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## Section 5.1

### Technological Change, Learning and Work

#### **Work and Lifelong Learning Resource Base (WALLRB)** Materials for Teaching, Research and Policy Making

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## **Chapter 5.0**

### **Other Topics in Learning and Work**

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#### **Section 5.1**

##### **Technological Change, Learning and Work**

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1. Abbott, L. (2005). The nature of authentic professional development during curriculum-based telecomputing. *Journal of Research on Technology in Education*, 37(4), 379-398.

What do teachers learn about their teaching when their students engage in curriculum-based online learning projects? This qualitative study explores beliefs about on-the-job, profession-related learning - or "authentic professional development" - among eight teachers whose students participated in educational projects hosted by five well-established programs: The Electronic Emissary, iEARN, KidLink, ThinkQuest, and ThinkQuest Jr. Telecomputing alone does not change teachers' teaching styles. Instead, teachers who are innovative, inquiry based, and student centered may find telecomputing to be a useful tool for helping their students become more confident, self-directed learners.

**KEY WORDS:** Teaching Styles; Professional Development; Online Courses; Beliefs; Teacher Attitudes.

2. Baldoz, R., Koeber, C., & Kraft, P. (Eds.). (2001). *The critical study of work: Labor, technology, and global production*. Philadelphia: Temple University.

This book is a compilation of essays "inspired by" a 1998 conference called "Work, Difference, and Social Change: Two Decades after Braverman's Labor Supply and Monopoly Capital" that was organized by Baldoz (sociology, Univ. of Hawaii), Charles Koeber (sociology, Wichita State Univ.), and Philip Kraft (sociology, SUNY at Binghamton), challenges the reality of globalization in the workplace. The book is comprised of four parts - "The Global Perspective: Continuity and Change," "Service and Service Sector Workers," "Production and Industrial Workers," and "Professional and Technical Workers" - with two or more essays in each part.

**KEY WORDS:** Working Class; History; 20th Century; Work Environment; Technological Innovations; Work and Learning.

3. Beckett, D., Agashae, Z., & Oliver, V. (2002). Just-in-time training: Techne meets phronesis. *Journal of Workplace Learning*, 114(8), 332-339.

New software and driven by internal budgets, managers' "just-in-time" is emerging as an interesting aspect of workplace learning, not least because it provokes re-consideration of adult learning, and perhaps of educative understanding itself.

**KEY WORDS:** Just-in-Time; Training; Management Development; Workplace Learning.

4. Braundy, M., O'Riley, P., Petrina, S., Dalley, S., & Paxton, A. (2000). Missing XX chromosomes or gender in/equity in design and technology education? The case of British Columbia. *Journal of Industrial Teacher Education*, 37(3), 54-92.

Presents data demonstrating the disproportionately low numbers of female technology teachers, teacher educators, and students in British Columbia. Discusses recruiting inequities, history of gendering in industrial technology classrooms, and resistance to gender-specific interventions. Outlines a technology education curriculum for all students.

**KEY WORDS:** Design; Enrollment; Foreign Countries; Higher Education; Secondary

Education; Sex Discrimination; Sex Fairness; Student Recruitment; Teacher Education; Teacher Recruitment; Technology Education; Work and Learning.

5. Carr, M. (2001). Let me count the ways. Analyzing the relationship between the learner and everyday technology in early childhood. *Research in Science Education*, 31(1), 29-47.

Outlines four ways in which the relationship between the learner and everyday technology might be analyzed using early childhood studies as examples. The four individual-technology relationships are described as affording, anchoring, distributing, and appropriating.

**KEY WORDS:** Elementary/ Secondary Education; Higher Education; Learning Theories; Science and Society; Science Education; Technological Literacy; Technology Education; Work and Learning.

6. Clark, K. (2003). Using self-directed learning communities to bridge the digital divide. *British Journal of Educational Technology*, 34(5), 663-665.

This article describes the role played by self-directed learning communities to bridge the digital divide between those who have access to new information technologies and those who are not able to access the information. In terms of education digital equity means ensuring that every student has equitable access to advanced technologies, communication and information resources, and the learning experiences they provide. Research on the digital divide or digital equity is diffuse and typically appears in three forms: policy studies, theoretical considerations and societal impacts, and examination of patterns of use, on-line content, and the expressed needs. Given the lack of digital divide research solely dedicated to pedagogy, researchers should begin to examine the application of the lifelong learning framework in informal learning environments.

