Chapter 1

Journal Conception and Design:

An Intuition-Driven Approach

*. . . no matter how ingenious or attractive his [**sic**] conception may appear in his imagination or on paper, if a designer overlooks just one way in which his structure may fail, all may be for naught.*

Henry Petroski, **To Engineer Is Human: The Role of Failure in Successful Design**

In trying to explain and understand how the journal could have been better designed, there is no better place to start than at the beginning. This chapter describes the original conception of the journal, and the steps we took to get it up and running and out to its intended audience. Our decisions were based on our own experiences and intuitions regarding faculty and student wants and needs, and hence is a perfect example of Schriver's (1997) intuition-driven audience analysis. In describing the conception of the journal, setting it up, and marketing it to students and faculty, I am still struck by how good an idea it still seems to be, despite my strong hindsight awareness that, in fact, it was not good enough to attract the participation needed to keep its interactive communication environment alive, much less achieve its objectives.

A. The Conception

In the spring of 1996, I began a program assistantship at NC State's newly established Center for Communication in Science, Technology, and Management (CCSTM, www.chass.ncsu.edu/ccstm/), helping to set up the program assistant position and find funding sources. Having just finished my undergraduate degree with a detailed honors literature review on complexity theory, I found myself in the same position many fellow undergraduates had experienced: a great deal of work on a paper, with apparently excellent results, but still a paper destined to be graded and filed away. I knew my work was not on par with the current professional conversation on complexity, which emanated

primarily from physics, biology, and computer science. Despite that, several professors and students read it with interest, but I could not think of a venue that was appropriate for publication, save a popular magazine (but the paper was too long) or a "popular" book — either way, changing audiences from scholarly to public would mean a complete rewrite, and I didn't have that kind of time.

Over the years many other students have been in the same situation: they put in untold hours of time to produce excellent papers — often current reviews on a topic — but yet not the type of work on par with the highly focused, research-program-oriented, disciplinary-community-forming conversation that occurs in the peer-reviewed journal arena. Humanities and science students alike had often lamented that it was too bad such hard work had to "go to waste."

That spring of 1996 I shared my laments, as CCSTM was getting up and running, and somehow in those conversations the concept of the *NCSU Student Researcher* (*NSR*; www.chass.ncsu.edu/ccstm/journal/) was born. Readings on scholarly history and publications during the course of my studies and my own experience in the publishing industry both pointed to the future of research publication as electronic, and we knew this would present new challenges to everyone as we learned to use it as authors, publishers, and editors. The responses to the idea were overwhelmingly positive from CCSTM associates and from other faculty and colleagues. Among these were Ann M. Penrose and Steven B. Katz, authors of the textbook *Writing in the Sciences: Exploring Conventions of Scientific Discourse* (1998). I was currently assisting on that project, and I ultimately taught the course for which the text was designed: ENG333, Professional Writing for Science and Research. The course and the book are based, in part, on the concept that to increase students' experience and practice of the communication situations in their fields is to increase their understanding of their discipline, their place in it, and its place in the larger society, to everyone's benefit. In the fall of 1996 a literature review on the place of scientific writing in technical communication found that several authors called for technical communication education to reflect the nature of the practicing scientific communicators (Hagge, 1994; Lott & Berrett-O'Leary, 1996; McDowell, 1995; McShea, 1994; Scheiber & Hager, 1994). Other researchers have shown that communication

practices other than "instrumental discourse" are important to the social organization of science (Battalio, 1996; Ceccarelli, 1994; Harmon, 1994; Johnson-Sheehan, 1996; Pinch, 1994; Taylor, 1994; Valletta & Paoletti, 1995). This practicing, social approach to writing experience is the spirit on which the *NSR* was based.

My teaching assistantship would place me in the classroom in January of 1997. So for the fall of 1996, as I began my graduate coursework, CCSTM gave me a research assistantship to establish an experimental undergraduate research journal, on line, the final report for which would ultimately become my MS thesis.

