ASSOCIATION FOR INTEGRATIVE STUDIES
NEWSLETTER

Inside
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We think, therefore I am:
Distributed cognition in ID collaboration and cognitive science

Sharon J. Derry, Christian D. Schunn and Morton Ann Gernsbacher, Eds. (2005). *Interdisciplinary Collaboration: An Emerging Cognitive Science*. Mahwah, NJ: Lawrence Erlbaum Associates. (ISBN: 0-8058-3633-0; list price $99.95)

Reviewed by Andrew P. Manion, Provost, Aurora University, Aurora, Illinois.

Sharon Derry, Christian Schunn, and Morton Ann Gernsbacher have taken on a formidable task: To "...call attention to the serious need to study the problems and processes of interdisciplinary inquiry, to reflect on the current state of scientific knowledge regarding interdisciplinary collaboration, and to encourage research that studies interdisciplinary cognition in relation to the ecological contexts in which it occurs" (vii). No small feat. To accomplish this, they have enlisted the aid of experienced collaborators from the seven areas represented in the logo of the Cognitive Science Society—anthropology, artificial intelligence, education, linguistics, neuroscience, philosophy, and psychology—to produce a work composed of 12 sophisticated but accessible chapters that guide the reader through the terrain of interdisciplinarity and cognitive science and, as the list price would suggest, is intended more for serious explorers to these regions than for the casual tourist.

Derry and her colleagues effectively imbue the work with recurring themes that provide a valuable set of guideposts, based on solid theory and supporting empirical evidence, for both those interested in the cognitive science of interdisciplinary collaboration, and those interested in embarking on their own interdisciplinary collaborative research journeys. The reader will also find that the work balances the theoretical with the applied and the idealistic with the notably practical (one of the editors' stated objectives, for example, is to make more research funding available for interdisciplinary work). The editors hope to raise several questions: "What are the problems associated with interdisciplinary work both in general and in cognitive science in particular? How does successful interdisciplinary work proceed (through work structure, graduate preparation, leadership, team makeup, etc.)? And what concepts and ideas drawn from the cognitive sciences, broadly conceived, can help both managers and researchers within interdisciplinary teams and researchers of interdisciplinary collaboration address these issues?" (xix – xx).

As the title implies, the volume is exclusive in its treatment of interdisciplinarity as an interpersonal (as opposed to an individual) way of knowing. As such, the emphasis is placed on the challenges (communication, proximity, competition, cooperation, funding, managerial, etc.) and advantages (knowledge, breadth of inquiry) of working in interdisciplinary teams, rather than the challenges and advantages facing "Leonardesque" interdisciplinarian individuals (Campbell suggests that an individual must have the abilities of Da Vinci in order to be truly interdisciplinary, but see Klein

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and Newell, 1997). What is not stated in the title, but quickly becomes clear to the reader, is that this is a work about research and problem solving, not about interdisciplinary teaching. While the principles discussed may be applied to interdisciplinary course collaborations, this is not the primary intent of the editors or the contributors.

Of particular interest throughout is the distinction between cross- (or multi-) disciplinary endeavors and inter-disciplinary (or omni-scientific; again per David Campbell) ones. While this distinction has been considered at length in many works on interdisciplinarity, it is worth noting here that even though all the chapters describe interpersonal collaboration as a means to achieve interdisciplinarity, there is a consensus that true interdisciplinarity is not achieved until the cognitive process of the individuals involved develop new, internal, and previously unconsidered (to them, at least) ways of thinking and approaching problems. That is, as long as the sociologist continues to think about and approach the problem using the cognitive tools of the sociologist and the linguist continues to think about and approach the problem using the cognitive tools of a linguist, their collaborative effort remains a multidisciplinary endeavor. Or, to paraphrase Vera John-Steiner (1998) from Susan Epstein's chapter, unless it changes the way participants think, collaboration among the disciplines "remains just a division of labor," (see also, Klein, 1990, and Newell, 2001).

