Technological Ecologies & Sustainability

CHAPTER	13
TITLE	Sustaining (and Growing) a Pedagogical Writing Environment: An Activity Theory Analysis
AUTHORS	Mike Palmquist Kate Kiefer Jill Salahub
OVERVIEW	In this chapter, we explore the use of activity theory (Engestrom, 1987, 1999; Leontiev, 1978) as a post-hoc framework for understanding how technology-supported writing initiatives come into being and as a predictive tool for sustaining those initiatives. We illustrate the potential application of activity theory by exploring the development of Colorado State University's writing Web site, Writing@CSU, paying particular attention to factors that have contributed to its emergence as a sustainable project situated within its institutional and extra-institutional contexts. We argue that activity theory—chiefly through its focus on interactions among individuals, communities, and tools—offers significant benefits to scholars in the field of computers and composition who wish to address the continuing challenge of developing and sustaining network-supported writing environments.
TAGS	act of composing, activity system, activity theory, activity, adapt*, assess*, building, cod*, community, community, composition, content, continuity, contradictions, contradictions, copyright, design*, division of labor, enduring, enhancement, evaluator, evolving, external funding, full-time, mismatches, hybrid, instructors, interactive forums, Jill Salahub, Kate Kiefer, labor, learning resources, long-term, Mike Palmquist, motive, multiple motives, object, open access, open source, outcome, positive effects, promotion, proprietary software, reports, research center, rules, rules, subject, subjects, teaching, technology specialists, tenure, tool, tool, tunnel vision, writing center, Writing Studio, Writing@CSU, writing-across-the-curriculum
AUTHOR BIOGRAPHIES	Mike Palmquist is professor of English, Associate Vice Provost for Learning and Teaching, and University Distinguished Teaching Scholar at Colorado State University, where he directs the University's Institute for Learning and Teaching. His scholarly interests include writing across the curriculum, the effects of computer and network technologies on writing instruction, and new approaches to scholarly publishing. His work has appeared in scholarly journals, edited collections, and books (including *Transitions: Teaching Writing in Computer-Supported and Traditional Classrooms,* which was written with Kate Keifer, Jake Hartvigsen, and Barb Godlew). With Jill Salahub and a host of WAC colleagues, he coordinates the development of Writing@CSU (http://writing.colostate.edu/)and the WAC Clearinghouse (http://wac.colostate.edu/). Kate Kiefer is a professor of English at Colorado State University where she teaches undergraduate composition and graduate composition theory courses. She developed her long-standing interest and expertise in computers and writing in the early 1980s when she co-founded *Computers and Composition*, of which she is still emeritus editor. She continues to research teaching in both physical and virtual computer contexts, but her most recent work has focused on studying the ways in which reading, writing, and thinking can be considered complex adaptive systems. Jill Salahub is the editor and programmer for Writing@CSU (http://writing.colostate.edu/). She also teaches an upper-division composition class focused on writing for the Web. Her research interests include computers and

	composition, the use of technology and hypertext/hypermedia in the classroom, professional development for teachers, creative nonfiction writing, and writing for the Web. She received an MA in Communication Development from Colorado State University in 2003, having been granted distinction for her thesis, a hypertext entitled "Fear, Happiness and the American Way: The Difficulty of a Simple Life." Her other Web writing projects are teaching and writing guides for CSU's Online Writing Center, Web-based textbook supplements for multiple publishing companies, and Web sites for various writing across the curriculum projects at CSU. Most recently, she's been focusing her efforts on providing professional development opportunities for teachers using such technologies as the Writing Studio to enhance and extend the environment of their writing classes.
COPYRIGHT AND REPRODUCTION	
PRESS URL	http://ccdigitalpress.org
BOOK URL	http://ccdigitalpress.org/tes

Computers and Composition Digital Press
AN IMPRINT OF UTAH STATE UNIVERSITY PRESS
Technological Ecologies & Sustainability

Sustaining (and Growing) a Pedagogical Writing Environment: An Activity Theory Analysis

Mike Palmquist
Kate Kiefer
Jill Salahub

As work on network-supported writing environments enters its third decade, scholars in computers and writing have begun not only to consider how to build and maintain these environments, but also how to understand the characteristics of successful long-term projects. While sustaining any instructional writing initiative requires extensive planning, implementation, assessment, and adaptation, sustaining initiatives that rely on significant technological infrastructure requires even greater attention to assessing and adapting to changing conditions. In this chapter, we explore the use of activity theory (Engeström, 1987, 1999; Leontiev, 1978) as a framework for post-hoc analysis through which we can understand how technology-supported writing initiatives come into being and as a predictive tool for sustaining those initiatives.

To illustrate the potential application of activity theory, we explore the development of Colorado State University's writing Web site, Writing@CSU; see Figure 1), paying particular attention to factors that have contributed to its emergence as a sustainable project situated within its institutional and extra-institutional contexts. Our discussion considers interactions among the site's developers regarding its conceptualization, development, and assessment. Here, we offer an overview of activity theory, describe the site and reflect on its development within the context of activity theory, and reflect on the use of activity theory as a framework for investigating computer-mediated writing environments.

Figure 1. The home page for Writing@CSU (http://writing.colostate.edu).

ACTIVITY THEORY

Activity theory considers the goal-directed, mediated activity of individuals within socio-cultural contexts.[1] It provides a framework within which actions—including the creation of texts—can be understood as goal-directed work situated within social, cultural, and historical contexts. Key concepts include:

Object: The goal(s) toward which activity is directed.

Motive: A socially constructed desire to address social needs by accomplishing a goal.

Activity: Collective action taken to realize a goal. Sascha Barab, Michael Evans, Eun-Ok and Baek (2004) characterized activity as "a coherent, stable, relatively long-term endeavor directed to an articulated or identifiable goal" (p. 204).

Subjects: People engaged in an activity.

Tool: A vehicle for a particular method of social action. Tools may be material, such as pens or pencils, or psychological, such as signs or symbols (Barab, Evans, & Baek, 2004).

---

[1] Activity theory emerges from work beginning in the 1920s that attempted to situate psychological inquiry within a Marxist framework, most notably by Aleksei Nikolaevich Leontiev, Lev Semyonovitch Vygotsky, Mikhail Basov, Sergy Rubinshtein, and Alexander Romanovich Luria. The fundamental contributions of activity theory include (1) its description of activity as goal-oriented, mediated work shaped by—and, in turn, shaping—social, cultural, and historical contexts, and (2) its characterization of the impact of activity on participants, tools, and contexts. The most comprehensive treatment of activity theory available in English is provided by Victor Kaptelinin and Bonnie Nardi (2006). A.N. Leontiev's (1978) book on activity theory is also available in English, but it is best characterized as a series of reflections on key concepts in activity theory rather than as a comprehensive treatment of its major tenets (see, also, Leontiev 2005a–k). Additional resources include James Wertsch (1981), *The Concept of Activity in Soviet Psychology*, which provided access to a range of work on the approach, and Yrjo Engeström's (1987) book, which usefully extended Leontiev's work by (re)viewing it through the lens of Vygotsky's cultural–historical theory.

