Chapter 3

Organizational Systems Theory Analysis: (Belated) Feedback-Driven Audience Analysis

> *Being customer oriented doesn't mean that our excellent companies are slouches when it comes to technological or cost performance. But they do seem . . . more driven by their direct orientation to their customers than by technology or by a desire to be the low-cost producer.*
>
> **Thomas Peters and Robert Waterman**
> **In Search of Excellence: Lessons from**
> **America's Best-Run Companies**

Stymied by the lack of participation by students, and hence by faculty who were apparently not encouraging their students to publish the best class papers, I at last "went to the source," to interview teachers and advisers across campus — I needed more feedback than I was receiving regarding the *NSR*'s design and potential for use in the classroom. Feedback I had received from students at the Undergraduate Research Symposium seemed positive enough, but yet I had received no papers from them, despite their promises. Clearly something was going on of which I was not aware, something more fundamental than simply getting the message out to more people.

In the fall of 1997 I undertook a systems analysis of undergraduate writing organized under on concepts based on Peter Senge's *The Fifth Discipline* (1990): mental models, personal growth, team learning, and shared vision. By using this interactive approach to gathering audience feedback, I uncovered two major factors influencing participation of which I was not previously aware:

1. A new universitywide proposed General Education Requirement had been proposed during that time, which may have required all upper-level undergraduate courses to include major writing requirements. Many faculty, rather than being enthusiastic about a venue for publishing the excellent papers they received, were concerned with

how they would incorporate the major writing assignments into their class, how they would assess the results, and how they would find the time to accomplish all these tasks. I learned the *NSR* was a "great idea" but one they were not yet ready to address.

2. Undergraduate students rely heavily on faculty to guide them in their activities, and without the faculty encouragement (and reward via class credit, etc.), their participation would be low. Systems analysis, as a form of audience feedback, showed me where my intuitive and classification approaches had missed their mark.
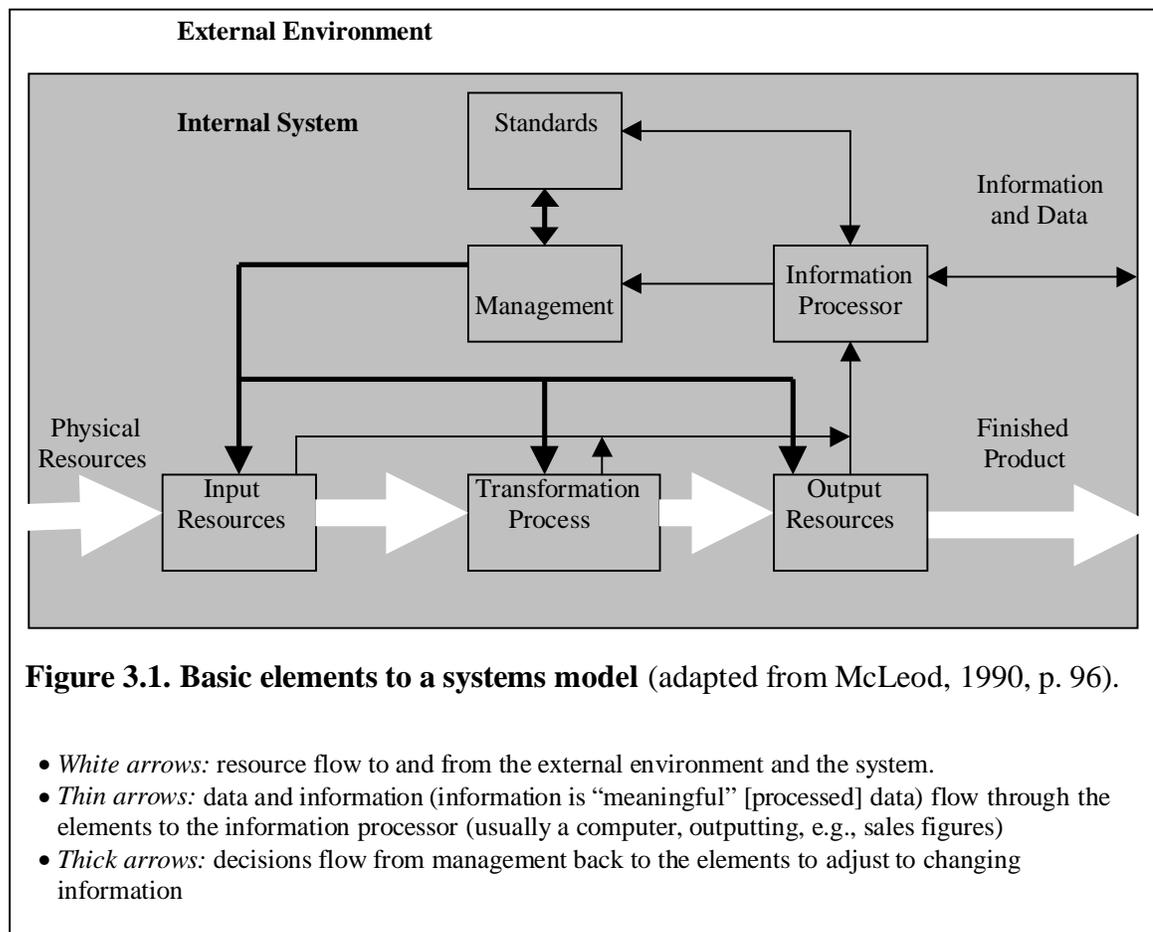
A. Introduction to Systems Theory

