# TWO PERSPECTIVES ON COLLABORATION:

# RESEARCHER AND ADMINISTRATOR

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In 1999 I participated in the Merrill Conference "Building Cross-University Alliances that Enhance Research." For the 1999 white paper, I wrote of my personal experience in collaborative research that involved a twenty-year collaboration with French scientists along with other collaborations that have provided long-term NIH support. Having recently assumed an administrative position in the Office of the Vice Provost for Research, I'd like to focus on the application of my previous experience to the present theme – How can a research administration support and encourage collaboration through the development of faculty leadership in research?

Teich and Gramp[1] have described the mission of faculty as being composed of three elements: Research – generating knowledge; Teaching – disseminating knowledge to the future work force; and Service – disseminating knowledge to the community at large. When I was an Assistant Professor I received each year from the administration of the university a form to report the percent time devoted to these three areas. I was only able to fill out the form to my satisfaction by normalizing effort to a 40-hour week in which case the total was more like 150% instead of 100%. This is, in my view, an important point because potential candidates for leadership roles are already heavily committed to their own work, and this will have to be taken into account. Investigators are experiencing even more demands on their time, especially administrative.

The turn of the millennium has seen a significant increase in the scope of collaborative activity. The National Institutes of Health has called for a reexamination of the way research is organized and the National Science Foundation also has numerous programs designed to enhance collaboration. Second, it is expected that, as scientists, we will be more diligent about imparting knowledge to the K-12 education arena, and involving minorities and minority institutions for the purpose of generating interest and commitment in science. Third, it is increasingly understood that research results should be placed virtually immediately in the public domain and, aside from the intellectual property issues, this requires informatics capability for ready public access while maintaining the requisite security. Finally, the university is being increasingly perceived as an engine for economic development and this requires the transfer of technology to the public sector. There are more imperatives now, and collaboration is more complex. For the purposes of this discussion we will define interdisciplinary interactions as low-dimensional, for example, involving the interaction of a chemist and a biochemist. While the chemist and biochemist are nominally in different disciplines, they share much common knowledge. Multidisciplinary interactions, on the other hand, would not only involve multidimensional interactions, but these interactions would require the development of a common language for communication because the multiplicity of approaches would have to be coordinated. These varied interactions might also involve multi-institutional projects, industrial partnerships and collaborations with government laboratories.

Last spring the Kansas Legislature passed the Kansas Economic Growth Act (KEGA). Its purpose is to provide resources for investment in bioscience, broadly defined. As part of a planning process, we decided to solicit proposals from the faculty. It was made clear that activity supported by this mechanism should eventually lead to technology transfer and economic development. We received a whole range of responses to the initiative. Faculty who have already had experience in moving discoveries in the laboratory to the public domain viewed this initiative as an excellent opportunity for research and development. A perhaps equally small group rebelled against the entire notion, stating clearly that they were perfectly happy interacting with colleagues in their own department. They did not wish to spend time in meetings that would prove to be a distraction to getting their own research done. It is, of course, not reasonable to expect faculty, who came to the university with the mission defined above, to now assume responsibility for the technology transfer process. If this part of the university mission is to be a success, we will have to find ways to help them, and, in the process to engage more faculty.

The KEGA discussion also coincided with the unrolling of the NIH Roadmap. Although the data are strictly anecdotal, a number of young investigators expressed concern that the focus on centers and broad initiatives would result in a deterioration of R01 (individual investigator initiated) grants as support for these other programs increased. In FY2002 NIH awarded 43,500 research grants, of which 63 percent were for R01 funding.[2] The R01 grants accounted for 53.4% of total funding ($16.8 billion). NIH Director Elias A. Zerhouni, M.D. recently paid a visit to the Lawrence campus and met with young faculty. He assured them that the percent of R01 grants was holding steady, there was no intent to reduce their number, and indeed that the average number of grants held by individual investigators was approaching 1.5. He pointed out that the purpose of centers is to link the R01 activities into a broader network with the necessary infrastructure to rapidly create and consolidate new knowledge and translate it into tangible benefits for people.

In order to develop an institutional response to aiding in the creation of multidisciplinary collaborations, it is perhaps important to define the process. Traditional problem solving, as depicted in Figure 1, might involve three persons/groups (A,B,C) with slightly different perspectives. They would look at the problem and pick out those parts that they knew how to solve, a perfectly logical and appropriate approach. The solution, however, would not encompass the entire problem but only parts A, B and C. There are clearly many problems for which this would be sufficient, but there would be, as a consequence, a delay in resolving the entire problem. Figure 2 shows a more broad-based approach that might, in the Roadmap context, involve scientists, mathematicians, engineers and clinicians. Creating the proper conditions for these interactions is clearly a challenge and one in which research administration should play a role.

