Notes from the Field

The Digital Divide and the Cognitive Divide: Reflections on the Challenge of Human Development in the Digital Age

Clotilde Fonseca
clotilde.fonseca@gmail.com
Minister of Science and Technology
Executive Director (2009–2010)
Omar Dengo Foundation
Costa Rica
P.O. Box 194-2050
San José
Costa Rica

Digital Revolution, Digital Divide

The digital revolution has changed the landscape of development. The disruptive nature of the transformation has forced countries and societies to undertake major projects and investments. Coming to understand the underpinnings of this revolution has been, however, a slow and intricate process, particularly in developing nations. Even today, when there is no longer any doubt about ICT's importance and impact, development policies and initiatives are not always oriented toward addressing major long-term needs.

As is well-known, most efforts to bridge the digital divide have been highly technocentric. Key attention has been given to issues of infrastructure. Connectivity and content have led the list of critical concerns as the essential building blocks of the digital revolution. Important efforts have also revolved around training issues, generally conceived as "computer literacy," or more recently, as "digital literacy." These terms—as well as the programs derived from such conceptions—tend to focus on the acquisition of computers, information, and Internet skills, and in most cases, basic knowledge about technology in job-related contexts.

The digital divide has clearly been perceived as a major concern and a threat to balanced development, one that marks a difference among generations, communities, societies, and even countries. Measurements of e-readiness at the individual, enterprise, and government levels are part of the data used to compare development achievements among countries. The term "digital inclusion" has become a key policy objective, so as to democratize access to these new resources and contribute to economic development. Digital inclusion is, today, a fundamental component of all forms of sustainable development. Most initiatives, however, continue to be limited in scope and vision.

The United Nations World Summit on the Information Society (WSIS), held in two phases in Geneva (2003) and Tunis (2005), along with the meetings thereafter, has marked a significant turn toward more people-centered approaches. Post-WSIS evaluations, however, have shown that there is still much that needs to be accomplished, particularly if the objective is to go beyond basic command of hardware and software. The skills and competencies required for the digital age are much more demanding and much more challenging in both intellectual and productive terms than is usually understood. It is important to note that, to be part of the new productive and cultural context, contemporary workers need to develop many new, different capacities. They need to be able to deliver products

and services that innovate and add value. They also need to be a part of the new technology-mediated interactive social environments.

Nicholas Carr (2003) has evaluated this change quite clearly. He indicates that, like transportation and electricity in the past, digital technologies have become "infrastructural technologies." They are a central piece in all productive systems. They are essential to economic growth, and they play a fundamental role in bridging all socioeconomic disparities. Being able to profit from them, however, does not depend merely on their availability. As Carr has highlighted repeatedly, it depends more on people's preparation and capacity to use the new digital technologies in new and creative ways.

Cognitive Divide

Materializing the potential in these tools is not, however, an easy matter. In reality, today's digital divide is strongly linked to the cognitive divide. It is related to the way in which people are able to understand, learn, express, produce, share, collaborate, create, and innovate using technology. This demands the activation of intellectual and knowledge acquisition skills and competencies with growing levels of diversity and complexity. Precisely for this reason, poverty reduction, as well as educational and development efforts, needs to go beyond traditional efforts to provide connectivity and content. Today, they also need to provide increased levels of technology-enhanced learning, production, and innovation capabilities. Therefore, it is critical to understand the digital culture and the new production paradigm. Without an adequate grasp of these processes, it is unlikely that human resource development efforts, particularly in the developing world, will be successful with respect to the new requirements.

The great danger, however, is that, as McLuhan warned us (quoted in Levinson, pp. 15–16), there is frequently a tendency to look at the future through the rearview mirror. As we know, much has changed as a result of the digital revolution. Still, people tend to address digital challenges by making use of pre-digital approaches. It is necessary to remember, however, that, as Alan Burton-Jones has noted (1999), knowledge is central to the new economy. It is critical in business and work in general. Apprehending knowledge and applying it to new productive and social contexts is not simply a matter of having access to technology, information, and data. Access to information is certainly not the same thing as access to knowledge. Building and profiting from knowledge involves the strengthening of the human capacities to analyze, to understand, and to derive meaning, as well as to apply that knowledge in real-life productive and creative contexts. It implies excellence and pertinence of education systems to stimulate higher levels of intellectual development in individuals.