In an attempt to understand the system of the teaching of undergraduate research writing at NC State, in the fall of 1997 I undertook an organizational systems theory analysis that, though broader in its original scope, provided a wealth of *NSR* audience information. The basic approach to understanding organizations, initially developed by Daniel Katz and Robert Kahn in the early 1960s, involves viewing the organization as an "energetic input-output system" that transforms input from its environment into output to reactivate the system (McLeod, 1990, p. 66). The concept of "system" itself is relatively new, developed in the late 1930s by Ludwig von Bertalanffy, who defined "open" and "closed" systems as relationships of a system to its environment (63). A system can reach a steady state by balancing inputs and outputs either within itself (closed systems) or to and from the environment (open systems) via feedback mechanisms (64). This focus on dynamic stasis via feedback mechanisms relates systems theory to feedback-oriented audience analysis, as described by Schriver (1997), and relates in a broader sense, to the feedback/balance concepts of complexity theory, which was originally founded as models of thermodynamics equilibria, in roughly the same time period as Katz and Kahn's work.

General systems theory as applied to organizations combines principles of the physical, biological, and social sciences, viewing the organization as a system of elements made up of people and their tools, interrelated through resource flows. A system works toward one or more goals, with more or less coordination depending on the nature of the resource flows. In human systems, the manager has the role of motivating participants to work in a coordinated fashion (12) — as manager I was the controller of

the system (71), whose responsibility is to make sure the organization meets its goals (13). Systems theory is offered as a conceptual system to help the manager fine-tune the organization's physical system (63) — the actual organization itself: the flow of money, material, machines, and manpower (83–84). The conceptual system involves information flow and how the organization is modeled. The manager in a systems model is the control/decision filter, using information to make changes in the physical system (86) — journal design, presentation, and marketing.

Figure 3.1 shows the essential elements of a systems model. Resources flow from the environment, are transformed, and flow out (white arrows). Information flows from the environment and among the system elements (thin arrows), is transformed into decisions, and flows back to the system in the form of changes to procedure, personnel, and resources (thick arrows).

Figure 3.1. Basic elements to a systems model (adapted from McLeod, 1990, p. 96).

- *White arrows:* resource flow to and from the external environment and the system.
- *Thin arrows:* data and information (information is "meaningful" [processed] data) flow through the elements to the information processor (usually a computer, outputting, e.g., sales figures)
- *Thick arrows:* decisions flow from management back to the elements to adjust to changing information

While the standard systems model views the conceptual, informational system and the physical system it affects as composed only partly, secondarily, by individuals, Peter Senge's systems approach, as outlined in *The Fifth Discipline* (1990), focuses first and foremost on the individuals that compose the system, with other resources (money, material, machines) as secondary to the analytical focus. Senge's basic approach follows the systems model of cycling of information and other resources, but rather than focusing on the material and information and its transformation involved in the system, Senge focuses on how individuals behave within the system and how they are transformed and in turn transform the flow of information and hence the flow of other resources: our mental models support our behaviors, and the flow of information affects our mental models, and in turn is affected by these models as we in turn pass information along (formally and informally).