**KEY WORDS:** Self-directed Learning; Digital Divide; Information Technologies; Learning Environments; Information Resources; Learning Experiences; Lifelong Learning.

7. Clark, K. (2005). Serving underserved communities with instructional technologies. *Urban Education*, 40(4), 430-445.

The goal of this exploratory research study was to use the self-directed learning framework in a nonformal learning environment to determine how an underserved community would use technology. The factors that support self-directed learning in a nonformal learning environment were the ability to communicate, access information, and acquire knowledge. The primary focus was on the needs of the residents as learners; looking at why, when, what, and how community members wanted to involve technology in their learning and living. Residents identified needs that included issues related to housing, health care, child care, finances, education, and community unity.

**KEY WORDS:** Community Programs; Educational Technology; Nonformal Education; Access to Computers; Computer Uses in Education; Independent Study; Self Management; Low Income Groups.

8. Clegg, S. (2001). Theorising the machine: Gender, education and computing. *Gender and Education*, 13(3), 307-324.

The article provides a theoretical overview of the relationship between gender, education, & computing. It explores the role of education in the continued reproduction of computing,

& latterly information communications technology, as masculine domains. Gendered social relations are inscribed into the development of computing technology & the ideological separation of the "expert" from end-users. The article offers a critique of the strong sociology of science & postmodernist analyses of technology for reducing technology to the social, & of technological determinism. It argues instead that we need to understand how computing is constituted historically & the ways computing can be understood as a concrete science. The article brings together perspectives on technology derived from a critical realist perspective with some aspects of the feminist standpoint paradigm. The author examines three key educational locales in the reproduction of gender ideologies of the machine. These are schools, universities, & the multiple sites of lifelong learning. The article concludes that the gendering of computing as a masculine discourse continues, & that the analysis of technology & the sociology of education needs to reconnect within a broader critique of society if women's continuing marginalization in the dominant discourse is to be understood & challenged.

**KEY WORDS:** Education; Computation; Sexual Inequality; Sociology of Science; Postmodernism; Feminism; Paradigms; Social Reproduction; Sociology of Education.

9. Cooper, C. D., & Kurland, N. B. (2002). Telecommuting, professional isolation and employee development in public and private organizations. *Journal of Organizational Behavior*, 23, 511-532.

This article employs a grounded theory methodology to compare the impact telecommuting has on public and private employees' perceptions of professional isolation. Ninety-three semi-structured interviews were conducted with telecommuters, non-telecommuters, and their respective supervisors (all aged 28-62 yrs) in 2 high technology firms and 2 city governments. These organizations had active telecommuting programs and a strong interest in making telecommuting a successful work option, providing an opportunity to investigate the challenges of telecommuting. The interviews demonstrate that professional isolation of telecommuters is inextricably linked to employee development activities (interpersonal networking, informal learning, and mentoring). The extent to which telecommuters experience professional isolation depends upon the extent to which these activities are valued in the workplace and the degree to which telecommuters miss these opportunities. Public respondents appeared to value these informal developmental activities less than private employees. Therefore, it is stipulated that telecommuting is less likely to hinder the professional development of public sector employees than that of employees in the private sector. A partial interview protocol and examples of codes are appended.

**KEY WORDS:** Telecommuting; Professional Isolation; Employee Development; Public Organizations; Private Organizations; Employee Perceptions.

10. Daugherty, M. K. (2003). Advancing excellence in technological literacy: Professional development standards. *Technology Teacher*, 63(3), 27-31.

Discusses the Standards for Technological Literacy: Content for the Study of Technology and their importance to the professional development of teachers. Includes an activity to be used to illustrate the role of design technology, explain the standards, and solves a problem likely to be encountered by teachers.

**KEY WORDS:** Design; Professional Development; Standards; Technological Literacy; Technology Education; Work and Learning.

11. Downes, S. (2001). The fragmentation of learning. *Education Canada*, 41(3), 4-7.

Information and communication technologies, especially the Internet, have vastly increased access to information and educational opportunities. Steadily increasing consumer demand is driving the development of online educational materials. The end result may be a "fragmentation" of learning involving multiple learning providers and delivery modes, where the autonomous learner chooses the learning experience that meets his or her needs.