Following the translation of Leontiev's work in the 1970s, activity theory gained attention outside of the Soviet Union. It drew the interest of scholars in human–computer interaction in the 1980s and 1990s (Cole and Engeström, 1993; Engeström, 1987; Wertsch, 1981; for a recent review of work in this area, see Bertelsen & Bodker, 2003). Engeström, drawing on work by Vygotsky, extended the theoretical framework developed by Leontiev (for useful discussions, see Miettinen & Kaptelinin, 2005; Russell, 2004). Educational theorists were also attracted to the theory, in part because it usefully extended the work of Vygotsky, particularly as it applied to understanding the zone of proximal development. Within writing studies, it has been seen as a means of problematizing discourse-community theory and has been applied in the study of text production among writers who do not share membership in a particular community. *Writing Selves/Writing Societies* (Bazerman & Russell, 2003), provides the most notable collection to date. David Russell has also written extensively about activity theory (see Russell, 1995, 1997a, 1997b, 1998, 2001).

Labor: A social process, involving tools, for influencing nature. Labor defines relationships among the people who carry it out (i.e., a division of labor; Russell, 2004).

Rules: Whether formal or informal, explicit or tacit, rules "shape the interaction of subjects and tools with the object. Of course, these rules can also alter, tacitly or explicitly, with changes in other nodes in the system, but the rules allow the system to be 'stabilized-for-now'" (Russell, 2004, p. 315).

Community: People who act on a common goal over a period of time form a community; communities, in turn, condition other elements in the activity system (Russell, 2004).

Contradictions: Contradictions emerge from changes in an activity system and can place people at odds with each other or cause them to question their actions or beliefs. Quoting Yrjo Engeström, Russell observed that, "an activity system 'is constantly working through contradictions within and between its elements' (Engeström 1987)" (2004, p. 316).

One branch of activity theory (following Vygotsky's lead) focuses more on the individual or subject involved in the mediating activity, while a second branch (following Leontiev) focuses on the objects of activity.[2] Leontiev's approach has been characterized by Engeström as involving a more complex interaction of subject, tool, object, outcome, rules, community, contradictions, and division of labor (see Figure 2). We believe this model is likely to prove effective for understanding the interactions of the large numbers of subjects typically involved in developing and adapting the complex set of writing tools found in network-based writing environments such as Writing@CSU.

[2] The development of activity theory over time can be viewed as a movement from Vygotsky's focus on the individual (or *subject*) involved in mediated activity to Leontiev's focus on the *object* of activity. Both approaches offer a means of understanding the social and individual development of the mind within cultural–historical context, and in so doing both approaches offer an important alternative to the behavioral psychology that dominated much of Western psychology in the early-to-mid 20th century. They differ, however, in their emphasis on the individual. Vygotsky focused on individual actions—and the cognitive and social development accompanying those actions—within a given context. In contrast, Leontiev focused on the object of activity. That is, he understood the development of the individual (and, importantly, the formation of social structures) as a function of the goals toward which activity was directed.

Vygotsky's model is typically characterized as a triad of subject, object, and mediating tool. It reflects his understanding of learning as a process in which "humans and their environment mutually transform each other in a dialectical relationship" (Barab et al., 2004, p. 200).

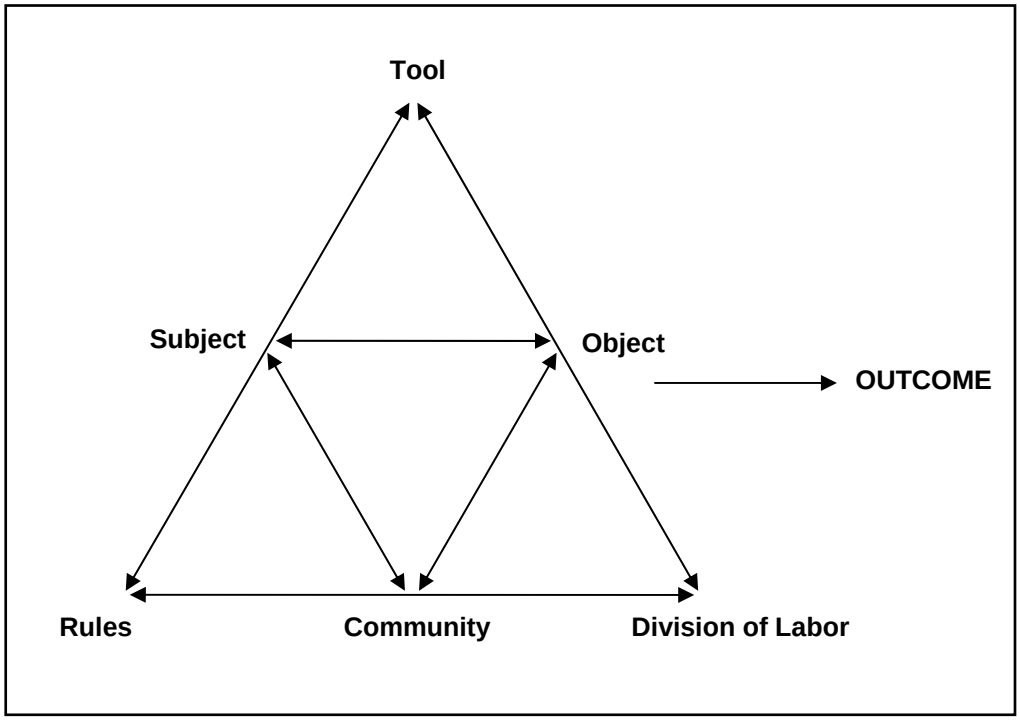

Figure 2. Engeström's elaboration of Leontiev's activity theory.

Engeström defined outcome as the implication (intended or not) of activity. Following Leontiev (see, for example, A.N. Leontiev, 2005j), Engeström characterized activity as collective labor. For example, the collaborative process of designing and developing a new video game would be considered an activity. Similarly, barn raising would be viewed as an activity. Activity is built up from actions, which are carried out by individuals. In isolation, actions would not allow the overall object (or purpose) of the activity to be realized; it is only through collective action that the object of activity can be realized. Thus activity can be understood as occurring at the social level, and actions can be understood as occurring at the individual level. Actions, in turn, are built from operations, which can be understood as physical movements or mental processes (see, for example, Leontiev's discussion of thinking and activity, 2005d).

Leontiev carefully argued that the social does not dictate individual cognition. That is, the members of a group engaged in an activity will not think in precisely the same way or react identically to events. However, Leontiev also argued that our understanding of the world is mediated through language and, more specifically, communication, which is necessarily social (see his discussion of Vygotsky's treatment of this issue in Leontiev , 2005i). These differences in understanding give rise to contradictions, which can occur at numerous points in an activity system and which Engeström characterized as occurring within the nodes of his model (e.g., within a tool or within the object itself), between nodes (e.g., between subjects and tools), and between related activities and activity systems. (For a review of these types of contradictions, see Barab et al., 2004.) With this brief theoretical overview in place, we can turn to our specific case—the development of Writing@CSU—to illustrate activity theory and its implications for building sustainable network-supported writing environments.