The Brave New World

The first section of the work is composed of three chapters that provide the underlying theory and contextual framework for the rest of the volume. The editors selected as the lead chapter the late Donald Campbell's article, "Ethnocentrism of Disciplines and the Fish-scale Model of Omniscience," which was originally published in 1969. Campbell did accurately describe the entrenchment of the disciplines and predict the resulting challenges (most of them resulting from disciplinary ethnocentrism) facing those brave enough to attempt interdisciplinary research: differences in status, problems with communication, difficulties finding a common framework for problems, departmental structures, challenges finding appropriate outlets for publication of results, and others considered at length within other chapters of the volume. Campbell suggests that a "fish scale" model of omniscience could be the answer: the disciplines do their own thing but overlap in interdisciplinary realms that together create a holistic body of knowledge, which is more complete than any of the disciplines could achieve working independently.

In Chapter Two, "Interdisciplinary Team-work: the Dynamics of Collaboration and Integration," Julie Thompson Klein provides a history of the rise of interdisciplinary work in the second half of the 20th century and emphasizes that teamwork is not synonymous with interdisciplinarity. In this chapter we are introduced to the importance of integration as a requisite condition for true interdisciplinarity. She details the many potential pitfalls to interdisciplinary team success including turf-protection, language barriers, lack of familiarity with interdisciplinary work or with the other disciplines represented in the team, tendency to reductive solutions, mistrust, insecurity, differing levels of status, methodological differences, and others (p. 31-33). However, she also points out that there are many enabling factors for interdisciplinary team success: mutuality, interdependence, development of the sense of "we," goal orientation, pragmatism, effective leadership, and others (33-36). Finally, Klein presents two models of integration: Stage and Process models, which emphasize the practical steps taken by interdisciplinary teams, and Linguistic and Communication models, which emphasize the importance of establishing common language (that is, not simply common terminology, but assurances that the terminology means the same things to people from different disciplines).

In the final chapter of the opening section, principal volume editor Sharon Derry works with Angela O'Donnell to provide a review of the literature that contributes to the conceptual framework around the cognitive processes at work in interdisciplinary groups. Distinguishing between naturally occurring groups like surgical teams or management teams, and more contrived laboratory-based groups, they show that natural groups differ from lab-based groups in the kinds of problems they solve, the consequences of ineffectiveness, and typically the (in)equality of status among members (as on a surgical team), and others. They argue that many social factors are at work in interdisciplinary groups, including leadership style, communicative processes, conformity, group composition, group status, power, prestige, ability, and, importantly, group expectations (including individual expectation of what s/he can contribute to the group) and group identity (including individual identity as it exists or develops within the group; p. 54-56). This chapter shows that effective groups (1) share certain characteristics: interdependence, accountability, and real contribution of all group members working on a problem that is genuinely challenging (Damon & Phelps, 1989; De Lisi & Golbeck, 1999); and (2) have three core activities: accomplishing goals, maintaining good relations among members, and developing and adapting to changing conditions effectively (Johnson & Johnson, 2002). Finally, the authors advocate for the development of a model for distributed cognition—one that accounts for both the individual characteristics of the members and system-level properties—for the understanding and evaluation of interaction in interdisciplinary teams.

Charles Goodwin's previously published "Seeing in Depth," provides an anthropologist's account of what field-based interdisciplinary collaboration looks like. Goodwin's account is the research equivalent of an Agatha Christie mystery insofar as it is conducted aboard

the neatly enclosed universe of a research vessel at sea. The reader can practically smell the salty air as Goodwin examines technical, linguistic, spatial, political, and other aspects of oceanographic research being conducted aboard ship in the mouth of the Amazon River. The ocean itself is a "boundary" object of study and brings together varying types of scientists like physical oceanographers, geochemists, biologists, as well as highly skilled seamen who are integral to the success of the research. While the scientists have their own research questions to answer, the constraints of time and space require that they work together and with the seamen, in a way that, Goodwin argues, is uniquely interdisciplinary.