**KEY WORDS:** Access to Information; Distance Education; Educational Demand; Educational Opportunities; Educational Trends; Informal Education; Information Technology; Internet; Learner Controlled Instruction; Personal Autonomy.

12. Gorard, S., & Selwyn, N. (2000). *Investigating the role of technology in widening participation in lifelong learning. Final report.* Retrieved July, 2006, from [http://www.eric.ed.gov/ERICDocs/data/ericdocs2/content\\_storage\\_01/0000000b/80/23/ea/85.pdf](http://www.eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/23/ea/85.pdf)

This small-grant funded project was intended to act as a pilot study looking at the use of information and communications technology (ICT) in adult education. In particular, the project aimed to investigate the use of ICT in extending patterns of participation in adult education to those social groups presently excluded from learning; one of the oft-stated rationales for the funding of such programs in the United Kingdom and United States. Over the course of the year, the project followed the development of the Digital College ICT-based program in Wales, alongside the concurrent implementation of the UK-wide national government initiatives the "University for Industry" and "learnirect." In doing so, a range of research instruments were developed, used and refined, primary and secondary data were collected and analyzed, and directions for future research formulated. The scope of the data collected allowed a series of tentative conclusions to be reached regarding the effectiveness of ICT-based education to achieve its aims. The overall preliminary finding from the project is the wide disparity between the enthusiastic rhetoric surrounding ICT-based education and the reality "on-the-ground," as it presently stands.

**KEY WORDS:** Adult Education; Computer Assisted Instruction; Computer Mediated Communication; Computer Uses in Education; Distance Education; Educational Development; Foreign Countries; Higher Education; Lifelong Learning; Pilot Projects; Technology Role; United Kingdom.

13. Gorard, S., & Selwyn, N. (2005). Towards a le@rning society? The impact of technology on patterns of participation in lifelong learning. *British Journal of Sociology of Education*, 26(1), 71-89.

This paper is based on 1001 home-based interviews with UK adults. It describes their varying patterns of participation in lifelong learning & their use of technology for learning & leisure. It finds that 37% of all adults report no further education of any kind after reaching compulsory school leaving age. This proportion declines with each age cohort, but is largely replaced by a pattern of lengthening initial education & still reporting no later education. These patterns of participation are predictable to a large extent from regression analysis using a life-order model of determining variables - all of which are set very early in life. This suggests that universal theories to describe participation, such as human capital theory, are incorrect in several respects. Where individuals create, for themselves & through their early experiences, a "learner identity" inimicable to further study, then the prospect of learning can become a burden rather than an investment for them. This has implications for the now widespread & extensively funded notion of overcoming barriers to access via technology.

**KEY WORDS:** Adult Education; Information Technology; England; Wales.

14. Gradwell, J. (2003). Technology education in Canada: A mosaic. *Canadian Journal of Science, Mathematics and Technology Education*, 3(1), 17-35.

Describes technology education on a province-by-province basis. Groups various approaches to technology education into three categories and summarizes them. Provides illustrative examples and focuses on the objectives of the curriculum, the way the content of the program is structured, and recent developments.

**KEY WORDS:** Curriculum Development; Educational Change; Foreign Countries; Secondary Education; Technology Education; Work and Learning.

15. Gunderson, M., Jacobs, L., & Vaillancourt, F. (2005). The information technology (IT) labour market in Canada: Results from the national survey of IT occupations. Ottawa: Software Human Resource Council.

In the new economy, portals have replaced ports, bytes have replaced bits, and the information highway has replaced the conventional highway as the basic infrastructure of the information economy. Ports, bits and conventional highways are still important; but even they are sustained by information technology (IT). In the new knowledge economy IT is crucial—in fact IT is almost synonymous with the knowledge economy. In our highly developed economy it is imperative that we facilitate the transformation of information into the knowledge. Canada needs to sustain its productivity and competitiveness. To sustain a high-wage economy like Canada's, a highly skilled, highly productive workforce is crucial. This is especially true in IT—and increasingly so given the feasibility of outsourcing and off-shoring service and IT functions. Canada cannot, and does not want to compete on the basis of wages with low-wage economies throughout the world. This means that Canada must have a flexible, adaptable and skilled workforce to maintain high productivity and high wages. In a world where the prices of goods, physical and financial capital and other inputs are increasingly fixed in the global market place, the comparative advantage of a country like Canada will increasingly depend on the skills and knowledge embedded in its workforce.