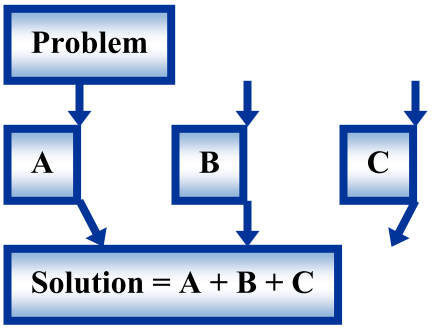


Figure 1 - Traditional Problem Solving

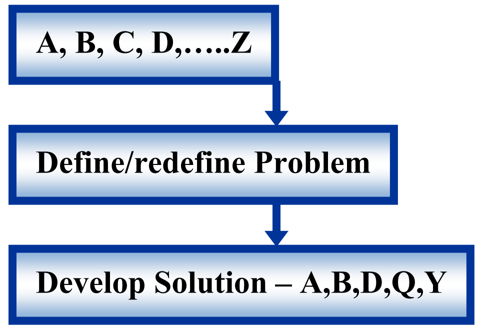


Figure 2 – Broad-based Problem Solving

As Kansas has EPSCoR status with NIH, we are eligible for several programs designed to build infrastructure. One such program is the Centers for Biomedical Research Excellence (COBRE). There are presently four such centers in Kansas: one at KU Medical Center, one at Kansas State and two administered at KU-Lawrence. Although administrated at the units indicated, there are participants from the other institutions in the various projects. I would like to comment on one of these with which I have the greatest familiarity, a COBRE project led by Robert Hanzlik on Protein Structure and Function. The mission of the COBRE program is to "expand and develop biomedical research capability through support of a multidisciplinary center." Initially there were three Assistant Professors in Chemistry, Medicinal Chemistry and Pharmacology and Toxicology and two Associate Professors in Microbiology and Microbiology/Genetics. Each was assigned mentors and provided with a reasonable level of grant support. Regular symposia were held and outside speakers were brought in to participate. Most interesting were the Associate Professors who have been able to incorporate into their research programs concepts in structural biology that have enabled them to think about their research in very different ways and employ new methodologies. For the Assistant Professors the focus has been on helping them write competitive R01 proposals. Some of the original participants have graduated and have been replaced with new additions. The awarding of this COBRE grant coincided with a decision to construct a Structural Biology Center, containing an 800 MHz nmr, protein crystallization and x-ray crystallography laboratories, and state of the art mass spectrometry for proteomics. The COBRE centers are expected to eventually acquire a life of their own to be supported through expanded research activity. There is a high probability that they will succeed because they have excellent leadership and significant levels of funding.

What are the essential elements of successful collaboration?

- Strong and respected leadership
- Clear identification of mutual benefits
- Clear criteria for setting priorities
- Process for assigning credit for accomplishments
- Administrative support and reward to leadership

It is clear that the source of energy and creativity for collaborations must come from the faculty, and in this sense “bottom up” evolution is essential. The Office of the Vice Provost for Research has been proactive in identifying potential team builders, and we have been assisted by some of the present team builders who also understand what skills are needed. For some years we have had in place the Research Development Fund (RDF) that provided up to several hundred thousand dollars to initiate new programs. We can certainly point to some successes, but, in general, this type of support did not lead to grant proposals designed to enhance infrastructure and promote multidisciplinary interactions. Accordingly, this program has been restructured as a fund for a Major Project Planning Grant (MPPG). A major project might be a center proposal or program project grant to NIH, a Science and Technology Center to NSF, or a major initiative to the National Endowment for the Humanities. The product of the grant is a proposal, and the MPPG will support release time from teaching, administrative support, development of grant materials, travel to visit potential collaborators, and external review or a “mock” site visit. We hope that this will enlarge the pool of individuals with the skills and incentive to assume the leadership roles necessary to make major initiatives a success.

There are other activities that probably need to be managed from the “top down,” but with plenty of faculty consultation. Information technology is one of these areas, particularly as it relates to high performance computing and to handling of very large amounts of data. The issue of wide dissemination of information has already been noted. Finally it is the responsibility of research administration to facilitate collaboration by creating alternative “university architecture.” As it is highly unlikely that departments are going to disappear, it is then necessary to devise alternative mechanisms for facilitating interactions among faculty from diverse disciplines. We are doing this in two ways: 1) Constructing research buildings that will house people with potentially common interests (for example, bioinformaticians from math, biology, pharmacy and engineering) and 2) Continuing to enhance and create centers. This approach has attracted critical masses of highly motivated researchers who, in turn, create additional resources for KU. The Institute of Medicine of the National Academies has recently reviewed, on behalf of NIH, the extramural centers programs, which constitute 9% of total NIH funding, and have come to the following conclusion:

> …the recent changes in the nature of biomedical research, which involve opportunities to understand complex biological systems through collaborations among multiple investigators in different fields and different institutions and by assembling large-scale research infrastructures and databases, will probably result in the expanded use of centers and other mechanisms that support collaborative research by interdisciplinary teams.

While my report has focused heavily on NIH, there are clearly other modes of funding from numerous other sources. It is extremely important to remember that collaborative research is not for everyone and there are many different styles of research and scholarly activity that must be supported and encouraged if we are to claim to be a university.

*End Notes*

[1]Teich, A.H. and Gramp, K.M. in “Competitiveness in Academic Research”, Teich, A.H., ed., American Association for the Advancement of Science, 1996.

[2]Manning, F.J., McGeary, M., Estabrook, R., eds., “NIH Extramural Center Programs: Criteria for Initiation and Evaluation” , National Academies Press, 2002.