Senge offers his interpretation of systems theory as a method by which organizations can be examined and changed via their personnel, rather than via their products, to achieve continual improvement and growth in personnel and hence the products they achieve. His general goal is for all organizations to become "learning organizations," deeply aware of their environment and their own elements, and creative enough and adaptable enough to use that knowledge to maximize, or "leverage," their goals, goals that are determined with the participation of all involved — similar to Schriver's conception of audience involvement in every aspect of document design. Such an organization would be able to produce any number of products well, rather than developing into an organization that produces one specific type of product well.

Senge's method essentially involves talking to everyone who's involved in whatever you're looking at, aiming for open exchange of information, to develop a picture of how the whole system works and who or what affects who or what else, how, and why — audience needs, expectations, interaction styles, and motivations. By receiving input from as many individuals as possible, one can evaluate the state of an organization's information flow from a range of perspectives from microcosm to macrocosm; any one of these perspectives may contain the key to whatever answer you seek — in my case, the factors influencing faculty and student participation in the *NSR*.

The general perspectives Senge uses are (1) the mental models of individuals as they interpret and interact with their environment, (2) their own patterns of personal growth (how well individuals are motivated and enabled to be aware and take control of their mental models), (3) team learning (how well individuals' personal growth motivates them interact and share information with one another), and (4) shared vision (how well that interaction results in a unified set of organizational goals that are believable and achievable). Shared vision in turn affects individual's mental models and motivation, in a feedback loop that reflects the basic principles of systems theory. That's why Senge calls it the "fifth discipline"[1] — systems theory is the umbrella that pulls the other ideas together into a living, growing, evolving, continually improving organization. Once these factors are identified, areas of potential "leverage," or the most change for the least effort, are sought to bring the organization more to a positively evolving state.

In my case I was seeking change to increase student and faculty participation. So first I had to answer the question, Why were they not participating? Senge's approach seemed well suited to examining audience response because in applying his concepts (mental models, personal growth, team learning, shared vision), I was addressing their basic rhetorical situation: Who exactly were the potential authors and their mentors? What was their purpose for participating as readers, authors, and mentors? What was their underlying motivation? What were their perceived circumstances for participating? Who did they perceive their own audience to be?

B. Systems Analysis of NSR

1. Approach

As part of a larger project examining how science students were taught research writing, using Senge's approach I interviewed teachers, advisers, and science students from across the NC State campus, to map the communication processes involved in decisions affecting how and why undergraduates were motivated to take one of three professional writing courses. During these interviews, student writing continually came

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[1] By "discipline," Senge means not "an 'enforced order' or 'means of punishment,' but a body of theory and technique that must be studied and mastered to be put into practice" (p. 10).

up as a topic of discussion, by which means I learned what students write for their research papers and what specific factors affect how and why science faculty assign these papers.

More specifically, I undertook a series of interviews with teachers of ENG333, both present and past, and with academic advisers in science departments at NC State,[2] to examine the level of alignment between undergraduate professional writing instruction, as conceived by those who teach it in the English Department, and as envisioned by science departments who use ENG333 to satisfy NC State's General Education Requirements (GER). The 1994 GER we operated under at the time encouraged all curricula at NC State to include an upper-level professional writing course or a speaking course. This sent numerous students to ENG333, which is designed for those "who intend to go on to graduate school in science or into other scientific research settings," fulfilling "the 'advanced writing' option under the Writing and Speaking requirements for many programs and students" (Professional Writing Committee, 1997). The goal of the GER writing and speaking requirement is to improve student performance in order that students, among other things, "develop a repertoire of strategies for addressing the concerns of audiences in the many contexts of contemporary life — academic, professional, and civic" (NC State University Council on Academic Policies and Procedures, 1997). ENG333, and its sister courses for business management and engineering (ENG332 and ENG331), achieve these goals by focusing primarily on work-related and completely on postgraduation audiences and situations:

