

# Chapter XXII

## Sociotechnical System Design for Learning: Bridging the Digital Divide with CompILE

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### ABSTRACT

*CompILE is a sociotechnical “comprehensive interactive learning environment” system for personal knowledge management and visualization that represents the growing collective knowledge an individual gathers throughout his or her lifespan. A network of intelligent agents connects the user and his or her inhabited knowledge space to external information sources and a multitude of fellow users. Following a brief perspective on educational technology, concepts of human-computer interaction, and a description of CompILE, this chapter will introduce CompILE as a sociotechnical system supported by an enriched design process. From an educational perspective, CompILE can bridge the digital divide by creating community, embracing culture, and promoting a learning society.*

### INTRODUCTION

This chapter begins with a brief perspective on educational technology, concepts of human-computer interaction, and a description of the *Comprehensive Interactive Learning Environment* (CompILE) as a knowledge management system controlled using a network of intelligent software agents. Strategies for bridging the digital

divide using CompILE will be presented using the four-part framework of the “Wheel of Policy Instruments” constructed by van Dijk (2005).

The effect of CompILE on society will be approached from the standpoint of lifelong learning and usability engineering. CompILE will create a sense of community via participatory research, scenario-based design, and heuristic evaluation. In terms of culture, CompILE will rely heavily

upon ethnography to refine its ability to facilitate cross-cultural communication, and a distinct effort to achieve functional beauty as an interactive system should help its participants achieve a higher level of appreciation for the aesthetics of “culture” from a philosophical perspective. Globalization can be addressed by CompILE in terms of ubiquitous computing, the mobile user, visual literacy, and just-in-time translation. The chapter will conclude with a description of CompILE as a hybrid entity, and the essence of CompILE as a sociotechnical system.

This chapter has two specific objectives:

- Introducing CompILE as a sociotechnical system supported by an enriched design process
- Using CompILE to bridge the digital divide by creating community, embracing culture, and promoting a learning society.

## **BACKGROUND**

One trait of humans that makes us advanced social creatures is our ability to create artificial devices or artifacts that expand our capabilities (Norman, 1993). Throughout history, many of these artifacts have been perceived as the final piece to the ultimate puzzle of technological advancement; the last thing humans would create to meet all their future needs. The automobile, the airplane, the telephone, the television, the microwave, the Internet; the list goes on. While no single invention can actually be that final puzzle piece, major technological advancements cannot be denied as a driving force of society. Norman (1993) agrees, noting the essential nature of technology for growth of human knowledge and mental capabilities.

An important consideration to be made when designing any new interface is the anticipated impact it will have on human activity. In fact, most significant consequences of design are

based on impact to human activity. In an effort to reduce occurrence of these consequences, the design process should include a well-managed team of participants with a variety of knowledge and skills, willing to completely deconstruct any particular problem that may arise (Carroll, 1991). Why are these consequences so important? These consequences have the power to make technology completely redundant, existing merely for entertainment.

This breakpoint of redundancy is paramount in education, which, upon clarification, is essentially a purposed form of communication between one or more individuals, intended to facilitate learning and knowledge construction. Using a learning-centric approach, the application of technology to the processes of teaching and learning can be seen as an amplification of the channels of communication. There is no point in seeking to improve the educational communication process with technology if all efforts result in glamorous toys with no effect beyond distraction. Computers cannot be placed in schools for an administration to show that it is on the forefront with cutting-edge educational technology. Technology must be carefully integrated with curricula to be used as tools, or artifacts, fundamental to the learning process.

This concept extends beyond the classroom geographically and temporally. Students using the technology must be wholly engaged in the content of the curriculum, using the technology as a mechanism of that engagement. Kling (2000) reinforces this notion of engagement when describing such an application of technology as the development of a “sociotechnical system,” or an information technology system that cannot separate its existence from the social context of its users. Once this point of engagement is reached, the technology available today and tomorrow can create amazing opportunities for experience and growth within and beyond the classroom. To reach this point, a sociotechnical system must be designed and developed, with an eye toward

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