B. Setting Up the Journal

In the fall of 1996 we set out to design an electronic site for the journal, a production procedure, and a marketing plan. The importance of protocol in establishing the journal immediately became apparent, and we sought the needed university contacts for approval and resource allocation. At the CCSTM Academic Advisory Council meeting in September 1996 our estimated timeline for journal startup included elements of technology, marketing, and protocol that allowed me to accept submissions by December of 1996. Our preliminary procedure for journal submissions was discussed at the council meeting. Each of these is detailed below.

1. Protocol

After the council meeting, one of my first tasks was to set up an Advisory Board for the journal, to help with contacts, ideas, and decisions in fine-tuning the journal procedures and marketing. The Advisory Board soon consisted of three members: Dr. Carolyn Miller, as my thesis advisor and director of CCSTM; Dr. Patrick Hamlett from the Division of Multidisciplinary Studies (my undergraduate alma mater), and Dr. David McAllister from the Department of Computer Science. With their advice and feedback from others as I explored university procedure, I focused on formalizing the issues by the end of the semester. Here I briefly describe how we arrived at those decisions.

The second item of protocol involved seeking permission from the university to set up what would essentially become a university publication. I found that no official

permission was needed, but that there were protocol procedures to follow — guidelines offered firmly (but with no apparently penalty for not following). For example, NC State's policy on university publications specified how and where the university name and logo were to appear, that all home pages should have a prominent link to the university home page, and so on.

We had decided that the name of the journal should describe what the journal was (vs. a more catchy name like *Snaz*). Also, we felt we could not wait for a naming/logo competition to find an appropriate name for the journal, because we needed a name to establish identity in our marketing campaign, which was to begin immediately. So we generated lots of ideas, and landed on the *NCSU Student Researcher.*[1]

We also focused on developing the purpose statement for the journal. This was a critical element because it defined in a very essential way what the journal did and why. It resides in a prominent place on the Web site and stakes the boundaries of what readers and authors can expect — somewhat like a constitution, from which later laws (or policies, in the journal's case) are derived, which combined with precedent guide future decisions. We generated countless drafts to find the one that addressed all our audiences: students, teachers, administrators, future employers, future funders:

> The *NCSU Student Researcher*, a two-year experimental online project sponsored by the Center for Communication in Science, Technology, and Management, provides a showcase for excellent student research writing from any NC State program or department. As such, the *Student Researcher* hopes to reward and enhance student academic achievement by providing a platform for students to share their research and interests with other students, with faculty and staff, and with potential employers. Publishing in the *Student Researcher* offers students experience in the research publishing process while they are still in a learning environment, which will enhance their future careers.

This purpose statement was posted on our Web site prototype in November 1996.

2. Procedure

Peer Review. As researchers and scholars know, peer review is an essential part of ensuring the quality of papers published, papers that ultimately will help form the state of

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[1] NC State's publications policy the next year changed to using "NC State" to refer to the university, hence dating our name.

the current conversation in the field. The draft of the undergraduate journal procedure that I presented to the Academic Advisory Council in September included asking the student for a list of suggested readers, whom the journal would then contact to arrange peer review. We wanted the peer review process to be a replica of the scholarly journal review process, to give students experience in that regard. But, we knew that undergraduate authors and professors with limited time might see traditional peer review as unnaturally difficult compared to what they faced already in their coursework.

I discussed ideas with faculty who were involved in peer review and on-campus writing competitions, and had a look at some online journals[2] and found not only that use and approaches to peer review varied greatly, but also that what constituted a journal varied as well: from collections of emails to fully blind reviewed scholarly edifices. Hence we were free to choose our own path. That fall we developed the idea of faculty nominating a paper rather than specifically reviewing it to make changes. Nominating rather than total (re)review would save professors time, and give them the option to nominate on condition that certain items being changed first. We felt it was a happy medium and reflected the teaching situations of the time. Feedback from faculty (CCSTM's Academic Advisory Council, *NSR*'s Advisory Board, colleagues) about this decision was very positive. To add to the authenticity, we asked students to have the paper nominated by a second faculty member from within the same department (likely suggested by the first nominator), who would likely be familiar with the standards pedagogical style within that particular discipline and thus would be able to judge the paper.[3] We felt this would both offer the students more authentic experience in some aspects of the review process, and also function as a certain balance on the part of the faculty.