**KEY WORDS:** New Economy; Information and Technology; Knowledge Economy; Canada.

16. Haynie, W. J., III. (2003). Gender issues in technology education: A quasi-ethnographic interview approach. *Journal of Technology Education*, 15(1), 16-30.

Interviews with 12 female technology education practitioners revealed that they felt accepted in the profession but sometimes felt isolated, patronized, or minimized by a minority of male colleagues. More women in the profession as role models and mentors would help improve the climate.

**KEY WORDS:** Ethnography; Gender Issues; Sex Discrimination; Sex Stereotypes; Technology Education; Work and Learning.

17. Hennessy, T., & Sawchuk, P. (2003). Worker responses to technological change in the Canadian public sector: Issues of learning and labour process. *The Journal of Workplace Learning*, 15(7/8), 319-325.

This article reports selected findings from a study on the changing nature of work,

learning and technology in the Canadian public sector (Ontario). Vis-a-vis the involvement of a major management consultant firm, these findings mirror the experiences at the nexus of policy, labour process and technology, seen in several other western countries, the authors examined workers' learning responses to management-led introduction of a leading edge, Web-based social service delivery system. The paper show how neo-Taylorist principles have shaped work design, and argues that the result has been a high-tech from a "de-skilling" (Braverman) in which semi-professionalized case management workers' skill/knowledge sets have been systematically broken down. The process has been contested however. Workers have sought to learn and re-skill, generating not only specific computer-based skills (or "work-arounds") but more general, collective cultures of learning within the everyday life of work. This learning is sometimes in keeping with managerial interest, and sometimes not.

**KEY WORDS:** Organizational Change; Public Sector Organizations; Deskillling; Trade Unions; Learning Processes; Canada.

18. Imel, S. (2003). Informal adult learning and the Internet. Trends and issues alert. Ohio: Office of Educational Research and Improvement (ED), Washington, DC.

The Internet seems an ideal medium for fostering and supporting informal adult learning because it allows adults to seek out and use resources independently, control the pace and direction of learning, and talk to and consult others. Because it provides access to information, encourages meaningful interaction with information or material, and brings people together, the Internet supports learning that is constructivist in nature and that builds on prior knowledge. Issues have been raised related to the Internet and its role in informal learning, including access; degree of control that governments or other agencies might exercise over information available through the Internet; incomplete understanding of the extent and type of learning that is occurring; skills needed to engage in self-directed learning on the Internet; motivation for those who use the Internet for informal learning; and how technology can be improved.

**KEY WORDS:** Access to Education; Adult Education; Adult Learning; Computer Mediated Communication; Computer Uses in Education; Constructivism (Learning); Experiential Learning; Independent Study; Informal Education; Information Seeking; Information Sources; Internet; Learning Motivation; Pacing; Prior Learning; Student Motivation.

19. Information Technology Association of America. (2000). Best practices in school-to-careers: The information technology industry. Arlington, VA: National Employer Leadership Council, Washington, DC.

This booklet highlights the efforts of five employers that rely on information technology (IT) workers and one "intermediary" organization connecting workplace experiences to classroom learning for secondary education students. The introduction lists the employers' and organizations' names, locations, and featured practices. The next three sections examine the IT industry; reasons why school-to-careers is an ideal strategy for addressing information technology industry skill needs; skills and certifications; and how the employer participation model works with students and teachers. These employers and intermediaries and their best practices are profiled: (1) The Kemtah Group (Albuquerque, New Mexico), which promotes school-to-careers experiences for under-represented populations; (2) The Gallup Organization (Omaha, Nebraska), which is helping students explore and understand the needs and demands of technology-driven workplaces; (3) EDS (Dallas, Texas), which gives students work-based opportunities; (4) Manpower, Inc. (Milwaukee, Wisconsin), which provides training and certification

opportunities for students; (5) Intel Corporation (Santa Clara, California), which is working with teachers to make a difference through technology; and (6) Greater Louisville, Inc. (Louisville, Kentucky), which is building coalitions to connect work and learning. The following items are also included: (1) an annotated list of eight organizations and resources; (2) a glossary; and (3) a discussion of steps to build on the National Employer Leadership Council's agenda.