Moving from the industrial age into the digital era calls for major cultural, political, and productive transformations. Throughout the last two decades, several authors and researchers have addressed this issue from different perspectives. Anthropologists, psychologists, and economists, alike, have repeatedly stressed the major changes that this will bring. For example, in her book *In the Age of the Smart Machine: The Future of Work and Power,* Shoshana Zuboff described some of the basic characteristics of this transition as early as 1988. The industrial age, she indicated, was characterized by the prevalence of manual work. Physical strength was highly valued, as were the capacities to follow directions and act according to the norm. In the Information Age, however, much more emphasis is placed on abstract, symbolic, and intellectual work. Flexibility, autonomy, and creativity are more highly valued than strict discipline and routine work. Information and intellectual choices, rather than physical response, are the real sources of knowledge. Major changes can also be observed in terms of power relationships. Collaboration, teamwork, and horizontal linkages have tended to substitute highly hierarchical and vertical work relationships.

Education and Creativity

Robert Reich (1992) addressed these issues from another angle. He described the types of jobs available in the global economy and how they require higher levels of education. He stressed the need for more creative specialists. These workers need to have extensive skills and specialized education. It is no longer adequate to have a large workforce with general skills and low knowledge-processing capacities. As a matter of fact, in his book *The Work of*

Nations: Preparing for 21st Century Capitalism, Reich holds that there are basically three general categories of workers present in today's economy: symbolic analysts, service providers, and routine production workers. As is obvious, higher-paying jobs are held by people who have greater intellectual skills, as well as more flexibility and creative capacity. Routine production workers hold lower-paying jobs that are, besides, also subject to automation.

Manuel Castells has made an even stronger argument, one that inevitably makes us ponder. He has stated that, for the first time in human history, the human mind is a productive force in itself, and not merely a key factor in production processes (2002, p. 43). The centrality of the human mind and its creative and productive capacity are a vital part of the digital revolution. To become a part of the knowledge society, it is therefore essential to address the development of these faculties.

ICT Initiatives, Costa Rica

The conviction that the combined development of technological, creative, and intellectual skills is crucial for development has led many countries to invest in the preparation of new generations to face the challenges posed by the digital age. The thrust to provide young students with a laptop, led by Negroponte's One Laptop per Child initiative, springs precisely from this conviction. Many countries are embarking in this direction in order to provide school children with new learning and capacity-building opportunities. Clarity about the importance of these issues has marked public policy debates in several nations. Uruguay is well-known for having recently taken important steps in this direction by providing each student with a laptop to enrich learning capacities and establish stronger links with the digital age.

Costa Rica has also been a country known to favor the use of technology-enhanced learning environments for over two decades already. As early as 1988, the country embarked on a major investment campaign to introduce computer technology to schools within a context designed to stimulate cognitive development and productive skills. This major public policy definition has grown and deepened over time. Several generations of Costa Rican children and youth have participated in a national program to provide young students with computer programming, project-based and curriculum-related learning, and creative experiences. Several years before "digital divide" was coined as a concept and gained currency worldwide, Costa Rica had launched a program designed to address the use of digital tools as key resources in developing cognitive and creative skills.

Twenty-two years later, the impact of this decision is evident. Costa Rica has been able to attract important technology-related foreign direct investment. As a matter of fact, today it is one of the main players in the export of high-tech products in Latin America. The country ranks high in World Economic Forum studies on e-readiness, particularly in those associated with the capacity of individuals to make profitable use of technology. This should come as no surprise. Costa Rican educational and political leaders have been convinced that the digital divide needs to be bridged alongside the cognitive divide. This focus has become one of the cornerstones of the country's technology-related educational investments.