For example, the practical task of accurate instrument placement necessarily becomes a collaborative interdisciplinary operation drawing on perceptions and knowledge of multiple "experts" to achieve a common objective. The physical oceanographer is in a room below deck reading a data screen to determine the depth of a submerged research instrument, and it is her responsibility to lower it as near to the bottom of the ocean as she can without actually hitting the bottom (and risking damage to or loss of the instrument). She has no way of physically seeing the instrument or controlling the depth, however. To do this she observes data readouts and communicates via "squawk box" with the winch operator in the ship's wheel room. The operator adjusts the depth of the instrument based on the scientist's request using his own experience regarding the winch and the angle of the line as it descends into the water. Similarly, the ship's navigator is responsible for assuring that the ship itself is in the right position based on a prearranged research grid plotted virtually on the ocean surface. So, Goodwin argues, these three people are engaged not simply in a division of labor, but in a division of perception … an interdisciplinary perception that does not exist without the contribution of all three people. While there is a hierarchy from

the research perspective, certainly no good would come of the research if the two sailors were not doing their jobs well. Goodwin also describes how researchers sharing lab space develop common language and integrated perceptual and cognitive patterns in order to maximize the efficiency of the time spent at the instruments during the grueling cruise.

Chapters Five, "Disrupting Representational Infrastructure in Conversations Across Disciplines" by Rogers Hall, Reed Stevens, and Tony Torralba, and Six, "Categories and Cognition: Material and Conceptual Aspects of Large-Scale Systems" by Susan Leigh Star work together as a set. In these chapters the reader is brought back to the fish-scale model (Campbell, Ch. 1) and asked to examine exactly what is in those boundaries and how is the overlap to be examined? Traditional cognitive psychology teaches that ideas reside in the head. But, as Star points out, since Campbell's model, a growing body of literature (labeled "situated cognition," "cognition and practice," and distributed cognition," and summarized by O'Donnell and Derry, Ch. 3) has demonstrated that ideas reside not only in the head, but in the hands, the tools, and "networks of human and non-human actors that ecologically form the complex that we call knowledge" (p. 168).

These two chapters emphasize the development of new cognitions and categories when uncertainty arises in interdisciplinary work involving entomologists and statisticians as well as architects and structural engineers (Hall, et al.) and in large-scale category systems (Star). Hall et al. show how researchers from different disciplines attempt to bridge differences in categorization and representation (and how formidable a task this is) while Star provides a series of examples to illustrate her point that categories appear when uncertainty arises. Star describes how anomalies in experience or evidence give rise to questions, which can provide new ways to organize information

drawing on examples ranging from the International Classification of Diseases of the World Health Organization to race classification in apartheid South Africa.

These two chapters show that categories are dynamic and are the regular subject of renegotiation. The final chapter in this section, Lori Adams DuRussel and Sharon J. Derry's, "Schema (Mis)Alignment in Interdisciplinary Teamwork," leads the intrepid reader into the morass of curriculum research, studying the case of the failed attempt of an interdisciplinary academic team to map the science curriculum of engineering students. DuRussell and Derry use Bartlett's (1932) concept of "schema" to suggest that the degree to which mental models are aligned or misaligned will facilitate or hinder interdisciplinary work and they point out the irony that the more intentional a team is at diversifying the expertise of its members, the more likely it is to have members with misaligned schema. This chapter shows how misaligned schema, primarily regarding the task of the group and the roles of its members, frustrated the interdisciplinary team and ultimately doomed the project.

In Part Three of the volume, Derry and her colleagues enlist the aid of cognitive scientists to engage in a kind of meta-examination of cognitive science itself. The five chapters here describe the history of the development of cognitive science and illustrate how this field has been an example of successful interdisciplinary collaboration, or not. The section begins with John T. Bruer's "Cognitive Science: Interdisciplinary and Intradisciplinary Collaboration," in which he shows how successful collaborations between cognitive scientists and educators, cognitive scientists and systems neuroscientists, and cognitive scientists and geneticists have contributed to the development of cognitive science and produced new ways of approaching and solving problems. Importantly, he also shows

Wayne State University launches interdisciplinary website

By Nancy Christ and Julie Thompson Klein, Wayne State University

Colleges and universities across the country employ a variety of strategies to foster and sustain interdisciplinary research and education. An interdisciplinary (ID) website link can be a powerful centralized mechanism. It offers greater visibility for existing programs, centers and institutes, projects, and other activities. It can enhance their legitimacy by publicizing successes, and support existing, emerging, and future efforts with information on funding opportunities, literatures, and other local, national, and international resources. Wayne State University has recently launched a long-term effort to develop a website devoted to Interdisciplinary Research and Education (www.research. wayne.edu/idre).