**KEY WORDS:** Academic Standards; Adjustment (to Environment); Advisory Committees; Annotated Bibliographies; Career Awareness; Career Ladders; Case Studies; Change Strategies; Communications; Computer Oriented Programs; Computer Software Development; Computers; Cooperative Planning; Demonstration Programs; Education Work Relationship; Educational Change; Educational Cooperation; Educational Practices; Educational Resources; Employment Qualifications; Entry Workers; Equal Education; Experiential Learning; Glossaries; Information Processing; Information Sources; Information Systems; Information Technology; Internet; Job Skills; Job Training; Labor Needs; Linking Agents; National Organizations; National Standards; Nonprofit Organizations; Partnerships in Education; School Business Relationship; Secondary Education; Skill Development; Special Needs Students; Student Certification; Technical Occupations; Vocational Education; Work Environment; Work Experience Programs; World Wide Web.

20. Jackson, P., & Reima, S. (Eds.). (2002). *Ebusiness and workplace redesign*. London: Routledge.

As the growth in teleworking, "virtual teams" and "virtual enterprises" has demonstrated, the economic landscape is increasingly characterized by an ability to work across spatial and organisational boundaries. Only with this redesign of working methods and business processes can the possibility of the digital age be delivered. *eBusiness and Workplace Redesign* argues that the key context for much of today's technology-supported organisational change is being established by developments in eBusiness. In the handling of change, this book places particular emphasis on how the design of work and use of space can be organized and managed in more systematic and effective ways. In doing so, we are shown how organisations can embrace the new technologies and business opportunities presented by the Internet by creating more productive, dynamic and sustainable workplaces that exploit the benefits of these new practices of work flexibility.

**KEY WORDS:** New Economy; Knowledge Workers; Workplace Alternatives.

21. Jung, I. (2003). Online education for adult learners in South Korea. *Educational Technology*, 43(3), 9-16.

Analyzes three applications of online learning and technology in South Korea: development of single-mode virtual universities; online education in conventional universities; and Web-based corporate training. Concludes with principles of online learning derived from experiences in implementing such environments.

**KEY WORDS:** Adult Education; Adult Students; Computer Assisted Instruction; Computer Uses in Education; Conventional Instruction; Developing Nations; Distance Education; Educational Development; Educational Technology; Foreign Countries; Higher Education; Nontraditional Education; Online Systems; Professional Development; Program Development; Training; South Korea.

22. Kolehmainen, S. (2001). *Work organisation in high-tech IT firms*. Tampere: University of Tampere.

Along with the growth of the service sector in the information society, the most rapid growth has happened in business services, including computer and related services. These high-tech knowledge-intensive business services produce sector-specific knowledge on new technology and distribute it to other industries of the economy. Therefore, they are important actors within the wider innovation system. High-tech business service firms operate in quickly developing 'turbulent' markets, which challenges their ability to adapt to the changes and transform along them. The success of business depends to a large extent on their intangible assets, mainly on their human capital. In order to guarantee the innovativeness and competitiveness of their business and the organisational commitment of their employees, it is imperative for the firms to pay attention to and invest in the organisation of work and competence. New emerging high-tech business services with increased knowledge intensity of work implicate the changing content of work which both demands and encourages new and diverse forms of work organisation. The focus of this paper is on describing the typical organisational features of a specific category of knowledge work, which is information system (IS) expert work in specific a category of knowledge-intensive business services, namely high-tech IT service firms.

**KEY WORDS:** New Economy; High Tech; Workplace Change.

23. Liker, J. K., Haddad, C. J., & Karlin, J. (1999). Perspectives on technology and work organization. *Annual Review of Sociology*, 25, 575-596.

Major perspectives on the relationship between technology and the nature of work suggest that technology's impact on work is contingent on a broad set of factors. How this is viewed varies with different theoretical paradigms. Historically, the treatment of technology as a deterministic causal force had predictable impacts. Recently, there has been recognition of the complexity of technology and its relationship to work that is both bidirectional & dependent on a number of contingent factors. Factors integral to the impact of technology are the dynamics of the change process. In fact, the change process & outcomes are inextricably linked. In conclusion, the social reality of technology implementation is highly complex. Very different technologies are brought into different social settings for different reasons, often with completely opposite effects. Complex theories that recognize the emergent & socially constructed nature of technology are needed.

