Integrating Technology into Learning and Working: Issues at the boundary

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ABSTRACT
In this introductory article, a context for part two of this special issue is provided. Introductory remarks are followed by a discussion of how and why this issue was organized around four sub-themes. We conclude with brief remarks about some aspects and key issues involved with integrating technology into learning and working.

Keywords
Learning environments, Technology integration, Work environments

Introduction
We began the enterprise of editing a special issue of Education, Technology and Society on “Integrating Technology into Learning and Working” with a number of assumptions including the following:
- Technology effects how people learn and work;
- Technology is changing the boundary between learning and working;
- Technology integration is a design issue requiring new or modified design perspectives and frameworks; and,
- Cultural and psychological issues underlie how people interact.

These assumptions led us to request papers that addressed one or more of the following:
- the impact of new technologies on the design, development and delivery of educational and training materials;
- the apparently disappearing distinction between learning and working;
- new frameworks for planning and implementing learning and work support materials for new technology settings; or,
- interactions that may exist between personality and cultural factors and collaboration in learning and work settings.

We have heard from capable researchers and competent scholars in this two-part issue about these ideas. Our own views have matured in the process. We still believe these issues are important. Consequently, we believe it is important to evaluate learning and work environments seriously. A combination of activity theory and a broad and dynamic view of instructional design provide a foundation for such evaluations. Wang echoes these notions in the concluding synthesis article.

Discussion
This second part of the special issue focuses on integrating technology into work environments and on the interactions between learning and working that technology facilitates. This issue is organized into full papers and short papers. The two full papers are broad in the sense that they address all of the components of an activity system (Leont'ev, 1978; Nardi, 1996), as was the case with the full papers in part one. Both of the full papers in this issue, DeLacey & Leonard and Koszalka, also explicitly address interactions between learning and working - the former does so in terms of communities of practice and case-based education in the Harvard Business School and the latter does so in terms of the influence of parents, teachers and peers on middle school children’s career interests.

We have organized the short papers into these sub-themes: (a) the transition from learning to working; (b) different settings and contexts; (c) theory and conceptual frameworks; and (d) reviews. The second part of this special issue concludes with a synthesis article by one of the co-editors (Wang) that offers reflective comments on both parts. In the next sections, a brief overview of each sub-theme is provided.
The transition from learning to working

The short papers in this section include a discussion of best practice in technology-mediated business education (Gemeinhardt), an examination of students making a transition from post-secondary education to the workplace (Kirby et al.), and an analysis of technology-facilitated convergence between work-based and campus-based learning (Radcliffe). Gemeinhardt concludes that a technology integration effort should not be undertaken lightly since successful technology integration requires substantial institutional commitment in terms of resources and effort. Kirby and colleagues differentiate surface and deep learners and argue that lifelong learning often prefer to learn independently and use computers in sophisticated ways, which presents many challenges efforts to integrate technology into working. Radcliffe argues that technology integration is likely to be successful when goals and assumptions are clear and shared, when a broad sense of ownership is present and when there is a sustainable development strategy.

Different settings and contexts

The short papers in this section include a discussion about integrating technology into a variety of settings and contexts, including the Australian Defence Organization (Ali et al.), the Texas Statewide Coordinated Statement of Need Project (Suggs et al.), Telenor in Norway (Folkman), a medium-sized enterprise in the engineering sector of the Scottish economy (Brink et al.) and a small city government (Maestro-Scherer et al.). Ali, Pascoe and Warne conclude that the development of information systems requires an understanding of the cultural and interpersonal issues prevalent in work environments. Suggs, Cissell and Ward suggest that the use of communication technologies for projects has advantages since the technologies are often cost effective, can reduce long distance bills and travel time, and allow for more communication, collaboration, and resource sharing. Folkman concludes that the division between work and learning is often blurred, but the fundamental transformation requires a shift from work-oriented management to managing a learning organization. Brink, Munro and Osborne identify some common problems associated with learning in small to medium enterprises, such as time and workload pressures, the operational culture of the company, and different learning preferences of participants. Maestro-Scherer and colleagues identify two diverging perspectives: technology that tends to result in less interpersonal involvement, and technology that tends to result in increased interpersonal activity and involvement. These two perspectives need not be viewed as conflicting as the associated technologies may have different goals and involve different kinds of activities, some of which are appropriate for individuals with others more appropriate for collaborative groups.

Theory and conceptual frameworks

Five of the short articles provide insights into theoretical considerations involving technology integration. After reviewing various approaches to the evaluation of training, Eseryel suggests ways that technology can be used to support the evaluation of training, such as developing automated expert systems to guide instructional evaluation. Lytras, Pouloudi, & Poulymenakou propose a dynamic learning model to address the multifaceted and dynamic nature of knowledge management. Sampson and colleagues provide a conceptual framework for knowledge-on-demand and offer a critique of existing standards and tools. Based on an electronic Delphi study, Bitter-Rijpkema provides insights into knowledge elicitation within virtual learning work activities embedded in an organizational setting, such as the need for support of social and community related aspects of knowledge processes occurring in professional teamwork. Avellis and Finkelstein propose a scheme – non-functional requirements – to annotate multimedia educational software. These papers taken together add both depth and breadth to fundamental issues pertaining to technology integration.

Reviews

There are three review papers included in this section. Annala describes the Strawberry Discovery project in Sweden. Eseryel, Ganesan and Edmonds provide a review of computer-supported collaborative work (CSCW) systems. Schreck reflects on the results of a project that introduced an American model for web-based corporate learning into Russia. Annala’s Niche Process facilitates a process to help individuals identify valued resources as they relate to career planning. Eseryel and colleagues describe and discuss three CSCW systems: Lotus Notes, Xerox DocuShare, and SevenMountains Integrate. It is just such systems that create a blurring of the boundaries between learning and working because they can be used to support either and are often used to support both. Schreck’s examination of the application of an American learning model in Russia revealed similar concerns in
both countries with regard to utility, timeliness and quality of instruction but also served to highlight how cultural factors impact instruction and training. Schreck argues that culture and technology shape corporate training in different ways.

**Concluding remarks**

More than anything else, in the course of editing this special issue we have come to the conclusion that technology integration is a complex process. When any of the situations discussed in this issue are examined, it becomes obvious that there are multiple actors with different roles and perspectives and that the local learning or work culture significantly impacts the success of technology integration efforts. In short, we now know less than we might have been inclined to believe when this issue was first conceptualized, but we feel much enriched by our recently acquired ignorance.

**References**