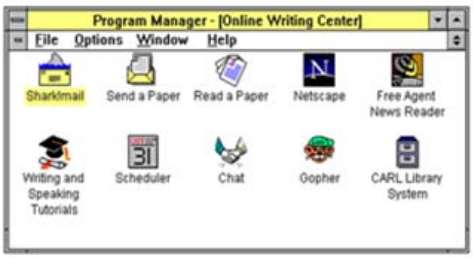

Figure 3: The Online Writing Center was initially available as a campus network application, running on Windows 3.x.

Figure 4: Guides provided instruction on a range of writing processes and genres.

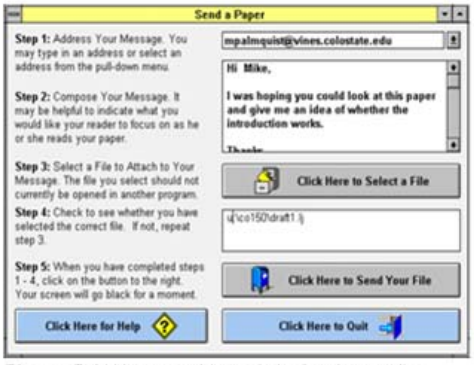

Figure 5: Writers could send drafts via email to instructors, other writers, and writing center tutors.

THE DEVELOPMENT OF Writing@CSU

The Writing@CSU Web site is a comprehensive Online Writing Lab (Lasarenko, 1996) that supports Colorado State University's composition program, writing-across-the-curriculum program, and writing center. It provides access to guides for writers and writing instructors, an annotated list of links, interactive activities, information about upcoming workshops for students, and information about visiting or sending drafts to consultants in the campus writing center. The site also houses the Writing Studio, an instructional writing environment used at the university and by a number of other institutions in the United States and abroad. In 2008, when this chapter was written, writers from more than 900 institutions had logged into their Writing Studio accounts in the previous 12 months, and instructors at more than 100 institutions had created Writing Studio class pages. In 2008, the Writing@CSU site included roughly 35,000 static pages. In addition, approximately 1,200 dynamic pages provided access to content housed in the Writing Studio's databases. The Writing@CSU site as a whole had received more than 4 million visits in the past year included in this total were more than 900,000 visits from 21,000 active account holders in the Writing Studio. From 2004 through 2007, use of the Writing@CSU site as a whole grew at an annual rate of roughly 30 percent, and logins to the Writing Studio increased at an annual rate of 50 percent.

The comprehensive and well-used set of tools available through the Writing@CSU developed over time through the coordinated efforts of many contributors.[3] The Writing@CSU project began in 1993[4] as part of an effort to develop a campus-wide writing environment to support

[3] Development of the Writing@CSU Web site and the Writing Studio is coordinated by Mike Palmquist in consultation with colleagues in the University's composition program, writing-across-the-curriculum program, and writing center. Jill Salahub serves as chief programmer for the site. Technical support is provided by the University's IT staff. Funding for server equipment and software is provided through student technology fees and program funds. Since its inceptions, more than 300 writers have contributed content to the site. These contributions include work for hire production, work completed in fulfillment of course projects, and work completed as part of graduate theses and other research projects.

[4] The Writing@CSU project emerged from related projects at two universities. In the late 1980s, Mike Palmquist had been working on his doctorate in rhetoric at Carnegie Mellon University. His association with Christine Neuwirth and Richard Young acquainted him with their work on a project that would have led, had it been funded, to the development of a

writing-across-the-curriculum and composition programs. Development was funded jointly by the state of Colorado and the university from 1993 to 1997. Since that time, funding for development and equipment has been provided by the University. In 1993, following a year-

---

campus-wide, network-based environment that allowed writers to seek and receive feedback on their writing. Mike's work at Carnegie Mellon also involved the study and use of a range of network-based writing tools developed by Neuwirth and her colleagues, including Comment, CECETalk, Notes, and the Prep Editor (see Neuwirth, Kaufer, Chimera, & Gillespie, 1987; Neuwirth, Kaufer, Chandook, & Morris, 1990; Neuwirth, Kaufer, Keim, & Gillespie, 1988; Neuwirth, Palmquist, & Gillespie, 1988; Neuwirth, Palmquist, & Hajduk, 1990). At about the same time, two projects at Colorado State University provided additional foundations for the Writing@CSU project. Since the late 1970s, faculty in the English department at Colorado State had been involved in a writing-across-the-curriculum initiative. One of the faculty involved in the initiative was Kate Kiefer, a specialist in computers and writing. With Dawn Rodrigues, Kate had been exploring the use of computer networks to deliver instructional materials and analyses of student drafts. The Electronic Writing Service (Rodrigues & Kiefer, 1993; Rodrigues, Kiefer, & McPherson, 1990) was intended to provide an environment where "students can 'talk' in writing to one another or to a tutor, a place where they will also be able to locate appropriate writing software to help them with a writing assignment in any of their courses" (Rodrigues & Kiefer, p. 223).

In 1990, Mike joined the faculty at Colorado State. Not long after his arrival, he was asked by Dawn Rodrigues and Don Zimmerman to collaborate with them on the development of a writing-in-the-disciplines project in electrical engineering. Kate Kiefer subsequently joined the group and the four faculty sought support for project development from Loren Crabtree, then associate dean of their college. Crabtree provided support in the form of a part-time graduate research assistant and encouraged them to seek funding of their project. Funding was subsequently obtained through an internal grants competition intended to identify "programs of research and scholarly excellence" (PRSE) at the University and from the Colorado Commission on Higher Education (CCHE) Programs of Excellence competition. The PRSE funding supported the formation of an interdisciplinary research center that continues to receive funding from the University. The CCHE funding, which totaled $400,000 over 5 years, allowed the planning group to assemble a project team involving faculty and graduate students from the departments of English, Journalism and Technical Communication, and Communication Studies (then named Speech Communications).

Following a year-long assessment of the use of writing in engineering and composition courses, a national study of professional engineers' perceptions about the role of writing in their professional lives, and a study of the roles and uses of writing in a leading software engineering company, the project team held a retreat to review results of the studies and plan the development of a writing-across-the-curriculum program. At the retreat, decisions were made to develop a WAC program that departed from the approach that, to that point, had been followed at the University. Rather than focusing solely on faculty development, the new project would adopt an integrated approach to WAC (Palmquist, 2000; Palmquist, Kiefer, & Zimmerman, 1988; Palmquist, Rodrigues, Kiefer, & Zimmerman, 1995) that relied both on traditional WAC strategies for faculty development and on direct outreach to students through a revitalized campus writing center and an "online writing center."