The Wayne State initiative began a year ago when an ID web team formed. The team emulated design and content features of two major ID websites at Duke University and the University of Michigan. Duke is unique in being the only institution in the country that has created a Vice Provost for Interdisciplinary Studies. The office of the new Vice Provost developed an *Interdisciplinary Studies* website with five sections. (1) The *Overview* covers the topics of managing centers, the grant process, organizing events, and information about interdisciplinary studies. (2) *Teaching and Learning* has separate sections for faculty, students, and staff. (3) *Funding* covers both internal and external opportunities. (4) *Centers* provides descriptions and contact information. (5) *News and Events* highlights local activities and has an "Interconnection" newsletter plus links to other news sources (http://www. interdisciplinary.duke.edu).

The other model that the Wayne State team emulated, the University of Michigan's "Interdisciplinary Learning, Teaching, and Research" website, is housed in the Rackham Graduate School.

Its major sections provide information on Rackham-based interdiscipinary workshops, courses, a summer workshop, interdisciplinary and collaborative research grants, and collaborative groups in humanities. In addition, Michigan's ID website has links to a variety of interdisciplinary academic programs and resources on campus, as well as an "About Interdisciplinarity" section that has a link connecting directly to the website of the Association for Integrative Studies, a bibliography of readings, and documents produced by two national groups, the Responsive Ph.D. Project and Revisioning the Ph.D. (http://www. rackham.umich.edu/Events/interdis.html).

Phase one of the Wayne State website project, which emphasizes research, is the culmination of a yearlong effort to increase awareness of and support for interdisciplinary activities on campus. The website has four major goals: to provide tools for Wayne State faculty that support their interdisciplinary research and education efforts, to spotlight interdisciplinary activities at the University, to serve as an information clearinghouse among university parties as well as the external community, and to present informative articles about interdisciplinarity. It has seven sections: (1) *Home* welcomes visitors to the site, links to the 2004 report on *Facilitating Interdisciplinary Research* from the National Academy of Sciences, and presents reprints of important publications; (2) *Interdisciplinary Research @WSU* provides news and other information about forming ID research groups, the Faculty Commons Meetings, and an earlier 1993 internal report on the status of interdisciplinarity at Wayne State; (3) *Interdisciplinary Education* is still under construction but at present has a preamble on current imperatives for ID education and a link to further information on training grants; (4) *Funding Opportunities* includes both internal and external opportunities with

a link to the SPIN computer database of public and private funding opportunities; (5) The *Conference Clearing House* provides a checklist for conference planning, news about upcoming events, and a place to post calls for abstracts and proposals; (6) *Tools for Researchers* has an assortment of links facilitating searches for equipment, the COS-Community of Scholars database, evaluation services, a database of faculty research interests, and a mechanism for locating research collaborators; (7) *More Links* leads to campus-based electronic research newsletters and a WSU Fact Sheet.

The authors of this report are Nancy Christ, Director for Research Program Development in the Office of the Vice President for Research (OVPR) at Wayne State University, and Julie Thompson Klein, Professor of Humanities in the Department of Interdisciplinary Studies. Christ and Klein are also members of the University's ID web team. Toyin Akinmusuru assisted with technical design and implementation of the site, and Gloria Heppner, Associate Vice President in the OVPR, assisted with conceptual design. With the launching of the ID website, the OVPR is now taking the next step by forming an oversight committee to explore and implement more widespread strategies and structures to enhance interdisciplinarity at Wayne State. ■■■

Changes in store for SFSU Liberal Studies Program

By Helen Goldsmith and Robert Cherny, San Francisco State University

The Liberal Studies Program at San Francisco State University is preparing for a major change in direction in the near future, as indicated by the ad in this newsletter (back page) seeking applications for two, new tenure-track positions. Until now, the Liberal Studies program has relied on courses offered by departments and programs throughout the university for its curriculum, on faculty members recruited from across the university for its advising, and on a council elected from throughout the university for its governance.

With some variations, the basic curricular structure has remained much as it was when SFSU faculty members created the major in 1972. The new major was primarily a response to new California preparation standards for future elementary school teachers. It was, and still is, structured around four areas required of prospective elementary teachers:

- Communication, language, and literature.
- Life sciences, physical sciences, and mathematics.
- Behavioral and social sciences.
- Creative arts and humanities.