21st-Century Skills

This is obviously a major policy issue everywhere, particularly in emerging economies. *The Economist* captured this clearly some years ago: "[A]s the price of telecommunications and computers go down, the real reason why the poor will not have access will be evident: They lack the skills to exploit it effectively" (August 12, 2001). Special efforts must be implemented to stimulate cognition, and to develop new capacities of different types. Much more than being "info rich" or "info poor" is required. Furthermore, since development is clearly a dynamic process, new challenges arise, and efforts have to be updated and re-focused. The complexity of the skills required and the need for educational systems to provide them have become a major source of concern.

Precisely for this reason, many countries around the world are now exerting important efforts to address what are known as "21st-century skills." There is even a 21st-century skills consortium in which representatives from major corporations, academia, and countries deliberate about the ways in which the skills can be cultivated or enhanced (see www.p21.org). Even emerging nations are taking

steps in this direction. In Costa Rica, for example, the Omar Dengo Foundation is leading a research project supported by Canada's International Development Research Center (IDRC) that aims to identify and contribute to the development of the skills and competencies required for contemporary productivity and citizenship. Current research is focused on the strategies required to develop those skills within the specific cultural and socioeconomic conditions of both that country and the wider Latin American region. In other latitudes, projects of this sort have already been undertaken, particularly in the United States and in some European countries.

Literacy for the Digital Age

Current efforts address the need to distinguish between "digital literacy" and "literacy for the digital age." This marks a fundamental difference in focus and approach. When reference is made to "21st-century skills," or even to "literacy for the digital age," clear emphasis is given to issues of "digital inclusion" in richer and broader terms (Bujanda & Zúñiga, 2008). Deep down, digital technologies are "intellectual technologies," as Daniel Bell has so keenly expressed it. They "are tools that extend our mental rather than our physical capacities" (cited in Carr, 2008). Today, they are at the core of most human cognition processes.

Academic, intellectual, and educational communities and research centers are currently trying to deal with the challenges that need to be addressed to generate those "21st-century skills," which others call "critical skills" or "essential skills." The North Central Regional Laboratory (NCRL) in the United States, for example, holds that stimulating digital age literacy also requires inventive thinking, effective communication, and high productivity. It stresses the need to focus on the development of an important array of "literacies." Among them they include, to name only a few, scientific, economic, technological, as well as visual and information literacies. They also call for "multicultural and global awareness literacies."[1] On the other hand, the International Society for Technology in Education (ISTE) focuses its students' learning standards on the need to develop creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem solving, and decision making, as well as digital citizenship and technology operations and concepts.[2] It is possible to cite other examples of this type of attempt. The aforementioned are illustrative enough, however. They are more than intellectual reflections or academic formulations of a general nature; on the contrary, they are well-grounded in the delivery of competencies and the generation of productive outcomes.

Human Capacity Building

As is evident, the critical issue from a development perspective lies precisely in the complexity of what is now required to prepare new generations for digital-age citizenship. Most unfortunately, a lack of understanding of these new phenomena has led to many contradictory and shortsighted positions. As is evident from the types of projects implemented throughout the last two decades, many countries and agencies have swung from positions of total skepticism about the role of technology in development—a position typical of the 1980s—to almost irrational levels of enthusiasm about the promising nature of these new resources—resources which, not so long ago, were considered too risky or too costly. Access to information and the Internet is suddenly perceived as a basic guarantee of development. Interestingly enough, the new vision and discourse have been accepted by politicians and experts, alike. Proof of impact is no longer necessary, as, all of a sudden, the benefits have apparently come to be considered obvious, though their impact is not always easy to document. Interestingly, the individual, the user, and the learner are most frequently absent from this new "technology-mediated" development equation.

For this reason, a greater focus on technology-enhanced human capacity building has become a must within the context of contemporary development dynamics. Cultural and technological understanding is necessary, as is knowledge about the nature of digital resources and their potential. These have to be linked to capacity-building efforts designed with people's needs and interests in mind. Several United Nations studies, including those prepared by the Latin American Economic Commission (2007, pp. 5–6) emphasize the critical value of

1. See http://theconnectedclassroom.wikispaces.com

2. See http://www.iste.org/content/navigationmenu/nets/for _students/nets_s.htm

focusing on the requirements of the beneficiaries and other actors in the development process. They stress the need for more integral approaches that address, in unison, issues of access, capacity building, application, and policy.