In 1993, work began on a network-based application that allowed students to contact instructors and writing center tutors via electronic mail, submit drafts for review by writing center tutors, view instructional materials about writing in the disciplines, and work on interactive writing tutorials. Developed in Asymmetrix Multimedia Toolbook, the Online Writing Center was available on roughly 400 computer across campus.

long assessment of writing needs and expectations at the university and in organizations employing university graduates, what was at that time called the Online Writing Center was launched as a campus-network application (see Figure 3).

The Online Writing Center provided access to instructional materials and allowed students to submit drafts or send email messages to consultants in the campus writing center (see Figures 4 and 5). In 1996, the Online Writing Center was moved to the Web[5] (see Figure 6). In 1999, work began on the Writing Studio instructional writing environment (see Figures 7 and 8). In December 2004, the Writing Studio was publicly announced and was made available to writers and writing instructors outside the university (see Figure 9).

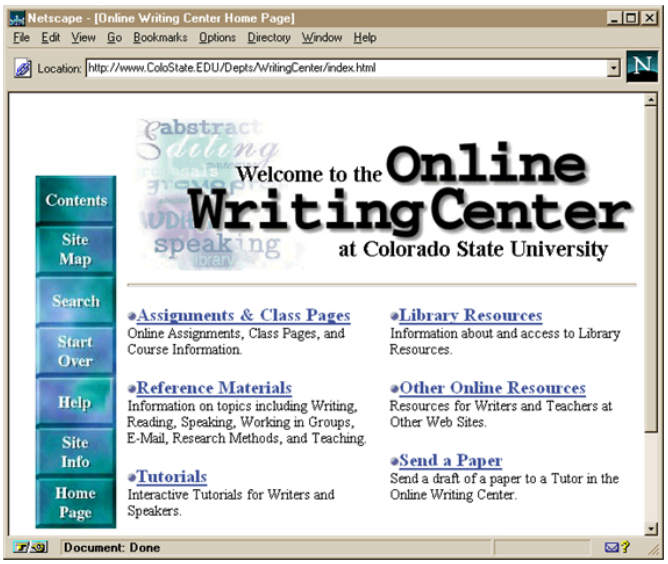

Figure 6. In 1996, the Online Writing Center moved to the Web.

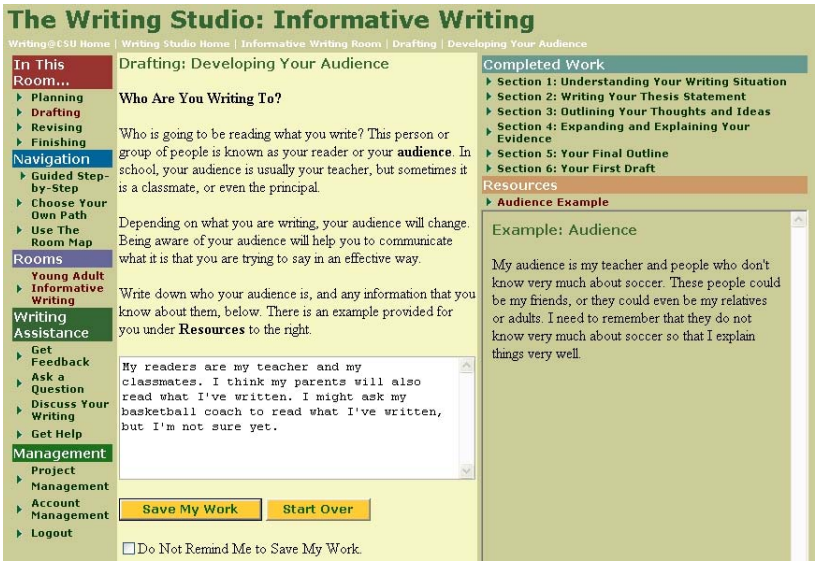

Figure 7. In 1999, a prototype was developed for the Writing Studio.

UNDERSTANDING Writing@CSU THROUGH AN ACTIVITY SYSTEMS FRAMEWORK

We believe that activity theory can provide a framework within which we can understand the development of Writing@CSU and its Writing Studio as "a coherent, stable, relatively long-term endeavor directed to an articulated or identifiable goal" (Barab et al., 2004, p. 204). Within the context of activity theory, development of the site can be seen as a form of tool development (Leontiev, 2005j), and the work of establishing and maintaining the site can be understood as a sustained effort to adapt the site to the needs—both enduring and evolving—of writers and writing instructors. Development of the site can also be understood as activity that stands in relation to other activity systems at the university and in the larger field of

[5] By 1999, the Writing@CSU Web site had become the largest Web site supporting writers and writing instruction, with more than 25,000 pages of instructional material. (By 2004, the number of pages on the site grew to more than 65,000; later that year, a redesign reduced the size of the site to roughly 27,000 pages. It currently contains about 35,000 pages.) Throughout the 1990s and into the early 2000s, the site could be characterized as a comprehensive online writing lab (Lasarenko, 1996).

composition studies, and which pursues related (and sometimes nested) goals, such as preparing students to succeed at the university, providing qualified graduates to the community, studying the use of technology to support writers and writing instruction, and developing instructional technologies.

Leontiev (2005j) observed that a tool "is the vehicle of a certain method of action, and, moreover, a social method of action, that is, developed in the joint activity of people" (p. 66). He noted that building a tool can "become a goal toward which action is directed" (p. 66). Viewing the creation of the Writing@CSU Web site and its Writing Studio as the creation of a tool—or, perhaps more accurately, a set of tools—allows us to understand it as a historically situated project that produces outcomes that serve as tools in related activity systems (e.g., supporting instruction in a writing class, educating students in a composition program, supporting the professional development of writing instructors). It is possible, as a result, to explore the creation of the site as an activity system in and of itself, and to view the site as a collection of tools (e.g., as a set of instructional materials, as a set of communication tools, as a course management system, as a system of storing and distributing written work).

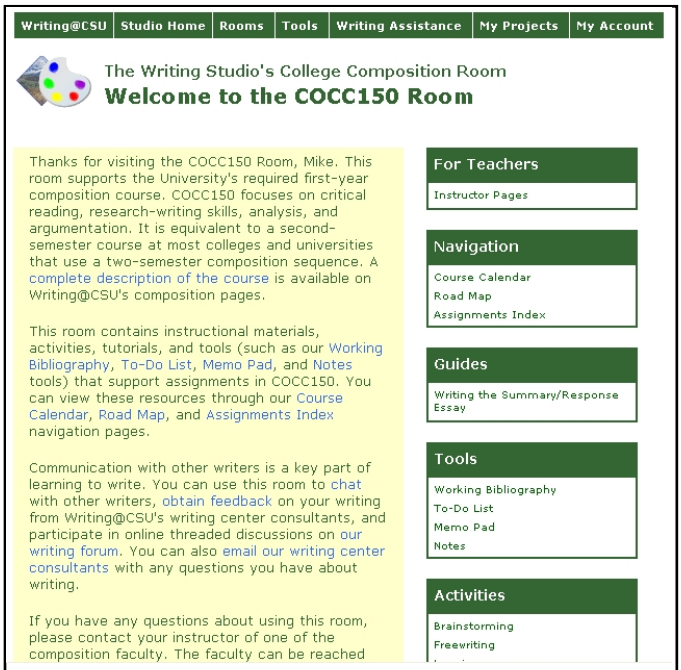

Figure 8. In 2002, the Writing Studio moved into a beta version.