**KEY WORDS:** Technological Innovations; Technology Assessment; Technological Change; Adoption of Innovations; Work Organization; Organizational Culture; Organizational Change; Office Automation.

24. McLoughlin, C., & Luca, J. (2002). A learner-centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology*, 33(5), 571-582.

Considers higher education and professional learning and describes a Web-based course focusing on project management skills, including collaboration. Discusses professional knowledge; self-directed learning; social processes of professional learning; integration of learning and assessment; social support for professional skills; cognitive support for professional learning; and task design based on project-based learning.

**KEY WORDS:** Cooperation; Evaluation Methods; Evaluation Research; Higher Education; Independent Study; Interpersonal Relationship; Learning Processes; Professional Education; Professional Occupations; Teamwork; Web Based Instruction; Cognitive Strategies; Knowledge; Project Management; Task Definition.

25. Moreland, J., Jones, A., & Northover, A. (2001). Enhancing teachers' technological knowledge and assessment practices to enhance student learning in technology: A two-year classroom study. *Research in Science Education*, 31(1), 155-176.

Reports on a two-year classroom investigation of primary school technology education. Explores emerging classroom practices in technology and intervention strategies developed to enhance teaching.

**KEY WORDS:** Educational Change; Elementary Education; Intervention; Professional Development; Teacher Attitudes; Technological Literacy; Technology Education; Work and Learning.

26. Mulholland, P., & Ivergård, T. K., Stuart. (2005). Introduction: Contemporary perspectives on learning for work. *Applied Ergonomics*. Special Issue: Contemporary Perspectives on Learning for Work, 36(2), 125-126.

Papers in the current issue of the journal *Applied Ergonomics*, 36 (2005). In the past decade we continue to witness many changes in the nature of organisations and working life. Coping with rapid technological change, greater job mobility and greater job insecurity are increasingly common characteristics of employment. Changes have had a significant impact on the requirements and methods of competence development and workplace learning. The most prevalent trend is the increasing need for life-long learning (Fischer, 2000). Workers cannot expect to acquire all necessary skills in formal education in advance of their careers. Career changes, necessitating further learning are becoming increasingly common. Technological developments are increasing the rate at which methods of working have to change in order to keep up-to-date, efficient and competitive. Papers in this issue highlight the need for increased research into both human & social factors of rapid technological change and the role that e-learning can play in meeting increasingly high demands for skills and competence. The papers, we hope, will serve to motivate further research work in this important area.

**KEY WORDS:** Organizational Change; Organizational Learning; Professional Competence; Technology; Computer Assisted Instruction; Computers; Internet.

27. Overton, L. (2006). Altering learning provision. *E.learning Age*, 35-36.

The author's propose to increase awareness of what employers want from e-learning with the relatively new Sector Skills Council (SSC), twenty-five organizations who have been tasked with representing employers' skills needs and influencing government provision. The SSCs are in place to understand what employers actually need from learning and to stand in the gap on their behalf in working with government agencies of learning provision. Currently, much of the e-learning work has been focused on the school and formal education system - reform in these areas is key. E-learning has the opportunity to radically alter government learning provision - encouraging flexible credit based learning programs more closely aligned to business needs. The SSCs will be key agents of change in this process and it is important that they are equipped for this role and connected with employer needs.

**KEY WORDS:** Provisions; Government Agencies; Online Instruction; Changes; Western Europe; Internet Communications; Development; Public Sector; United Kingdom; UK.

28. Rennie, L. J. (2001). Teacher collaboration in curriculum change: The implementation of technology education in the primary school. *Research in Science Education*, 31(1), 49-69.

Documents the ways in which one teacher from each school established successful classroom strategies for incorporating technology into classroom life using case studies from two Western Australian schools. Discusses implications in terms of leadership and collaboration.

**KEY WORDS:** Cooperation; Educational Change; Educational Strategies; Elementary Education; Foreign Countries; Leadership; Teacher Attitudes; Technological Literacy; Technology Education; Work and Learning.