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[2] In the fall of 1996 there were not many true peer-reviewed journals on line. Online journals I examined included *Kairos*, *Postmodern Culture* (including interviews with Dr. Eyal Amiran, a founding editor, at NC State at the time), *Public Access Computer Systems Review,* and *Psycholoquy*. Scientific journals I found on line tended to be Webfronts hosting abstracts of articles printed in their traditional publication. Several mathematics and computer journals I accessed either were collections of emails or required software I didn't have in order to display the mathematics.

[3] This decision would be challenged at our first submission, a multidisciplinary paper that had been overseen by two professors from different departments.

Submissions. We wanted the submission procedure to be streamlined for the students, for the same reason as described above — especially graduating seniors, whose final semesters are often a flurry of papers, presentations, and job or graduate school interviews. The focus of the journal was "undergraduate research," loosely defined as papers with citations and references, to be flexible for differing assignment descriptions and disciplinary norms. We wanted the journal to be open to research in all fields — all fields have their research studies, and all students do them for their classes, to varying degrees.

In the procedure we adopted, the student submits a nomination form with a signature from each nominator attesting that this was "excellent undergraduate research," plus both an electronic copy and a paper copy of the nominated paper. The idea was to make the submission "hurdles" low enough for undergraduates to not shy away, but yet enough effort to involve them in the significant publication steps, to introduce them to their postgraduation publication environment. The publication schedule took advantage of "anytime" electronic publication by posting an article within a few weeks of when it was received rather than having a fixed schedule. That way students didn't have to wait too long to see their work "in print." On the homepage, just under the purpose statement, we posted the following brief description of the submission procedure:

> Articles will be published as they are received and will be archived for research and development purposes. Articles submitted for publication must be nominated by the professor of the course for which the paper was written, or by the professor sponsoring the project, and co-nominated by another faculty member of the same department.

3. Marketing Contacts and Promotion

To get some ideas about marketing (soliciting authors and readers) for undergraduate publications, I searched for preexisting forums for undergraduate research. I learned of none other than the NC State Undergraduate Research Symposium (http://www.ncsu.edu/ugrs/), a poster presentation sponsored each spring by NC State University and the Sigma Xi Research Society, at which I myself had presented in 1996. It is modeled after the classic poster presentation now common at conferences, and many professors and fellow students visit and ask questions. I contacted the local Sigma Xi

representative, who gave me the name of their contact person on campus, Dr. Sarah Rajala, a member of the engineering faculty. She was invaluable to us in marketing the journal, later enclosing brochures and handouts in Undergraduate Research Symposium mailings, and sending email announcements throughout the College of Engineering at NC State. That same month I sent press releases to the NC State student newspaper, the *Technician,* and to the local chapter of the Society of Technical Communication.

4. Technology

When I first started working at NC State I knew that budgets were tight, and a major part of CCSTM's early efforts focused, as most of us would expect, on finding funding. As part of CCSTM's sponsorship of the journal, their program assistant would handle submissions; at that time it was only a half-time position. So I knew that whatever we decided on needed to be fairly simple and short. I had hoped the journal would become a perennial project, with enough interest to be self-sustaining. Because I knew that, regardless of who ultimately would direct the journal, academic time and money be would be limited, I focused on streamlining the process as much as possible. I had helped order the equipment for the program assistant position and I knew the budget was not large, so I focused on either using preexisting equipment and software, or suggesting inexpensive purchases that would be of use in other areas.