Figure 9. In 2004, the Writing Studio was released as an application running inside the Writing@CSU Web site.

Below, we focus on the Writing@CSU project as an activity *system*, rather than on its use as a tool in other activity systems. Our analysis focuses on the subjects who participated in the development of the site, the community they formed (as well as the larger communities in which they also participated), the actions they carried out as they developed the site, the rules that shaped their actions, the object of their activity and its motives and outcomes, the tools used in the creation of the site, the division of labor that distributed the actions across subjects, and the contradictions that arose and shaped the overall direction of the project. Given the genre constraints of a chapter, the following analysis is illustrative rather than exhaustive.

Subjects, Community, and Rules

The initial development of the Writing@CSU project was carried out by a group of faculty and graduate students drawn from the departments of English, Journalism and Technical Communication, and Communication Studies (then Speech Communications) at Colorado State University. Over time, the number of people involved in the project grew to include professional staff, artists, and roughly 300 writers who contributed documents to the project. It is difficult, given the scope of this project, to consider this group a single community, in the typical sense offered by activity theory. Instead, it might be more appropriate to consider the core group of individuals who planned and oversaw the development of the project as the community most responsible for the outcomes of the project, joined by writers who moved in and out of the community as they developed tools for the site. This smaller group was influenced by their participation in prior communities, such as the research group led by Christine Neuwirth at Carnegie Mellon University, the faculty involved in the early WAC program at

Colorado State, and the group of faculty and information technology specialists who worked on the Electronic Writing Services project.

The members of the community who designed and oversaw the development of the Writing@CSU project also had, as is always the case, memberships in related communities, and the rules governing their participation in those communities strongly influenced activity on the Writing@CSU project. These rules included the reward systems for tenure and promotion in their respective disciplines, the expectation that scholars acknowledge work drawn upon to design and develop the project, the expectation that external funding be sought for projects, the need to report to and keep administrators informed, and so on. Other rules were developed within the project, such as the need to write documents that followed a particular style, to design the documents using an agreed-upon set of templates, and to code those documents using a set of agreed-upon procedures.

The activity theory framework developed by Leontiev and elaborated and articulated by Engeström suggests a number of avenues for exploring the notion of sustainability within an activity system. In reference to subjects and community, situating the project within a research center informed strongly by a long-standing, stable composition program allowed participants who had already developed a sense of community to re-form around the new project. Building on the shared values they had already drawn on or formed in prior collaborative work, they were able to integrate the Writing@CSU project into their scholarly lives in ways that allowed it to be viewed as normal and reasonable work. For example, scholarly articles and presentations at conferences about the project were among the outcomes of the project, and the faculty and graduate students who produced those documents viewed them as a valuable contribution to (and expression of) their scholarly lives.

Equally important, the involvement of departmental, college, and university administrators in the early stages of the project, combined with a conscious decision to keep them actively involved in its development, led to long-term funding for the project that has continued for more than a decade after the end of the grant that first supported the project.

The adoption of rules consistent with practice in other areas of the project teams' professional lives, as well as the development of rules regarding the day-to-day practices of building the site, also contributed to its sustainability. In activity theory, rules govern practice. When practice is both regularized and meaningful to subjects, fewer conflicts are likely to arise between the motives and goals of participants and the actions in which they engage. By developing reasonable and appropriate rules for actions such as coding, writing, and designing documents, project participants are likely to feel that their actions are valued and relevant to the success of the project.

Actions, Tools, and Division of Labor

The members of the core community in the Writing@CSU project engaged in actions that contributed to reaching the goals of the overall project. These actions included, among others, designing the overall project, designing the studies carried out during the project, assessing progress on the project through usability testing and classroom assessments, designing writing guides and activities, designing composing tools, designing the commenting system, designing the course management, assigning writing projects, writing materials for the site, coding materials and tools, maintaining the server, working with administrators and information technology specialists, training faculty, and responding to queries about the site from internal and external audiences. To carry out these actions, members of the project team drew on a range of tools, not least of which, given the nature of the project, was written language. Included among the tools used regularly by—and shaping the actions of the

subjects carrying them out—were the research methods they employed to conduct studies; communication tools such as email, chat, video conferencing, and the telephone; word-processing, image-editing, video-editing, and coding software; operating system and database software; video cameras and audio recorders; transcription machines; desktop computers, laptops, and Web servers; and so on.

A careful analysis of the manner in which any one of these tools mediated the actions of subjects in the Writing@CSU project community as they pursued the goals of the project might serve as the foundation for a chapter in and of itself, so we will avoid a comprehensive analysis. Consider, however, the importance of choosing to move from the use of Asymetrix Multimedia ToolBook as the delivery platform for the Online Writing Center in 1996 to the use of HTML and Web-browser-delivered content soon after. This change of tools had profound effects on the project. It reduced, for example, the project team's ability to deliver high quality interactive content to writers and writing instructors (given the primitive state of HTML and the Web at that time). At the same time, it reduced the complexity of distributing those materials on and beyond the campus. It also laid the groundwork for moving in the late 1990s from a static Web site to a dynamic, database-driven site. The decision to change the delivery platform also shaped the way the project team conceptualized the project itself. Rather than viewing it as a piece of software, we began to think of the Online Writing Center as a Web site, and to frame our thinking about its potential development within a framework consistent with what was then known about Web sites. For instance, the decision to publish on the Web, rather than to distribute the project via the campus network or on CD-ROM, shaped everything from the overall architecture of the site to the design of individual pages—and these decisions have continued to shape the site in significant ways even as the Web has matured to the point where it far outstrips the capabilities of the mid-1990s version of Multimedia ToolBook.

Division of labor, a key component of both Leontiev's and Engeström's conceptions of activity theory, is strongly related to the tools used to carry out the Writing@CSU project. It is clear that a strict division of labor (in a Marxist sense of management and labor, for example, or in the sense of an assembly line) was not typical of the project, particularly at its inception. Over time, however, and particularly as the project grew in scope, individuals began to take on more defined responsibilities for carrying out the project. Mike Palmquist, for example, emerged as the overall designer of the site and administrator of the project. Luann Barnes emerged as the lead programmer, and Jill Salahub took on that role when Barnes left after working on the project for 11 years. Don Zimmerman, who was associated with the project until the late 1990s, served primarily as its lead evaluator. Others, such as Kate Kiefer and David Vest, took the lead on a number of the research studies associated with the project. Still others served primarily as writers, coders, or artists. Over time, the project also relied on the efforts of accountants and information technology specialists, among other professional staff. It especially benefited from the efforts of writing instructors who provided feedback on the materials developed through the project.