> These courses introduce students to the kinds of communication tasks they can expect to perform after graduation and in the workplace; instruction emphasizes the needs of various professional audiences, strategies of adapting organization and style to those needs, and ways of supplementing written communication with oral reports and visual aids. (Professional Writing Committee, 1997)

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[2] Advisers interviewed were Phyllis Bradbury (Zoology), Peggy Foegeding (Food Science), Gerry Luginbuhl (Microbiology), Wendell McKenzie (Genetics), John Meyer (Entomology), Jeannette Moore (Animal Science), Richard Noble (Fisheries and Wildlife Sciences), Sam Pardue (Poultry Science), Bob Patterson and Lance Bullock (Crop Science), Ron Tilley and Steve Reynolds (Physics), and Donna Wolcott (Marine, Earth, and Atmospheric Sciences). ENG333 teachers (all from English Department) included Mike Carter (Campus Writing Consultant), Steve Katz (Director of Technical Communication Program), Nancy Penrose (later Associate Director of Freshman Composition), Carolyn Miller (CCSTM director and Professional Writing Committee chair), Jamie Larsen, Brad Mehlenbacher, and Linda Rudd.

Through teaching ENG333 I had further contact with the standard student laments stemming from a lack of student commitment (mostly lack of confidence in the reward for the effort) and from limited time, especially when students feel they must choose between an English writing assignment and a science assignment for a course in their own department. To try to take advantage of the writing students were already doing, in order to better align both my syllabus and the *NSR* to their educational environment, I interviewed some of their teachers and advisers to find out what goals we shared for student education, what links we shared for communication, and what leverage might exist to help us reach our goals. I asked them about their writing and curriculum needs for their undergraduate students, and their expectations for student writing and writing instruction. And, teacher of ENG333, an undergraduate research writing course that served many disciplines (e.g., biology, physics, meteorology, textiles, etc.), I discussed with my own science and research students as well as others how motivated they were to participate in the electronic journal.

2. Writing Across the Curriculum

During this study I encountered much concern regarding Writing Across the Curriculum (WAC) issues, in particular, a proposed new GER mandating that all upper-level courses include major writing assignments. Many departments at that time were using ENG331–333 to satisfy the 1994 requirements, and the new requirements proposed in 1997 were causing departments and faculty to completely rethink their course content. NC State departments at that time varied greatly in their departmental classroom writing requirements, from essay exam questions almost exclusively, to a senior seminar that includes both lab and literature research to produce a final written and oral project, to large writing components in all 300–400 level courses. Large class size was cited as a primary reason for not including significant writing components in courses. In 1997 the proposed new GER required that, "in order that skills develop broadly and consistently along with the individual's increasing knowledge of subject matter, *all* upper-division courses offered in the university should incorporate *significant* writing and speaking experience" (NC State University Council on Academic Policies and Procedures, 1997,

emphasis added), rather than, as first proposed, "that at least two upper-level courses contain significant writing elements" (NC State Council on Undergraduate Education, 1997). The more expansive newly proposed requirement apparently was the source of so much concern regarding how to design and manage assignments in undergraduate courses, many of which have enrollments of 75 students, much less how to assess the improvement such a broad requirement can bring, causing faculty to rethink their mental models of writing within their courses.

This concern regarding the new proposed GER, combined with students' perception of their roles and boundaries, proved to be a major, yet previously hidden, obstacle to the success of the *NSR*, which offered to publish "excellent" undergraduate research encouraged and nominated by university faculty, as described below.

3. Mental Models

Students' responses to the idea of the *NSR,* as presented to them at the Undergraduate Research Symposium and on other occasions, seemed enthusiastic enough, if they did not already have plans to publish their research along with their research mentors. But when I asked other students about whether they wanted to participate in specifically *NSR*, their responses were almost unanimous: senior year is so full of required projects that few considered using any spare time for a publication that by their mental models was of questionable benefit.

Students were not quick to recognize a simple avenue for reward, simply because they did not recognize the reward. Undergraduates have little identification with their future selves as authors, hence perceive little reward for publishing. Students perceived their audience to be their teachers and future employers, not fellow students, and the journal was not perceived as addressing the audience they wished to reach. To them "publishing" was something they did later in their careers, or an honored few did along with their professors while undergraduates. For undergraduates performing research, their goal was professional publication, and there was no intermediate step to aspire to (except the Undergraduate Research Symposium, which for many participants was a requirement

of a course they were taking). The *NSR* would have had to help generate a completely new mental model of intermediate publishing in the minds of undergraduate researchers.