To address the cost-savings aspect, Dr. McAllister suggested a fairly new format, Adobe PDF, which could be viewed by Acrobat Reader that could be downloaded from the Web for free. PDF format had several advantages, focusing on high quality for low labor: it reproduces pages identical to the ones you would print onto paper, so paper quality would be maintained better than with HTML, which must be converted and then tweaked to even come close to formatting available to word processors. For this reason PDF conversions are faster than HTML, which addressed our labor problem.[4] Because PDF reproduces exactly as though printing on paper, it converts figures and mathematics simply and easily, which is especially important for some types of research. And it is difficult (as of yet) to copy and alter, so authenticity is less of a concern — one question I

addressed early was teachers' concerns regarding plagiarism: couldn't students simply copy papers from the Web, change them a little, and hand them in? Copying a PDF paper is little different from copying a printed paper (which has been available to cheaters for centuries); publishing excellent papers keeps them out of the frat files and makes them publicly available to teachers and students alike.

Our choice of PDF addressed our procedural issues beautifully. But authors and readers ran into a bit of difficulty. Readers had to download Acrobat Reader so that they could view the file. But it wasn't that simple. Browsers had to be programmed to access it after it was installed. So, we posted help on downloading: I asked and received permission to copy some excellent assistance I found on the Web, by "Chris" at MIT. Yet I later discovered that many computer labs didn't have Acrobat Reader and didn't allow new programs to be added by users, so many students who tried to access the journal couldn't read its papers. We also ran into what I thought was a small difficulty with author submissions, in that to keep original page breaks and other formatting for submissions, the PDF file we post needs to be made from the original word processing program. Since most people didn't have Adobe Acrobat programs to do this, they could print to a file instead, and then we'd convert the print file to a PDF file. The steps to print to file seem simple, but later I found that they were daunting to many students.

By November of 1996 we had our peer review, submissions, and purpose statement finalized, and had worked out the software and procedure for uploading to the server. I posted a prototype Web page to act as our display — a location interested parties could visit to learn more about our project. It was up in time for us to show Dr. Rajala and others what we were working on. Below are the final objectives at which we had arrived.

C. Finalized Objectives for NSR

In the course of designing the *NSR,* we wanted it to contribute to the university's scholarly enterprise in several ways:

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[4] Time trials for a 60K paper (an average size) were HTML, ~2 hours; PDF, 1 minute.

- reward and enhance research efforts of undergraduates
- provide experience in publishing
- enhance awareness of university and student quality
- provide a forum for exploration
- increase research resources

1. Reward and Enhance Research Efforts of Undergraduates

While undergraduates generally do not contribute directly to advancement of scholarly research, my experiences with my own and others' undergraduate research indicated that students expend a great deal of research effort for their classes and projects, with the aim of developing themselves as researchers and informed users of research, positioning themselves to navigate and contribute to their fields at a later date. It is generally understood among teachers that the greater the effort expended, the greater the learning experience. Giving students the opportunity to publish their research, rather than simply discarding it and moving on to professional levels, might encourage greater research at the undergraduate level, theoretically better preparing students for their careers.

2. Provide Experience in Publishing

Because scholarly communication almost invariably involves publication, future graduates at some point encounter the processes of publication and the demands these processes place on themselves and their work, either through their own publishing or by using published materials to stay informed. Giving students some experience with these publication demands would allow them to draw on that knowledge later as they evaluate, and contribute to, the publications in their fields — hence, the undergraduate journal would help prepare students to encounter and, for those who continue, to enter the world of scholarly communication by providing direct experience of the publication process.

3. Enhance Awareness of University and Student Quality

My own awareness of the excellent nature of some undergraduate research at my university, which I came to know only by direct contact, indicated the likelihood that many unsung undergraduates were involved in excellent research. Providing a forum for publishing excellent undergraduate research would increase campus awareness of the excellent quality of work that goes on here at NC State. Also, students whose work is deemed "excellent" by virtue of publication in this journal would likely benefit from this distinction in their job and graduate school applications that follow their undergraduate tenure.