Of these elements, the most important contributions to sustainability appear to have been made by decisions about the tools used in the project and the emergent division of labor as the project progressed. The decisions to rely on relatively easy-to-use development software, such as the scripting-language-based Multimedia Toolbook and, later, Allaire's ColdFusion database-integration tools, simplified the process of updating the site, re-using code, and moving to a database delivery system. The decisions to use proprietary software, although the subject of critique by members of the open source/open software community, also contributed to the project's sustainability. By following the hardware and software standards of the University (e.g., by using Microsoft server and database software), we have made it easier for the information technology staff at the University to provide support for the project, which in turn has resulted in a system that requires less maintenance and technical expertise on the part of the project team.

The division of labor has also contributed to the sustainability of the project. The decision to hire a full-time programmer and, later, a full-time writer, contributed to the early stability of the project. Over the life of the project, a number of writers have worked on a year-long or longer basis on the project, providing them the time needed to understand the instructional, organizational, and stylistic conventions of the materials developed for the site. The decision to allow one person to direct the development of the site has also resulted in a stable vision for the project, even as that person has worked with other members of the project team to refine and, in some cases, change the overall direction of the project.

Contradictions

Engeström's notion of contradictions provides a means of addressing Leontiev's observation that activities do not dictate the thinking of subjects involved in activity. Leontiev's attempt to understand the psyche within the context of activity does not appear to have been intended as an argument that all members of a community will think in similar ways. Kaptelinin and Nardy (2006) observed that

> It is important to mention that Leontiev specifically emphasized that the individual is not a carbon copy of culture and society. In particular, he pointed out that meanings live a 'double life' in the consciousness of the individual as both (a) meanings that objectively exist in a culture and are generally shared by individuals who belong to the culture and (b) 'personal senses' that are different for each individual. (p. 66)

Contradictions arise from the recognition of mismatches between the various elements of an activity system. The consequences of contradictions can shape a project in important ways. In the Writing@CSU project, several contradictions had positive effects on the direction of the project. In its formative stages, the recognition of a contradiction between the expectations of team members about the kinds of writing they thought would be assigned in engineering courses and in the engineering workplace and the kinds of writing that were actually assigned caused the project team to rethink their approach to supporting writing in engineering. Later, as we began to distribute instructional materials through the Online Writing Center, we recognized a contradiction between the goal of protecting the work of individual writers who had contributed to the project (i.e., the notion of copyright) and the need to make information easily available. This contradiction led to a decision to leave the copyright with the writer, but to ask for the "right to distribute" the materials created. Still later, the contradiction between the goal of making the Online Writing Center available to as many members of the Colorado State University community as possible and the limitations of the stand-alone software package used to deliver it contributed to the decision to distribute the instructional materials via the Web.

Perhaps most important, a contradiction between the original design and how students used the site and its resources led to one of the most significant changes to the project. Concerns about the overall direction of the project in the late 1990s led to a significant reconceptualization of its mission. Critiques by scholars such as Eric Hobson (1998) about the instructional focus of many OWLs, and observations by scholars such as Eric Crump (2000) concerning the limitations of existing OWLs, as well as the recognition that, aside from online submission of drafts, the site was providing (albeit in a more accessible form) materials that could easily be distributed in print, led us to question the value of continuing to follow the development path we had chosen. Although the overall project had been successful—the campus writing center had, as had been hoped, emerged as the focus of a community of writers on campus and students and instructors were making extensive use of the materials available through the Web site—the value of continuing to focus primarily on the development

of additional instructional materials was called into question. Our discussion was strongly influenced by the results of a year-long study in which the same teachers had taught the same class in computer-supported and traditional classrooms (Palmquist, Kiefer, Hartvigsen & Godlew, 1998). The study found that students in the computer-supported classrooms appeared to benefit from access to writing tools, network resources, and feedback from peers and instructors during the act of composing. Taking a cue from those results, we began to ask how the Writing@CSU Web site might be used to support student writers in the act of composing. We decided to begin developing a writing environment, subsequently named the Writing Studio, to provide that kind of support to writers.

Contradictions encourage sustainability by calling attention to the need for changes in elements of an activity system. In an activity system with the duration of the Writing@CSU project, contradictions offer a means of identifying needed change. Without a way to identify useful adaptations, members of a project team might come to feel that their work is of little consequence. Worse, they might continue working in unproductive and perhaps counterproductive ways. Without the recognition of contradictions, the Writing@CSU site might have remained a “full service OWL” and the Writing Studio, which has provided a means of continuing engagement among the project team members, might not have emerged.

Object, Motives, and Outcomes

The object of an activity system is a goal or set of related goals; these goals are a response to a particular motive. The effort to achieve the goals leads to specific outcomes, which might or might not reflect success in meeting the goals and might or might not be consistent with the motives informing those goals. To understand the interplay of object, motives, and outcomes in the Writing@CSU project, it is useful to begin with the overall motive that informed the project: the initial desire on the part of the initiators of the project to create a means of supporting the use of writing in courses across the disciplines, and in particular in engineering. This motive is informed by a constellation of professional and personal values about the appropriate behaviors of writing instructors, the relationships between composition programs and other departments, and the potential role of writing-across-the-curriculum programs in higher education. The object of the Writing@CSU project—initially, to create a technology-supported WAC program housed in a writing center and coordinated with the University’s composition program, and later to develop a Web site supporting writers and writing instructors at and beyond the University—was strongly informed by the motive. As the motive changed over time, the object changed as well. And as the outcome was understood, and in the early to middle stages of the project, found lacking, the contradiction between the outcome, the object, and the motive led to changes in the overall direction of the project.

Activity theory appears to imply a single object, or at least a set of related goals. However, it seems possible that complex activity systems, such as the Writing@CSU project, might be able to accommodate multiple motives informing a particular object. For example, some members of the project team were motivated by a need to respond to a particular problem: that is, improving the quality of writing among students in the disciplines. Others were motivated by a desire to study the use of technology to support writing instruction. An overlapping motivation, for many of the participants in the project, was the publication of scholarly work that would contribute to their professional lives. It is not clear whether the notion of multiple motives is accommodated within Leontiev and Engeström’s conception of activity theory, but the Writing@CSU project appears to offer an example of a complex project informed by multiple motives.

Enduring motives appear to be among the most important elements of sustainability in the Writing@CSU project. One of those motives is the desire to use technology to support writing

instruction in composition courses and in courses across the disciplines. This motive has allowed a number of key participants to continue to see value in the project, and it has enabled the institution to view the project as consistent with its overall motives of educating students and preparing graduates for participation in the larger society. On an individual level, the concept of enduring motive has been important as well. The project coordinator decided in the late 1990s to focus a significant part of his scholarly work on this project. His motive, at least in part, was to build a scholarly career around the project. That decision allowed him to think more fully about the implications of the project than might have been the case had he viewed it simply as an administrative assignment or some other form of service.