29. Revill, G., Terrell, I., Powell, S., & Tindal, I. (2005). Learning in the workplace: A new degree online. *Innovations in Education and Teaching International*, 42(3), 231-245.

This paper reports on attempts to develop a new learning in the workplace degree based upon an online learning community approach. The paper describes the use of individualised learning plans, shared electronic portfolios and collaborative reflection on practice. Online strategies such as "hotseating" and the use of workplace advocates are illustrated. The paper exhibits that it is possible to build an online community for an award-bearing workplace learning degree but that new tools and approaches need to be developed to ensure self-directed learning from experience and through reflection can take place in a community of learners.

**KEY WORDS:** Exhibits; Online Courses; Labor Education; Continuing Education; Student Centered Curriculum; Independent Study; Educational Innovation; Discourse Communities.

30. Rosow, L. V. (2001). Technology in education: Equity and theory are key. *TechTrends*, 46(4), 31-39.

The author shares ways technology may empower students and how it has enabled her as a teacher to expand beyond some of the traditional boundaries for writing, reading, and assessment. In the discussion, the importance of economic and environmental equity and the need for theory to inform pedagogy are emphasized.

**KEY WORDS:** Access to Computers; Access to Education; Curriculum Development; Educational Development; Educational Technology; Educational Theories; Equal Education; Student Empowerment; Technology Implementation; Technology Role.

31. Sawchuk, P. H. (2003). Informal learning as a speech-exchange system: Implications for knowledge production, power and social transformation. *Discourse & Society*, 14(3), 291-307.

Most empirical investigations of 'informal learning' either arbitrarily operationalize the term or take common sense notions of the term as the basis for their claims. Few studies to date have problematized the phenomenon itself with reference to its accomplishment in moment-by-moment interaction. This article draws on detailed analysis to make claims about the nature of informal learning as a distinct speech-exchange system with features of both formal pedagogical communication and everyday conversation. The analysis shows how two novice computer users can collectively construct a Zone of Proximal Development for their learning. I discuss ambiguities of informal learning, the difficulties

of computer-mediated learning interaction specifically, and the political significance of shared control over turn-allocation. I conclude that analysis of informal learning as a speech-exchange system is useful and that learning can be understood outside of expert-novice relationships. The broader social implications of this are that hierarchical knowledge/power relations are not necessarily definitive of the learning process. This, in turn, provides support for the claim that informal learning may be a means of transforming rather than reproducing knowledge forms.

**KEY WORDS:** Informal Learning; Zone of Proximal Development; Pedagogical Communication; Political Significance; Novice Computer Users; Speech-Exchange System; Computer-Mediated Learning; Conversation.

32. Schwier, R. A. (2001). Catalysts, emphases, and elements of virtual learning communities: Implications for research and practice. *Quarterly Review of Distance Education*, 2(1), 5-18.

Examines theoretical and conceptual issues around promoting the growth of virtual learning communities and considers issues around using communication technologies in formal and informal learning environments. Highlights include: the theoretical context of community; categories for examining virtual learning communities; emphases of virtual learning communities; ten elements of community; and research issues raised by virtual learning communities.

**KEY WORDS:** Community Characteristics; Community Development; Computer Mediated Communication; Computer Uses in Education; Distance Education; Educational Technology; Learning Communities; Learning Environments; Virtual Communities.

33. Selwyn, N., & Gorard, S. (2003). Exploring the "New" imperatives of technology-based lifelong learning. *Research in Post-Compulsory Education*, 8(1), 73-92.

Policy discourse about lifelong learning has shifted from economic imperative to social and moral pursuit and intrinsic good. Despite this, the emphasis on technological solutions in Information Age discourse subjugates social, civic, and political concerns to an economic competitiveness rationale.

**KEY WORDS:** Discourse Analysis; Educational Attitudes; Educational Objectives; Educational Technology; Foreign Countries; Information Technology; Learning Motivation; Lifelong Learning; Public Policy; Telecommunications; United Kingdom.

34. Stephenson, J., & Saxton, J. (2005). Using the internet to gain personalized degrees from learning through work: Some experience from Ufi. *Industry & higher education*, 19(3), 249-258.