Liberal Studies majors take courses offered by disciplinary departments or interdisciplinary programs in each area, including two core courses (6-7 semester units) in each area. Currently, students are required to take two specific interdisciplinary courses in the areas of behavioral/social sciences and creative arts/humanities. Students select among several choices for their two core courses in the other two areas. In addition to the core courses in each area (totaling 25 units), students take three to four additional courses (12 units) to develop an area of emphasis, focused on a theme, in one area. There are an additional nine units of electives, for a total major of 46 semester units.

Despite its origins in preparing teachers, the major has served multiple groups of students from the beginning—it has provided future teachers with subject matter competency in the four designated areas, and it has provided other students with a broad liberal arts education. Because of the values of the institution and the faculty members who created and led this program, it has always attracted almost equal numbers of students seeking pre-professional training and those seeking to satisfy their multidisciplinary interests. And, happily, some students choose it for both reasons! This is unusual in the California State University system, where on most campuses over 90% of the students majoring in Liberal Studies intend to become teachers.

For years at SFSU, the Liberal Studies program leadership grappled with whether the program was "interdisciplinary" or "multidisciplinary," and in recent years opted for the latter term because of the lack of courses in most parts of the curriculum that make the theoretical and methodological connections that would make the program truly interdisciplinary. In the near future, however, we anticipate that the opportunity to hire our own faculty will bring the program closer to its original, interdisciplinary goals.

The decision to seek permission to do tenure-track hiring resulted from the convergence of a number of factors:

- During the past decade or so, SFSU has discontinued interdisciplinary baccalaureate majors in the sciences, creative arts, and social sciences, and also a baccalaureate degree program in humanities and science convergence that was offered through the Liberal Studies major. Most of the faculty members in those interdisciplinary programs have retired. The Liberal Studies program had relied heavily on many of those faculty members to teach key courses (especially core courses), to advise students, and to lead the Liberal Studies Council, the curricular governing board for the program. Recently hired faculty members usually have a disciplinary home in a department, and the expectations of their home departments as they work toward tenure make their participation in interdisciplinary activities unlikely. The hiring of new tenure-track faculty members into interdisciplinary programs in recent years has been focused on subject matter programs, e.g., Human Sexuality Studies or Environmental Studies, rather than on issues of theory and method. This has made it difficult to attract new faculty members as advisers and even as members of the Liberal Studies Council. Due to retirements of all but one of the tenured faculty in the program in Social Science (Interdisciplinary Studies), the core courses in that area have been taught by temporary faculty members for several years.

- At the same time as these patterns have developed on campus, as has been the case across the country, there has been a strong push for assessment of program effectiveness. Despite some valiant efforts, the Liberal Studies Council recently concluded that it is impossible to accomplish authentic and useful assessment without dedicated courses and faculty, particularly in a major as large as ours.

- Recently SFSU adopted a set of

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that this type of research is fundable. His main argument is that the interdisciplinarity of cognitive science provides the novel methods and ideas that enable collaborating researchers from other disciplines to avoid the gross overstatements and miscalculations of "naïve reductionism" and instead to examine issues with more granularity and precision.

"Making Interdisciplinary Collaboration Work," the chapter contributed by Susan Epstein, is perhaps the most valuable in the volume for those interested in attempting an interdisciplinary collaboration for themselves. Epstein studies (informally, by her own admission) 21 people involved in interdisciplinary cognitive science. Including very practical advice, such as collaborators must be nice to each other and it is helpful if all participants have a stable home life, her complete recipe for a successful interdisciplinary collaboration calls for the following ingredients:

- Attitude – You have to want to collaborate and respect those with whom you collaborate.
- Communication – Careful attention must be paid to language, making sure that the same terms mean the same things across disciplines. "Early vigilance is well repaid," (250).
- Time – Interdisciplinary collaborations take more time than those within one discipline, and the participants must be willing and able to invest this time.
- Proximity – While electronic communication may be rendering this less essential, several of those studied emphasized the importance of face time, especially at the beginning of the collaboration.
- Institutional climate – The institution must support interdisciplinary collaboration not only in terms of reward structures and physical plant considerations, but also in

terms of relief from other responsibilities.
- Funding – Interdisciplinary collaboration tends to be expensive, which is a potential obstacle to successful interdisciplinary research.
- Roles – The useful division of labor is important, (see also DeRussel and Derry).
- Appropriate topics and publication outlets – The best topics are couched in several disciplines, none of which is significantly advanced ahead of the others. Also the responsibilities for write-up are important insofar as this also may determine (or be determined by) likely publication venues.