Change, Growth, and Inclusion in the Knowledge Society

Clearly, deeper and more enriched "digital visions" need to be developed by individuals and policy makers, alike. The "digital gap," however, is no longer only an issue related to individual groups or communities. National visions—or the lack thereof—strongly impact the development options that citizens can expect. As is well-known, more highly developed nations have addressed e-inclusion within a context of clear understanding of the real meaning and implications of the role that digital technologies play in the knowledge societies. Many countries—the Republic of Korea among them—consider that the digital age marks the era of the ubiquitous citizen. They promote, therefore, different forms of e-learning, e-government, e-health, e-procurement, e-industry, e-commerce, e-business, and e-citizenship within the framework of an advanced digital society. Widespread citizen access to broadband connections, mobile phones, laptops, and portable devices has made the ubiquity of communication, learning, social, and financial services possible. Citizen-centric services are currently being put in place. As has been stated, these, in turn, require both intellectual and technological capabilities.

The knowledge society is an intellectually challenging and skills-intensive society. Major investments need to be made in order to generate more innovative and powerful learning and productive contexts in both formal and nonformal educational environments. It is therefore essential to pay attention to the new learning ecologies (Brown, 1999) that modern technological developments and digital resources make possible. Knowledge sharing and knowledge creation involve complex mental and symbolic processes that need to be stimulated in new generations. A better understanding of these new literacies must permeate school, community, and work-related learning processes.

There is, today, much scientific knowledge about learning that needs to inform these new approaches. A brief look at various international approaches will show that governments are willing to invest in these technologies for their own education systems. New learning approaches, experiences, and resources need to be developed to bridge the gap between the availability of devices and the value of their actual impact in schools and communities, both in formal and nonformal environments. This is an area in which further research and development need to be conducted. Initial enthusiasm and massive investment must be linked to research and scientific knowledge about technology-mediated learning.

Digital technologies can and should be powerful accelerators of social change and economic growth. They have a fundamental communication, productive, and creative potential that is critical to the development of any modern society. Their role, however, will always be directly dependent upon the visions that societies and their leaders have about them, and upon their capacity to stimulate their citizens' intellectual, productive, and creative skills, along with the more technical competencies required to profit from the capabilities that these technologies can make available. ■

References

Ayres, E. (2000). Note from a WorldWatcher, *World Watch,* January/February, 1–2.

Brown, J. S. (1999). Learning, working and playing in the Digital Age. Tape transcription from *1999 Conference on Higher Education of the American Association for Higher Education.* Available at http://serendip.brynmawr.edu/sci_edu/seelybrown/

Bujanda, M. E., & Zúñiga, M. (2008). *La alfabetización del Siglo XXI en el contexto de una sociedad digital y sostenible.* San José, Costa Rica: Fundación Omar Dengo.

Burton-Jones, A. (1999). *Knowledge capitalism: Business, work and learning in the new economy.* London: Oxford University Press.

Carr, N. (2003). IT doesn't matter. *Harvard Business Review,* May, 43–48.

Carr, N. (2008). Is Google making us stupid? What the Internet is doing to our brains. *Atlantic Magazine.* July/August.

Castells, M. (2002). *La era de la información: Economia, sociedad y cultura. La sociedad Red.* Tomo 1, Volumen 1 [*The information era: Economy, society and culture, vol. 1. The Network Society*]. México: Editorial Siglo XXI.

Levinson, P. (2001). *Digital McLuhan: A guide to the Information Millennium.* London: Routledge, pp. 1–2 (editorial).

The Economist. (2000, August 17). *What the Internet cannot do.* Available at http://www.economist.com/node/317881

Reich, R. (1992). *The work of nations: Preparing ourselves for 21st century capitalism.* New York: Alfred A. Knopf.

United Nations Latin American Economic Commission. (2007). *Monitoring eLAC2007: Progress and current state of development of Latin American and Caribbean information societies.* Santiago: Observatory for the Information Society in Latin America and the Caribbean (OSILAC).

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power.* New York: Basic Books.