

ROGER SÄLJÖ

## REPRESENTATIONAL TOOLS AND THE TRANSFORMATION OF LEARNING

*Keynote Address*

### ABSTRACT

Human learning, following Vygotsky, Dewey and others, is the appropriation and mastery of knowledge and skills that have accumulated in society. This ability to accumulate experiences over generations, and to communicate them in time and space, are two of the features that are so distinctive for the human species. A corollary of such a perspective on learning, and one that contrasts with most theoretical traditions, is that learning, and cognition in general, are historical phenomena subject to change in nature as the fabric of social practices changes, and as the mechanisms for storing and communicating information are transformed. Dewey recognised this sociohistorical contingency of cognition when pointing out that we have to rid ourselves “of the notion that “thinking” is a single, unalterable faculty” (1909/1997, p. 38). Already a hundred years ago, he argued in his vivid metaphorical language that “thinking is specific” and “not like a sausage machine which reduces all materials indifferently to one marketable commodity.” (p. 39).

One of the most significant mechanisms through which learning is transformed is technology. Artefacts represent one of the forms of externalisation (Donald, 1991) that we make use of. Over the past three thousand years, a range of artefacts has been produced that have modified how people learn in various situated practices. Some of these technologies have had a very general impact (and here the artefacts and practices relating to literacy and uses of text are the most dramatic), while others have been more local, affecting the way in which a particular practice is organised (for instance, the invention of the chart and the compass for navigation at sea).

In the case of learning, and especially in relation to institutionalised forms of learning, representational tools that have to do with storing and representing information are particularly significant. During the past hundred years, a number of technical inventions in this field (the motion picture, the radio, the television, the VCR, computers and digital technology and several others) have been introduced, and they have changed our daily practices in many spheres of life quite dramatically. As Cuban (1986) points out, many of these have also been hailed as the start of a revolution where education will be transformed and learning vastly improved. The arguments have also had a rather similar flavour to them: books and lectures are boring; motion pictures, television programmes and computers are fun, and they will

take most of the hardships out of learning. However, the experiences of introducing technologies into institutionalised forms of learning have never lived up to the initial expectations. The new media have found a place within institutional practices, but their impact has been considerably less than argued by the enthusiasts.

However, the significance of new technologies does not lie in their enhancing learning in a linear sense. Learning does not become better or more efficient. Rather, the important point about new technologies is that they, if they are powerful enough, transform basic features of how people communicate knowledge and skills in society and how information is organised. In this sense, new media may imply that learning will become different. This pattern of transformation of learning through new technologies has happened on several occasions in history, and one might argue that digital technology is another case in point.

## BIOGRAPHY

Roger Säljö is a Professor in educational psychology at Göteborgs University. His research interests include learning and communication within a sociocultural perspective. Säljö has an impressive list of publications on learning and development from sociocultural and cultural psychology perspectives. He is also scientific leader for the Swedish Knowledge Foundation's research programme Learning and IT (LearnIT).

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MASANORI SUGIMOTO

## HOW SENSING AND MOBILE TECHNOLOGIES CAN ENHANCE COLLABORATIVE LEARNING IN CLASSROOMS AND MUSEUMS?

*Keynote Address*

### ABSTRACT

We have so far developed several systems for supporting collaborative learning that are used and evaluated in classrooms and science museums. The underlying philosophy of these systems is that CSCL systems should raise the levels of learners' motivation and participation in a learning situation. We believe that enhancing interactions among learners in a physical world is an effective way for supporting their learning. Recent development of sensing and mobile technologies allows us to devise new computational systems for enhancing such interactions. In this talk, we discuss about design and development issues of the CSCL systems in our projects.

### BIOGRAPHY

Masanori Sugimoto is Associate Professor in the Department of Frontier Informatics, Graduate School of Frontier Sciences, University of Tokyo, Tokyo, Japan. He received B.Eng., M.Eng., and Dr.Eng. degrees from University of Tokyo, Japan, in 1990, 1992, and 1995, respectively. His research interests include human-computer interaction, computer supported collaborative work/learning, artificial intelligence, information visualization, database systems, and information retrieval. In recent years his research group has been developing several systems for supporting collaborative learning in face-to-face and networked environments using sensing and augmented reality technologies. The purpose of these systems is to raise learners' motivation and enhance their participation in a learning situation. The systems have been evaluated in elementary schools and museums.



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