In the faculty's minds, students are not expected to "publish" until later in their careers — after all, they're only undergraduates. Most faculty did not perceive students as true authors per se; hence, there were few authors, in their minds, for the journal to address, or for them to strongly encourage. I found that in most if not all departments, research publication pressure does not begin until the graduate level, when faculty usually first begin to encourage their students to submit their work to journals, and undergraduates are not generally considered ready to make a contribution to the research record. Hence, in faculty's mental models, there was no "disciplinary space" in which undergraduates should publish: coursework assigned to students usually did not yet include genres that faculty would consider acceptable for publication (e.g., complete research report). Thus, judging a piece of student writing as "excellent" that did not fit into their definition of professionally, publishably "excellent" (i.e., advanced research report beyond the capabilities of most undergraduates) was problematic.

4. Personal Growth

Students do have great need for recognition, in preparation for future employment, but do not perceive a student publication as providing that recognition, and so were not motivated to pursue publication in *NSR* regardless of how low the hurdles were placed. Their circumstances, regarding both little available time and course assignments not yet resembling "publishable" research, were not conducive for the smooth transition from class paper to publication I had envisioned while designing the journal. Students' purpose and motivation in personal growth — to establish careers and achieve success — were not addressed by the *NSR*.

Faculty were quick to recognize the *NSR* as a great learning tool, judging by the feedback I received on the journal conception. From the faculty's perspective, their purpose and motivation in personal growth — personal success and satisfaction in helping students succeed, without overtaxing their physical and mental resources — aligned with the goals of the *NSR*, to increase student learning and exposure of university

and faculty efforts by taking advantage of teaching elements already in place throughout the university, rather than adding to them. The faculty perceived the new proposed GER as adding to their teaching burdens without compensating them, in terms of more financial and labor assistance (e.g., teaching assistants).

The proposed GER as a universitywide mandate caused much discussion and concern among faculty over not only how to incorporate the GER requirements into their individual classes, but also just what was an "excellent paper" (which not only varied from discipline to discipline but also varied in class assignment versus "publishable paper") — obviously whatever *had* been perceived as excellent in the past was not good enough. Hence the situation was a (short-term) dilemma for faculty, who were being asked by the *NSR* to label papers as excellent and sponsor them for public viewing as such.

5. Team Learning

Those students who are motivated to "publish" satisfy this goal by publishing as acknowledged assistants or, occasionally, co-authors with their research mentors. Students who are encouraged to publish by their teachers generally experience publishing through this route, so there was no team learning already in place for faculty to encourage students to publish in the *NSR*, or for students to seek sponsorship from faculty to do so. The *NSR* needed to campaign long and hard to generate this sense of team learning necessary for students and faculty to work together toward achieving an "excellent" publishable paper.

Interviews with faculty in many different disciplines indicated that assignments and standards of excellence varied among disciplines, problematizing faculty's willingness to publicly portray, to the entire university and beyond, that any assignment within their course, within their discipline, met universitywide standards of excellence. But even so, students, advisers, and committees were already engaged in discussion regarding precisely the issue the *NSR* offered them: how to create a disciplinary space for increased student writing. The depth of debate and discussion among faculty over just what was excellence, and how to incorporate the GER requirements into their individual

classes indicated a high degree of ongoing team learning on this issue. Where *NSR* erred was in not participating in that discussion, in which the new Campus Writing and Speaking Program at NC State is now engaged.

6. Shared Vision

For students, the mental models, personal growth, and team learning environment under which they operate include no disciplinary space for publishing, and so they lacked the motivation and encouragement to participate in the *NSR*. Students in only some departments were just then beginning to be required to produce papers of the type the *NSR* had sought. Such a shared vision, at that time absent across and within disciplines, was an assumption on my part in designing the *NSR,* and without it, or without actively participating in establishing it, the *NSR* would receive few submissions.