ACTIVITY THEORY AS A FRAMEWORK FOR ANALYSIS AND GENESIS OF COMPUTERIZED WRITING ENVIRONMENTS

What precisely do we gain by subjecting a decades-long development project to rigorous analysis with activity theory? In our view, the theoretical framework provides a perspective that reduces the tunnel-vision effect of snapshots of the project. Activity theory allows us to focus on interactions rather than on discrete elements. The theoretical framework also gives us a way to use the history of the project generatively to plan further enhancements, and, as we noted in the introduction, sustainability implies both continuity and enhancement, building and adapting.

Particularly important to us in this analysis is the balance of benefits to individuals and to the community. Any one member of the community might have specific goals governing his or her participation in the activity. For instance, a graduate student might want to write pedagogical or curriculum materials as part of a thesis project or might want to write Web texts as part of a portfolio of work to present to prospective employers. A faculty member might want to participate in the activity as a focus of specific research and scholarship. Another faculty member might choose to engage in the activity system as a way to facilitate student engagement in the classroom. Motives such as these are certainly not mutually exclusive, but the community as a whole can recognize that some contributors participate to fulfill different goals. Through division of labor, each participant can contribute to the overall outcome; through rules, each contribution conforms to the established conventions required for a coherent outcome. In the case of Writing@CSU, contributions from each participant become part of the whole, so that each contribution sustains those made by others.

Equally important is the notion that activity systems can be nested or interact in complex ways. We can view Writing@CSU as an activity system in itself with complicated outcomes and continual adaptations to changing technological and local conditions. But we can also see that Writing@CSU functions in relation to the composition program more generally, and that program in turn relates to the nested activity systems of the English Department, the College of Liberal Arts, and Colorado State University. And, of course, the University and its activity systems develop within the larger systems of higher education in Colorado (as governed by the state legislature and the Colorado Department of Higher Education) and higher education more broadly. We see multiple implications of this interaction among activity systems:

- Student writing isn't contained by the specific classes in which students enroll or the institution they attend. Yet the interactions between academic and nonacademic writing, between writing to learn and writing to maintain social contacts are not always exploited fully in a composition program. **The activity system model allows us to examine interactions among systems to better adapt objects for more productive outcomes for students.** To illustrate, in January of 2007, a major upgrade simplified the Writing@CSU interface and incorporated tools that reflect students' growing familiarity with and interest in social networking. After logging in,

writers and instructors view a customizable "writing page," from which they can access writing tools, saved work, classes and co-curricular experiences, learning tools, and instructional materials (see Figure 10). Account holders can also view information about writers with whom they have shared work or who are enrolled in their classes or co-ops.

Figure 10. Writers are taken to a personal, customizable "Writing Page" when they log into the Writing Studio.

- **Because the community is not limited to one geographic site, the system itself can recruit new community members over time and space.** For example, following the release of the Writing Studio as a resource accessible to writers and writing instructors beyond the University, a number of writing instructors investigated its use as a course management system at their institutions. Of these, the writing faculty at the University of California at Irvine proved most interested in the project. Beginning in 2005, they used the Writing Studio to support all first-year composition courses taught at their university. Because of their heavy use of the site, they became involved in its development, offering suggestions for new features (their suggestions, for example, led to the development of the blog tool) and exploring the use of resources at their institution to support its continuing development. By mid-2007, several other institutions were using the Studio regularly in their composition programs and, like the faculty at UC Irvine, were offering suggestions for improvements and expansion of its features. In March 2007, at the Conference on College Composition and Communication, representatives from several of these institutions met to explore the development of an open-source version of the Studio. Such extensions of the local community enhance the long-term sustainability of any writing initiative by sparking adaptation and refinement.

- **Activity theory can help scholars in the field of computers and composition account for the continuing challenge of developing network-supported writing environments.** When working within the framework of activity theory, for example, analysts are encouraged to recognize significant contradictions that, without attention, might sap the momentum of a project. By looking for contradictions and viewing them, when recognized, as potentially productive, we can consider what these contradictions might tell us about the overall direction and potential outcomes of a project. Similarly, activity theory calls attention to the importance of maintaining and nurturing the interrelationships that develop among members of the community/communities engaged in work on a project. In a project as complex and a team as large as that involved in the Writing@CSU project, for instance, it might be easy for members who view themselves as central to the project to think of the contributions of other members of the project community as somehow less central to the collective effort of the community to realize its goal. As Russell (2004) noted, however, labor defines relationships among the people who carry it out and communities, in turn, condition other elements in an activity system. It would seem that the complex interrelationships among the members of an activity system and their labor does not allow easy assignment of responsibility (or credit) for the realization of

> an activity system's goal. Rather, it reinforces an awareness of the interrelatedness of activity.[6]

There appear to be strong benefits associated with using activity theory to examine our efforts to support the teaching and learning of writing. In the case of the Writing@CSU project, viewing the writing environment we have developed as an activity system nested within and overlapping other activity systems has allowed us to better understand the directions we might pursue to sustain appropriate writing instruction, especially when that instruction—and related support—takes place in digital realms. Our experiences suggest that activity theory offers a powerful tool for both design and assessment. As such, it can make important contributions to our work as writers, teachers, developers, and scholars.

[6] Indeed, we might find it helpful to consider as members of that community not only those involved in its production, but also the students—who as a group are increasingly facile with new digital media forms—who used and in some cases provided suggestions for the refinement and expansion of the digital tools and resources that make up the Writing@CSU Web site.

REFERENCES

Barab, Sasha A.; Evans, Michael A.; & Baek Eun-Ok. (2004). Activity theory as a lens for characterizing the participatory unit. In David H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 199–214). Mahwah, NJ: Lawrence Erlbaum Associates.

Bazerman, Charles, & Russell, David. (2003). *Writing selves/writing societies: Research from activity perspectives*. Perspectives on Writing. Fort Collins, CO: The WAC Clearinghouse and Mind, Culture, and Activity. Retrieved from http://wac.colostate.edu/books/selves_societies/

Bertelsen, Olav W., & Bodker, Susanne. (2003). Activity theory. In John M. Carroll (Ed.), *HCI models, theories, and frameworks: Toward a multidisciplinary science* (pp. 291–324). San Francisco: Morgan Kaufmann.

Cole, Michael, & Engeström, Yrjo. (1993). Cultural-historical approach to distributed cognition. In Gabriel Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 1–46). New York: Cambridge University Press.

Crump, Eric. (2000). How many technoprovocateurs does it take to create Interversity? In James A. Inman & Donna N. Sewell (Eds.), *Taking flight with OWLs*: *Examining electronic writing center work* (pp. 223–233). Mahwah, NJ: Lawrence Erlbaum Associates.

Engeström, Yrjo. (1987). *Learning by expanding*. Helsinki: Orienta-Konsultit.

Engeström, Yrjo. (1999). Activity theory and individual and social transformation. In Yrjo Engeström, Reijo Miettinen & R. Punamaki (Eds.), *Perspectives on activity theory* (pp. 19–38). Cambridge, MA: Cambridge University Press.

