrast to Local Tech, this region adopts a global rather than a local perspective towards technological development. Of course, we see this region coming on with extraordinary speed right now; thanks to the continued growth and development of

the DNA paradigm, it is one of the hottest, newest regions. Another example would be biodiesel fuel created from algae.

The last region overlaps all of the others and is the most ambiguous one of the set: Human Tech. Human Tech consists of all the technology that humans have, from outside our skin down to the marrow of our bones. It is hard to think about our fingers as technology, but they really are. Our eyes are technology. Our digestive system is actually a phenomenally sophisticated technology, but we don't think about it that way. Furthermore, this region does not only include physiological examples but also values human self-understanding and self-realization in a more holistic fashion that includes psychological, sociological, and philosophical dimensions as well. The definition of technology in this realm would therefore encompass qualities of human creativity and leadership, political ideals such as democracy, or even the idea of formal schooling to promote an informed citizenry. In this regard Human Tech is like the ocean beneath the islands of the other technologies; in other words, Human Tech has given birth to all the other regions. The slogan of Human Tech is "we are beautiful."

While each region seeks to adopt technology in a way that gives people a good life, each of the regions has its own emphasis on what constitutes a good life and how technology can help human beings realize it.

JM: Why create yet another new set of terms for describing technology?

JB: In the past, when we have talked about a particular technology, we have said, "This is biotech, or this is high tech, or this is info tech." If I say those things to you, and I ask you to tell me what that particular technology does, you would not be able to tell me because those are all origin descriptions. They have limited descriptive power. What we have said is that we need a new lexicon to talk about our technologies so that we understand their purposes and results rather than their origins. If the general public had a clearer understanding of the purpose of a proposed technology, they could in fact get into the conversation much more easily about its implications and whether we should or should not pursue it. The labels we picked—Super Tech, Limits Tech, Local Tech, Nature Tech, and Human Tech—actually tell us a lot about the technology as soon as we understand the definitions.

JM: How can the Five Regions model help us imagine education differently or attend to different purposes/different types of learning outcomes?

Scott Erickson [SE]: The Five Regions attends to two different purposes of education. One is the role schools have in culture transmission. Schools have always had a role in passing culture, knowledge, and information from one generation to another. The Five Regions is an organizing model for the discussion of what technology is available to us. Since technology has such a large impact on society, it is important for schools to make sure that knowledge of technology is passed on to each succeeding generation.

The second purpose for which the Five Regions is useful is the role that schools play in social change. The reconstructionist philosophy of education, popular in the United States since the 1930s, is that schools do and should reconstruct, or shape, society in the future. The Five Regions model shows that there are different outcomes for society based on the technologies that are selected. Selecting oil for energy generation, for example, results in a vastly different society than selecting wind power or other Local Tech energy solutions. So, by teaching the Five Regions and the potential outcomes of our technology choices, schools can influence the shape of the society to come. In a sense, schools could help select the choice of technology and which regions of the future are developed in a particular society.

JM: If schools of education adopted the Five Regions model as a way of teaching educational technology, how would their curricula change?

SE: It would lead to a technology curriculum. One hundred years ago the leading American philosopher of education was John Dewey. One of his chief contributions was to advocate successfully for the introduction

of a science curriculum in the schools. He argued that people needed a basic understanding of sciences like biology, chemistry, or physics to live in the modern world and that society would benefit from an educated public in these areas. I would guess if he were alive today he would advocate a technology curriculum for the same reason. People need knowledge of technology to live successfully in the 21st century, and society would benefit from a public that can choose between technologies that have very different implications for the future.

JM: How do these concepts help us understand and forecast the future of using IT in education?

JB: Information technology in education has a transforming effect on the setting or institution itself. For example, in Local Tech, an environment without information technology, the only relationships are those that exist within a village. But with information technology, villages and schools can be linked around the globe. All of a sudden we have Marshall McLuhan's global village. Information technology puts them together almost as if they are in the same neighborhood. In that way, we see education transforming itself as it is impacted by this technology. Information technology is important in each of the regions, but the use of it is a little bit different in each region because of differing values. For example, in the Super Tech region, the educational use of information technology provides information to a lot of people—more things for more people, faster information flow, more information. By contrast, in Limits Tech, the educational use of information technology might be used to quantify some of the underlying assumptions of the region: Do we really have enough oil to use it the way we have forever? Is there a population limit to the globe? When we get over a certain number of people, does the quality of life suffer?

JM: You use a term in your book, "the geography of technology." What does this mean in terms of anticipating how the future of education may unfold?

SE: We use the word geography to match the metaphor of the Five Regions. It could very well be that these theoretical regions actually wind up being geographically different places. We have identified places in the world that are more inclined toward one region of the future than another. The boundary lines of TechnEcologies are not as well marked as geographic regions that are bordered by mountain ranges or bodies of water, but technologies often seem to spread only so far. In a very large, complex society, many subgroups with different values make different choices. One of our theses is that people's values make certain technologies more appealing than others, and, as that technology takes root, it has a cascading effect in that region; the result is a TechnEcology, an environment where values and technology choices have a synergistic impact to create the good life in that region.