Faculty were not quick to encourage lots of papers as "excellent" because of the debate over what's "excellent" and what should be required and rewarded in undergraduate writing, introduced by the GER requirements. The depth of faculty discussion regarding just what an excellent *student* paper *should* be, spawned by the perceived inadequacy of student writing as indicated by the need for new writing requirements, indicated that there was a perceived lack of consensus regarding just that issue — no shared vision that the *NSR* could tap into, no encouragement from teachers to motivate students, no papers submitted for publication.

But yet each discipline, department, and division was constructing its own assignments and definitions of "excellence" according to their specific approach to writing in the undergraduate curriculum. Some departments and colleges within the university were more suited to an undergraduate research publication, because they already had a strong writing tradition from which I could build my base and work out. The shared vision within these departments, the ones that required major writing assignments in all 300–400 level courses, would have been an excellent place to focus *NSR*'s attention — but that would have been contrary to its (static) design as a universitywide publication that played no favorites.

C. Implications for the NSR

I was surprised to find that I had mentally defined the organization that was the *NSR* far too narrowly: in accounting for all the factors I found to affect the behavior of students, teachers of research writing, and science advisers who sent students to their classes, I ultimately came to see the strong role that the university administration and even the source of funding for the university played in their individual decisions. I learned that teachers and advisers were being "squeezed" between increased teaching responsibilities and decreased resources to accomplish their tasks, and that the *NSR*, by being unaware of and hence unresponsive to their needs, had not offered them a service they found compelling at that time, and hence they were unmotivated to participate.

Faculty did not require and rarely encouraged undergraduate publication (no team learning in that direction), no or few other undergraduate journals existed to demonstrate career enhancement by undergraduate publication (no external reinforcement), and students and faculty alike believed that because it did not contribute directly to the disciplinary record of research (as professional-level journals do) it warranted little attention (no shared vision supporting it).

Generally speaking, the journal was based on two flawed assumptions regarding undergraduate research students and their faculty: that undergraduates would be quick to see the benefits of having a fairly straightforward avenue for publishing their research and hence motivated to publish, and that faculty would be quick to encourage students to publish, and then capitalize on students' desire to produce a publishable, "excellent paper" and to use previous excellent, published papers as examples for their students. I found that in most if not all departments, research publication pressure does not begin until the graduate level, when faculty usually first begin to encourage their students to submit their work to journals. Undergraduates are not generally considered ready to make a contribution to the research record (mental model). Hence, there is no disciplinary place — no shared vision, no team learning in this direction — for undergraduate research publication per se.

Essentially, via Senge's approach in understanding their mental models and their motivations based on those models, I discovered that the students' and faculty's

situations, for the most part, were not addressed by the journal. Students perceived their audience to be their teachers and future employers, not fellow students, and the journal was not perceived as addressing the audience they wished to reach. Their circumstances, regarding both time and the nature of their course assignments, were not conducive for the smooth transition from class paper to publication I had envisioned while designing the journal. As authors, students in some departments were just now beginning to be required to produce papers of the type the *NSR* had sought, and so my cross-university approach had not focused on who the real potential authors could have been. Students' purpose and motivation — to establish careers and achieve success — were not perceived to be addressed by the *NSR*. My own mental model of the journal, developed through experience, intuition, and literature research, did not fit their mental model of what being a student, much less a student author, was like.

From the faculty's perspective, their purpose and motivation — personal success and satisfaction in helping students succeed, without overtaxing their physical and mental resources — aligned with the goals of the *NSR*. However, most did not perceive students as true authors per se; hence, there were few authors, in their mental models, for the journal to address, or for them to strongly encourage. Faculty's audience (aside from the students, which I address here as authors) comprised one another and their administrative decision makers; the relationship between teacher and audience at this stage of the university's development was tentative and tenuous.

In light of what I learned from audience feedback, gathered and organized from Senge's perspective, and comprehended as Schriver's (1997) concepts of feedback-oriented audience analysis (see Chapter 4), I realized that *NSR* had, for all its intentions and efforts, seriously missed the audience mark: where most research journals must face merely the issues of prestige and readership that determine which papers they receive, an undergraduate journal must face the additional hurdle of receiving any submissions at all — mental models, personal growth, shared vision, and team learning practices would all have to change. Better the journal had changed to match them.