Now that Epstein has described the conditions for successful interdisciplinary collaboration, Yvonne Rogers, Mike Scaife and Antonio Rizzo in their chapter, "Interdisciplinarity: An Emergent or Engineered Process?" ask whether it is really necessary. They suggest that many enterprises claiming to be interdisciplinary are, in fact, multidisciplinary insofar as they do not generate new methodologies or ways of thinking. They provide a rather poignant example of a 1998 meeting on cognitive science, the theme of which was interdisciplinarity, that included virtually no genuinely interdisciplinary presentations and had evaluation forms that asked participants to categorize each presentation as either psychology, computer science, or philosophy … without providing for the possibility of a response of "cognitive science" (266). True interdisciplinarity is necessary when the questions not only defy the boundaries of a particular discipline, but also defy the boundaries of multiple disciplines, even when they work together (in a multi- or pluridisciplinary way). Rogers and her colleagues argue that the most likely way to break new ground in interdisciplinary areas is in responding to applied research problems. These are typically the places where collaboration is expected and valued and fresh frameworks can be developed with the least resistance.

Next, Christian D. Schunn, Kevin Crowley, and Takeshi Okada ask, "Why do researchers from different disciplines ever come together to form new disciplines?" in their chapter, "Cognitive Science: Interdisciplinarity Now and Then." Schunn, Crowley, and Okada test the assumption that the field of cognitive science is interdisciplinary by examining the main cognitive science journals and the primary cognitive science annual meeting. They find that, while cognitive science purports to be composed of psychology, computer science, neuroscience, philosophy, linguistics, anthropology and others, the vast majority of principal authors of articles published in the cognitive science journals are affiliated with departments of psychology or computer science. A similar pattern was found for meeting participation. They point out that not only are researchers likely to be trained in a discipline that produces ethnocentrism, but so too are the reviewers for journals and conferences.

Finally, in "Being Interdisciplinary: Trading Zones in Cognitive Science," Paul Thagard presents the concept of trading zones (an analogy developed by Gallison in his 1997 book on modern physics) as a framework to understand, and perhaps promote, interdisciplinary collaboration in cognitive science. This concept explains how people can exchange goods that have widely different meanings and values (like fish for baskets, for example). Thagard argues that cognitive science has successfully developed as an interdisciplinary enterprise (however, see Schunn, et al.) because five factors have promoted the development of trading zones within which scientists from different disciplines can thrive. These five factors are: disciplinary "pioneers" who pushed the boundaries of their fields; institutions that supported the interdisciplinary crossing of boundaries (trading zones) that facilitated the development of cognitive science; other organizations like the journal *Cognitive Science* and the Cognitive Science Society; ideas that cut across disciplinary boundaries; and

methods that were new and not housed within a discipline. Thagard asserts that these five factors have allowed Campbell's (Ch. 1) overlapping fish scales (necessary in the development of an omni-science) to become intellectual trading zones in which genuine interdisciplinarity has developed.

Returning to Terra Cognita

Having emerged from the volume, the reader is no doubt in need of a shower and a hot meal but should still have the pluck to ask a question or two. Among them is whether the emergence of Cognitive Science as a new field of study is an example of an interdisciplinary enterprise coming into its own, or are we observing the "natural" development of a new discipline? Before there was the science of psychology, for example, there was philosophy of the individual and empirical science. Merging these two fields into a new modality of thought and methodology was originally an interdisciplinary process, but psychology has emerged as a discipline in its own right. Are we simply observing the same process with cognitive science (see Schunn, et al.; and Thagard, p. 319)? The answer may depend on the role of distributed cognition, and its relation to the development of experts in cognitive science and the stabilization of concepts and categories. The pioneers in cognitive science have been immigrants to this landscape, carving out places (trading zones?) for themselves and working with other immigrants to overcome language, cultural, and other barriers that take the forms of jargon, methodology, and instruments native to their own disciplines (to say nothing of attitudinal biases, differences in status, and other challenges enumerated within the volume). These people are all non-native speakers of this new, constructed language. As the number of "natives" increases (i.e., those whose initial graduate and perhaps even undergraduate training is in cognitive science, per se, rather than in one of the seven disciplines currently included in the society's logo), perhaps the necessity of distributed cognition will wane, contrary to Campbell's assertions about