JB: The other reason we like the term geography is because people tend to think about the future as a place. I have found that as soon as people see the title of our book, they say, "What are the five regions of the future?" They immediately think of the answer in spatial terms, and they have not even read the book.

As for how this geography applies to the future of education, we should really talk about it region by region, starting with Super Tech. Because its concept is "bigger is better," what we see Super Tech education becoming is as much entertainment as it is education—"edutainment." The focus in this region is strongly on the individual consumer, and this region assumes that individuals want to be educated in a fashion that suits their own needs and desires. And why not? If we have more than enough of everything for everyone, then whatever the individual wants, we can deliver.

In Limits Tech, systems thinking will be a dominant part of education. If we are going to deal intelligently with the planet's limits, for example, we must understand ecological systems, population systems, resource depletion systems, financial systems, and the interplay between them. So Limits Tech teachers will have a thorough education in systems thinking. Moreover, with regard to how technology is actually used in education, a Limits Tech perspective would likely stress efficiency measures such as centralized or cost-effective course management systems, reusable or shared content in online courses, and scalability in technological resources.

JM: What about the other regions of the model you propose? Do they have their own implications for future educational goals or priorities?

SE: One Local Tech assumption is that local energy sources are for local use and local purposes. For example, energy can be supplied by wind power where the wind blows, by wave power where tides ebb and flow, or by geothermal power where geological activity releases heat close enough to the surface to capture it. Where local conditions dictate behavior, education likewise focuses on how to take care of the connection between daily life and those different local resources. In a region whose economy relies strongly on agriculture, for example, the use of educational technology might be customized to foster research into the most effective means of crop cultivation; in a region whose economy relies strongly on tourism, the use of educational technology might be tailored to focus more on issues of historical preservation, environmental preservation, or regional promotion. Meanwhile, the pervasiveness of information sharing via technology would also allow people who do not live under the same conditions to learn about their respective endeavors.

In the Nature Tech realm, we are just discovering things now that have been true for a very, very long time. Very popular, of course, is the idea of manipulating DNA either to correct genetic defects or, in some cases, to create new things. So education in this region is geared toward trying to help us understand what nature has already evolved.

JB: Biology drives Nature Tech education, and almost an infinite number of biological organisms exist. By understanding how these organisms solve their problems, Nature Techers hope that such solutions can be adapted to our needs. This approach differs fundamentally from education as we have it right now. We separate ourselves from nature with our science and our technology, but in the Nature Tech approach, we would reintegrate ourselves with nature.

Gold mining provides a good example. We know of certain bacteria that process ore and concentrate gold as a waste product. Some bacteria produce hydrogen as a waste product, which, of course, we can use as fuel. Just recently, bacteria that produce electricity have been discovered. So, education in the Nature Tech realm is really about the exploration and application of answers that Mother Nature has evolved over several billion years. Along the same lines, any new technologies that would emerge within this realm would likely be oriented toward the discovery and precise modelling of natural processes so that such processes could be adopted by human beings in their relationship with the world.

JM: What about Human Tech?

JB: Education is an important topic in the Human Tech region, and learning about the body's internal technology and how, in turn, internal technology affects learning is an important activity. An example that illustrates the significance of this relationship can be seen in chronobiology, the study of the body's internal time clock, which determines whether someone is a morning person or a night person. Some students are at their best in the morning and others in the afternoon. This has important implications for instructional activities and testing.

SE: To take advantage of the new knowledge generated by Human Tech, schools will become more data-driven. Data will be collected about each student and used to create individual development plans based on the students' needs and individual differences. This not only has implications for changes in school operations and the preparation of teachers but also leads to a philosophy of continuous improvement based on results of the individual development plans. Since Human Tech encompasses a broader range of values with respect to the good life—values that are not limited to the pragmatic or materialistic—a Human Tech approach to education would avoid the one-size-fits-all approach that we see in the case of standardized testing and overly regimented curriculum requirements.

JB: Scott and I are trying to provoke a discussion about technology. We have an important reason for doing so. What we know is that our machines are getting smarter and smarter. At some point, they will become

intelligent. When they do, they will be the ones who will want to have this conversation. So, we think we ought to start now with ourselves and then let them join in after we have spent some time thinking about it.

This discussion, now and later, between us and perhaps our intelligent machines, is important for the future of education. Whether it is teaching about the future implications of choices between technologies, advocating the use of certain kinds of technology to create a desirable future, or using technology to enhance the education process, we think the Five Regions is a useful new concept for educators.

JM: Thank you so much. Your insights about the traits and benefits of the five technological ecosystems described in your book will be most helpful to educators as they strive to prepare their students for an unpredictable future.

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