And though we had tried to accommodate this decreased student reward/participation by lowering the peer review and submission hurdles, these

procedural changes did not address the fundamental hesitation on the part of the rewarding faculty and the participating students that stemmed from no disciplinary space (shared vision) in which to operate. The fundamental task of the journal should have been to help create that space by inviting others to create it with us (team learning) and hence occupy it comfortably, rather than to create a physical, procedural, and technological pathway to funnel and focus what we thought was preexisting communication. The communication was not preexisting because the communication space did not preexist — not as yet. Rather than take advantage of the (then unknown) situation by creating that space, I simple assumed it was there and acted accordingly.

And yet such models, visions, and learning practices — rhetorical situations that *were* conducive to the audience participation *NSR* needed — were already in place to some extent in pockets throughout the university in the form of Writing Across the Curriculum applications. At the time the journal was piloted (1996–97), the WAC movement had permeated the university in the form of the GER mandates that had caused most departments to rethink their writing requirements and assessment practices, and faculty to rethink their teaching approaches. Students, advisers, and committees were already engaged in discussion regarding precisely the issue the *NSR* offered them: how to create a disciplinary space for increased student writing. But where the *NSR* disappointed was in its static cross-disciplinary submission review process that was offered in toto rather than developed with an ear toward more specific, individual departmental and collegial needs of the individual faculty and students — I had tacitly assumed a shared vision that the audience as a whole was at that time trying to create. The feedback and encouragement I had received from the advisory boards and faculty were piecemeal slices of those enthusiastic pockets, rather than random samples of a broader base of faculty interest. By using systems theory I was able to identify those pockets (in hindsight), which would have been the ideal place to start to grow a more modest representation of academic publishing — capitalizing on those departments and faculty who already had the vision of its potential, and then growing it from there.

I recognized too late that the journal, at this particular stage of the university's organizational development, rather than supplementing student education directly, could

supplement *faculty discussion*: rather than telling faculty what we would accept (though I had tried to be flexible in loosely defining a "research paper" as one simply with a bibliography, and "excellence" as anything they were willing to put their name on), I could have asked them what they would like to see, involving them in a related but relatively risk-free, open exchange of information that encourages team learning and an evolving organization. In this way the journal could truly have been the platform for faculty experimentation I had hoped it would become.

But the journal also disappointed in its cross-disciplinary approach (encouraging at least the assumption of cross-disciplinary norms). I learned that cross-departmental "discussions" are unwieldy — chains of communication among departments are filtered through layers of committees, and each college has its own preferences for communicating among itself and other colleges.[3] Because no apparent formal chain of communication existed across departments without going through layers of committees first, the concept of cross-departmental decision making was viewed as yet another task for already overburdened faculty to accomplish. If *NSR* were to participate in the decision-making conversation regarding student writing, it would need to go through existing committee channels to avoid being perceived as "extra," hence a hindrance rather than a help, which would mean wooing not the students, as *NSR* had done, and not the faculty, as the interviews had suggested, but rather wooing the committees charged with handling the cross-departmental decisions. I do not know if that would have been successful. Perhaps better would have been to, as mentioned above, identify those pockets of enthusiastic faculty and departments that already incorporated research writing projects, and let others participate when and how they saw fit.

But, as it was, at NC State no campuswide decisions had yet been made regarding how to handle writing in the classroom, and with the exception of possible participation in those decisions on a quasi-cross-departmental basis, the journal as it stood could do nothing but wait until courses of action had been decided.

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[3] I learned this not only through my interviews with departmental advisers, but also through my experience of trying to access universitywide, and then collegewide emailing lists to advertise the *NSR*. Had I wondered at the differences, rather than merely marveled at them, I might have recognized them as representative of the varying approaches the colleges take to communication in general.

Figure 3.2. Communication patterns at NC State concerning writing instruction for undergraduates.

This is a map of the overall university comunication pattern, from legislature as primary funding source, down to students as recipients of the main benefits and the alumni and employers as the ultimate judges of graduate quality. The *NSR* had unsuccessfully attempted to be a bridge between faculty of different departments, and between students and their future employers, but yet had incorporated no avenue for conversation, decision making, and feedback among them, and so did not occupy the position in the larger organization that we had desired.