Hobson, Eric H. (1998). *Wiring the writing center.* Logan: Utah State University Press.

Kaptelinin, Victor, & Nardi, Bonnie A. (2006). Acting with technology: Activity theory and information design. Cambridge, MA: MIT Press.

Lasarenko, Jane. (1996). PR(OWL)ING AROUND: An OWL by any other name. *Kairos 1* (1). Retrieved from http://english.ttu.edu/kairos/1.1/index.html

Leontiev, Alexei N. (1978). *Activity, consciousness, and personality* (Trans. Marie J. Hall). Hillsdale, NJ: Prentice-Hall.

Leontiev, Alexei N. (2005a). Lecture 13. Language and consciousness. *Journal of Russian and East European Psychology 43*(5), 5–13.

Leontiev, Alexei N. (2005b). Lecture 14. The structure of consciousness: Sensory fabric, meaning, personal sense. *Journal of Russian and East European Psychology, 43* (5), 14–24.

Leontiev, Alexei N. (2005c). Lecture 35. Types of thinking: Thinking and sensory cognition. *Journal of Russian and East European Psychology, 43* (5), 25–40.

Leontiev, Alexei N. (2005d). Lecture 36. Thinking and activity. *Journal of Russian and East European Psychology, 43* (5), 41–52.

Leontiev, Alexei N. (2005e). Lecture 37. The genesis of human thinking. *Journal of Russian and East European Psychology, 43* (5), 53–64.

Leontiev, Alexei N. (2005f). Lecture 38. Thinking and speech. *Journal of Russian and East European Psychology, 43* (5), 65–81.

Leontiev, Alexei N. (2005g). Lecture 39. The varieties and transformations of speech. *Journal of Russian and East European Psychology, 43* (5), 82–96.

Leontiev, Alexei N. (2005h). Letter from A.N. Leontiev to L.S. Vygotsky. *Journal of Russian and East European Psychology, 43* (3), 70–77.

Leontiev, Alexei N. (2005i). Study of the environment in the pedological works of L.S. Vygotsky: A critical study. *Journal of Russian and East European Psychology, 43* (4), 8–28.

Leontiev, Alexei N. (2005j). The genesis of activity. *Journal of Russian and East European Psychology, 43* (4), 58–71.

Leontiev, Alexei N. (2005k). Will. *Journal of Russian and East European Psychology, 43* (4), 76–92.

Leontiev, Dmitry A. (2005). Guest editor's introduction. *Journal of Russian and East European Psychology, 43* (3), 3–7.

Miettinen, Reijo, & Kaptelinin, Victor. (Eds.). (2005). Special issue: Perspectives on the object of activity. *Mind, Culture and Activity, 1*.

Neuwirth, Christine M.; Kaufer, David S.; Chandook, Ravinderm; & Morris, James H. (1990). Issues in the design of computer support for co-authoring and commenting. *Proceedings of the Third Conference on Computer-Supported Cooperative Work*. Baltimore, MD: Association for Computing Machinery.

Neuwirth, Christine M.; Kaufer, David S.; Chimera, Rick; & Gillespie, Terilyn. (1987). The Notes program: A hypertext application for writing from source texts. In *Hypertext '87 Proceedings* (pp. 345–365). New York: Association for Computing Machinery.

Neuwirth, Christine M.; Keim, Gary; & Gillespie, Terilyn. (1988). *The Comments program: Computer support for response to writing*. CECE-TR-3. Pittsburgh, PA: Center for Educational Computing in English, Carnegie Mellon University.

Neuwirth, Christine M.; Palmquist, Michael E.; & Gillespie, Terilyn. (1988). *An instructor's guide to collaborative writing with CECE Talk: A computer network tool*. Pittsburgh, PA: Center for Educational Computing in English, Carnegie Mellon University

Neuwirth, Christine; Palmquist, Michael E.; & Hajduk, Thomas. (1990, April). *Collaborative writing and the role of external representations*. Paper presentation at the annual meeting of the American Educational Research Association, Boston, MA.

Palmquist, Mike; Kiefer, Kate; Hartvigsen, James; & Godlew, Barbara. (1998). *Transitions: Teaching writing in computer-supported and traditional classrooms*. Greenwich, CT: Ablex.

Palmquist, Mike; Kiefer, Kate; & Zimmerman, Donald E. (1998). Creating community through communication across the curriculum. In Donna Reiss, Richard Selfe, & Art Young (Eds.), *Electronic communication across the curriculum* (pp. 57–72). Urbana, IL: National Council of Teachers of English.

Palmquist, Mike; Rodrigues, Dawn; Kiefer, Kate; & Zimmerman, Donald E. (1995). Enhancing the audience for writing across the curriculum: Housing WAC in a network-supported writing center. *Computers and Composition, 12* (3), 335–353.

Palmquist, Mike. (2000). Notes on the evolution of network support for WAC. In Maureen Daly Goggin (Ed.), *Inventing a discipline: Essays in honor of Richard E. Young* (pp. 373–402). Urbana, IL: National Council of Teachers of English.

Rodrigues, Dawn, & Kiefer, Kate. (1993). Moving toward an electronic writing center at Colorado State University. In Joyce A. Kinkead & Jeanette G. Harris (Eds.), *Writing centers in context: Twelve case studies* (pp. 216–226). Urbana, IL: National Council of Teachers of English.

Rodrigues, Dawn; Kiefer, Kate; & McPherson, Stuart. (1990). English department offers electronic writing service. *Vector, 7* (5), 3–4, 16.

Russell, David R. (1995). Activity theory and its implications for writing instruction. In Joseph Petraglia (Ed.), *Reconceiving writing, rethinking writing instruction* (pp. 51–78). Hillsdale, NJ: Lawrence Erlbaum Associates.

Russell, David R. (1997a). Rethinking genre in school and society: An activity theory analysis. *Written Communication, 14*, 504–554.

Russell, David R. (1997b). Writing and genre in higher education and workplaces: A review of studies that use cultural-historical activity theory. *Mind, Culture, and Activity, 4*, 224–237.

Russell, David R. (1998). Russian activity theory. In Mary Lynch Kennedy (Ed.), *Theorizing composition: A critical sourcebook of theory and scholarship in contemporary composition studies* (pp. 265–268). Westport, CT: Greenwood Press.

Russell, David R. (1999). Activity theory and process approaches: Writing (power) in school, and society. In Thomas Kent (Ed.), *Post-process theory: Beyond the writing process paradigm* (pp. 80–95). Carbondale: Southern Illinois University Press.

Russell, David R. (2004). Looking beyond the interface: Activity theory and distributed learning. In Harry Daniels & Anne Ewards (Eds.), *The RoutledgeFalmer reader in psychology of education* (pp. 309–325). London: RoutledgeFalmer.

Wertsch, James V. (Ed.). (1981). *The concept of activity in Soviet psychology*. New York: M. E. Sharpe.