4. Forum for Exploration

The advent of electronic publication provides a medium for both inexpensive and accessible publishing. Many scholars have commented that electronic publication will change the nature of scholarly communication. An experimental journal of undergraduate research would give students up-to-date publication experience, plus potentially operate as an experimental platform for exploring the impact of electronic publication on the elements of scholarly community. Providing such a journal, which in 1996 had no precedent that I could find in my research, was itself a change and perhaps a challenge to scholarly communication, and so would act not only as a pedagogical tool for students, but also itself contribute to the changes to come. It had the potential to be a tempting platform for experiments regarding electronic publishing, including copyright, archiving, indexing, and reader/author participation.

5. Increase Research Resources

Reading and critiquing examples of excellent research is a good first step in doing research in many fields. It provides templates for critiquing and experimenting with research presentation and documentation to give students an introduction to the genera of their fields. Also, having access to bibliographies in targeted research papers can prove invaluable in delving into research topics. From our own research experience, we all

know that no index or search engine is complete in and of itself,[5] but is further augmented by anecdotal suggestions from colleagues and from the bibliographies of articles we find by using indexes. Given the effort many students put into their research, their bibliographies alone would be an excellent contribution to the resources available for other research.

D. Marketing the Journal to Students and Faculty

At the end of the fall semester we had in place our major journal procedures: peer review, submissions, and purpose statement (defines range of articles we would accept), and software procedure. Yet because I had hesitated to actively market the journal before we had finalized these major decisions, word did not get out soon enough to attract submissions for us to have a December '96 issue.[6] So, I contented myself to work at attracting final papers from spring semester courses and turned my attention to more intensive marketing. Below I briefly describe the marketing events that took place during the spring semester as I researched the scholarly communication literature.

In January of 1997 I tried to locate an emailing list that would contact the entire university, to publicize the journal. I learned of a "3-D" emailing list that goes to all "deans, directors, and department heads." I tried to track down the administrator of that list, and in the process learned that the 3-D emailing list was a spin-off of a campuswide mailing list that had been used for decades. I could get access to the mailing list, but avoided that because printing cost would raise our budget. And, we felt that electronic publicity would be more appropriate for an electronic journal. But I never did manage to get access to the emailing list. Apparently its approval procedure was far more strict, probably to prevent the campus version of spamming. By early February I had contacted each college individually (except for the Vet School, which has no undergraduates), and

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[5] This fact creates a potential threat to disciplinary coherence as scholarly communication goes online: members of a discipline will experience more varied, and individual, encounters with literature, decreasing the shared experiences within a discipline; there will be a difference between items that are and are not indexed electronically (and in varying indexes), which has the potential to place great power in the hands of secondary sources that provide electronic indexes (Lynch, 1996).

in so doing found that each college has its own procedures for intracollege email contact: some had an open list to which anyone could post; others had an administrator who previewed the message and then posted those deemed appropriate; one college had no such list and instead the dean emailed to the department heads, who each in turn emailed to their own departments.[7]

In late January Dr. Rajala sent out an announcement of the *NSR* in the mailing announcing the Undergraduate Symposium. She also sent emails to department heads in her college (Engineering). That same month I consulted with Dr. Eyal Amiran, a founder of *Postmodern Culture* who was at that time teaching at NC State. His feedback on a preliminary version of my literature review on scholarly literature, and on the journal's purpose and procedure, was favorable.

In February, shortly after emailing the colleges, I received an email query from a senior majoring in French Language and Literature, whose professors had suggested he publish his French literature research paper in the *NSR*. As the paper was written in French, he asked if he should translate it to English. I responded to his email the same day, saying that a translation was fine but not required, but could he submit key words in English, and perhaps an English abstract, for indexing purposes. I also suggested that we could take advantage of Web space and post both English and French versions of the paper. I was excited that I had a potential submission arriving exactly as I had hoped it would: an excellent research paper by a student encouraged to publish it by his professors, one that could take advantage of the Web by posting simultaneous French and English versions. I was heartbroken that I never heard back from him.