Presented are the outcomes of a systematic review of first cohort experiences using Ufi's online Learning through Work (LtW) facility. This was to negotiate personalized programmes of study leading to full university awards based on projects related to their everyday work. Learning through work and wider experience of online work-based learning are discussed. As well, the main features of the LtW programme are described. Data are drawn from user surveys and in-depth interviews of participants. A grounded theory methodology is used to allow propositions to emerge from the data about user readiness, institutional responses and wider impact on the learners and their work-place. Propositions are presented for discussion in the wider context of learner-managed learning and the use of the Internet for university-recognized learning through work.

**KEY WORDS:** Educational Sociology; Economics of Education; Academic Success; Academic Achievement; Higher Education; Internet; Universities; Learning; Empirical Research; Comparative Analysis; United Kingdom.

35. Svensson, L., Ellstrom, P.-E., & Aberg, C. (2004). Integrating formal and informal learning at work. *Journal of Workplace Learning: Employee Counselling Today*, 16(8), 479-491.

A model for workplace learning is put forth and looks to integrate formal and informal learning through the use of e-learning. An assumption is made that the integration of formal and informal learning is necessary in order to create desirable competencies, from individual and an organisational perspectives. The article uses two case studies to test the model. One study is set in an industrial setting, while the other is performed in a hospital. There are some promising results in terms of flexibility and accessibility, but some problems have yet to be solved. These problems primarily deal with the integration of individual and organisational learning, and with the lack of time for reflection and learning during conditions of down-sizing and rationalisation.

**KEY WORDS:** Workplace Learning; Computer Based Learning; Informal Learning; Formal Learning.

36. Thornburg, D. (2002). *The new basics: Education and the future of work in the telematic age*. Alexandria: Association for Supervision and Curriculum Development.

The increasing globalization of work, coupled with rapid advancement in communications technology, is making age-old teaching methods irrelevant. To thrive in the plugged-in future workplace, students today need to learn a whole new set of fundamental skills. This book starts by presenting the author's assumptions and biases with regard to economic cycles and evolution, and standards. It explores the foundations of the future economy, the notion of the telematic age driven by information technology, the characteristics needed to succeed in this emerging world, and the changes needed to be made in education to ensure that all students leave school prepared to face the challenges of a world undergoing continual redefinition. It provides an in-depth discussion of the skills necessary for professional success in the coming years, along with strategies on how best to teach them in the classroom.

**KEY WORDS:** Education; Technological Innovations; Labour Supply; Work and Learning.

37. Walmsley, B. (2003). Partnership-centered learning: The case for pedagogic balance in technology education. *Journal of Technology Education*, 14(2), 56-69.

Results of the Cognitive Holding Power Questionnaire completed by 480 Australian technology education students suggest that design-based technology classes develop higher-order thinking skills. Teachers are attempting to balance support with student autonomy and control while shifting to learner-centered instruction. However, they may be emphasizing doing over thinking and planning.

**KEY WORDS:** Educational Change; Educational Strategies; Foreign Countries; Secondary Education; Technology Education; Thinking Skills; Work and Learning.

38. Wannell, T., & Ali, J. (2002). Working smarter. *Perspectives*(Winter), 48-59.

This integrative study examines the relationship between the introduction of technology, training and education.

**KEY WORDS:** Skill; Technology; Management; ICT; Knowledge; Underemployment; Upgrading.

39. Wolfe, C. R. (2001). Creating informal learning environments on the World Wide Web. In C. R. Wolfe (Ed.), *Learning and teaching on the World Wide Web* (pp. 91-112). San Diego: Academic Press.

This chapter describes principles and strategies that support the creation of informal learning environments on the World Wide Web. The discussion is informed by over five years of experience developing the Dragonfly Web Pages, an informal science education environment on the Web. The author describes the following Web page departments: expository text, interactive experiences, side bars, links to related resources, and off-line investigations, as well as assessment and evaluation. A discussion of the development of the Dragonfly Web Pages includes five principles of the American Psychological Association Work Group that address cognitive and motivational factors influencing learning; the role of play in the development of scientific learning; and research on gist formation. Strategies for creating informal learning environments on the Web are outlined.

**KEY WORDS:** Informal Learning Environments; Dragonfly Web Pages; World Wide Web; Cognitive & Motivational Factors; American Psychological Association; Role of Play in Scientific Learning; Gist Formation; Children.



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