Leonardo, and the disciplinary boundaries simply dissolve, leaving the discipline of cognitive science. If this happens, will the discipline of cognitive science be any less perilous than its interdisciplinary predecessor? One would expect it to be so.

Derry and her colleagues have provided an important contribution to the understanding of both interdisciplinary collaboration and cognitive science. The volume—part travelogue, part instruction manual—is itself an example of those things that it studies: interdisciplinary collaboration and cognitive science. It is a worthwhile read for both those native to these regions and those who have arrived more recently.

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strategic goals, one of which is that "San Francisco State University makes writing central to education and ensures that its graduates write proficiently." To achieve this goal, a pending task force report looks toward creation of writing-intensive courses in each major at the junior and/or senior level(s). This goal has converged with discussions within the Liberal Studies Council on the need for a capstone course in the major. However, neither a writing-intensive course nor a capstone course (or a course that combines both objectives) can be offered so long as the program continues to rely solely on courses taught in other departments and programs and on faculty members whose tenure and time commitments lie elsewhere.

These elements converged to persuade the Liberal Studies Council that the time was right to request tenure-track faculty members of its own, and the Provost approved our request to hire four faculty members (one in each area) over the next two years. Council members see this as a crucial opportunity to strengthen the program, refocus the curriculum, improve the student experience, and reinvigorate interdisciplinarity more generally across the campus. Although these new faculty members will help revise the curriculum and create Liberal Studies courses, they cannot serve all of our majors. Thus, we shall continue to be dependent on course offerings from departments and programs across the campus. Given the heavy advising load, we are likely to continue to rely on faculty advisers from other departments and programs as well. But we hope our new, dedicated Liberal Studies faculty members will make connections and build bridges across campus, enhance SFSU's intellectual life, and offer a programmatic home for those students seeking a broadly interdisciplinary approach to their baccalaureate education. ■■■

Job Posting

Assistant Professor (2 openings), Liberal Studies Program, San Francisco State University

San Francisco State University seeks candidates for two tenure-track assistant professor positions, effective Fall 2007, to teach interdisciplinary courses in one of the Liberal Studies subject areas: (a) communication, language and literature; (b) life sciences, physical sciences, and mathematics; (c) behavioral and social sciences; (d) creative arts and humanities. The successful applicants will develop capstone courses that are broadly interdisciplinary and integrative courses. Requirements include three courses per semester and advising responsibilities. Salary and benefits are competitive, dependent on qualifications. Desired qualifications include a disciplinary or interdisciplinary terminal degree (Ph. D. or MFA) and broadly interdisciplinary preparation in one of the Liberal Studies subject areas; skills to integrate or synthesize knowledge from disparate disciplines; interest in working with prospective K-8 teachers; evidence of teaching excellence or promise and potential for successful research and publication; familiarity with recognized best practices in teaching; interest in using and developing innovative instructional technologies to promote student learning; awareness of and sensitivity to the educational goals of a multicultural and socially diverse urban university population. Knowledge of the California K-8 curriculum standards is desirable. The program is particularly interested in recruiting women, ethnic minorities, and persons with disabilities. SFSU is an Equal Opportunity, Americans with Disabilities Act employer and has a strong commitment to the principles of diversity. Applications will be reviewed October 30, 2006. A letter of application, curriculum vitae, three letters of recommendation, and any additional materials that support the application (teaching evaluations, samples of publications, etc.) should be sent to: Liberal Studies Search, Office of Undergraduate Studies, San Francisco State University, 1600 Holloway Avenue, San Francisco, CA 94132. For more information, phone (415)338-2206 or e-mail ugs@sfsu.edu.

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