Also in February I was interviewed by a *Technician* reporter, and the March 5, 1997, edition of the student paper ran a front-page news report on the journal, plus inside a lead editorial urging students to participate. That same month we officially electronically linked to the Undergraduate Research Symposium site. Their Web

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[6] Though we took advantage of "anytime" publishing on the Web by publishing papers just a few weeks after we received them, at the end of each semester we were to give submissions we'd received during that semester a volume designation so they would be citable (see Chapter 2).

[7] NC State comprises nine undergraduate colleges: Agriculture and Life Sciences, Engineering, Physical and Mathematical Sciences, Management, Humanities and Social Sciences, Textiles, Forest Resources, Education and Psychology, and Design.

administrator, Margaret Hudacko, volunteered her time to completely redesign the *NSR* Web site look and navigation, for which we received many compliments. I felt we were set to go: student inquiry, student advertisement in the *Technician,* teacher interest and awareness, and a Web presence to be proud of. I was ready to receive our submissions.

In April I attend the Undergraduate Research Symposium with handouts about the journal and chatted with every student I encountered — I would estimate about half the students who presented at the symposium, plus many faculty. I described the project, answered many enthusiastic questions, noted suggestions, and handed out the flyers to all interested parties. I learned that many of the students who were presenting their research already had plans to publish as co-authors or were in the acknowledgments in papers by their research mentors or professors. Others seemed enthusiastic about having a place for their upcoming paper and promised to contact me when they had finished their papers. A few said they had already heard about the *NSR* and had plans to submit their paper at the end of the semester. A week after the symposium Dr. Rajala sent out a follow-up letter to students who presented at the symposium, and included a copy of the *NSR* handout. A Sigma Xi representative, on his own initiative, took a stack of handouts for the Sigma Xi awards presentation banquet that same week. I felt the journal was on its way, and I eagerly anticipated many queries and receiving many papers.

The next major landmark in developing the *NSR*, also in April, came when I met with NC State Libraries representatives, who were gearing up for their participation in the oncoming electronic age. I learned that they have a mandate to archive all NC State publications, of which the *NSR* is one: we were technically a "serial" they had acquired. They archive by mirroring (systematically copying) Web sites that they "acquire" or subscribe to, making them available on the library's electronic journal index, and allowing searches for documents by their in-house search software. They could set up the mirror software to copy at any interval, and they wanted to know specifically what our publication interval would be: would we be posting monthly, would we be changing articles once they are posted (must they mirror all issues each time, or only the latest one)? I told them of our policy to post articles when we received them but to segment them into issues and volumes with cutoff dates, so papers can be adequately cited: one

issue per semester, two issues per volume, one volume per year. On their request, I contacted them when we reached the first issue's cutoff date, June 1, 1997.

In April I received the first student paper to publish, a multidisciplinary study of women and sports. As a multidisciplinary paper overseen by two different faculty in two different departments, the requirement that both nominating professors be from the same department didn't apply — the first application of the system we had developed showed us a glaring exception.

In May 1997 I sent out notices to the Academic Advisory Board and other interested faculty announcing the first issue of the journal. In June, downhearted that I had not received more papers, I notified the library of the cutoff date so they could mirror the site, and I sent the update to the Academic Advisory Board.

Though I continued marketing the journal, including redesigning the brochure to be more student friendly, heavier marketing to the Undergraduate Research Symposium in the spring of 1998, and several face-to-face discussions with teachers and advisers from a broad range of departments across campus, in the spring of 1998 I received just one more paper for publication. By that time I had investigated the lack of participation and felt I had a pretty good idea of what went wrong — so wrong, in fact, that with my own graduation nearing and little to no interest by other graduate students or faculty in trying to resuscitate the ailing journal, we folded the journal at the end of its two-year stint with a grand total of two articles published. I had found that two obstacles — unmotivated students and hesitant faculty — could not be overcome by redesigning the brochure for the journal, by working more directly with my own students to encourage (yet still not require) publication, or by talking with more teachers and advisers in other departments. Our intuitions had failed us, a great surprise to me then, but of little surprise later once I applied Senge's (1990) systems analysis approach to gather audience feedback, and discovered Schriver's (1990) approaches to understanding audience.

CHAPTER 2