

# **Report of the *ad hoc* Biology Education Planning Committee on cross-campus undergraduate biology education**

## **Executive Summary**

### **The committee and its charge.**

The *ad hoc* Biology Education Planning Committee (BEPC) was given the charge by Provost Spear to "Identify the strengths and weaknesses of cross-campus undergraduate biology education (including courses and programs such as Botany/Zoology 151/2, Biocore, the Center for Biology Education, and the cross-college biology major) at UW-Madison and recommend ways to improve it. This evaluation should include instructional, administrative, and physical resources for cross-college undergraduate biology education. A starting point should be reference to previous program reviews and reports on these and related issues. Please submit your report to me and the BioDeans by September 1, 2002."

The committee consisted of the members of the 2001-2 Biological Sciences Strategic Planning Committee (Phillip Anderson, Curtis Brandt, Charles Czuprynski, Michael Gould, Janet Greger, Donna Peters, Kenneth Raffa, Gary Roberts, Arnold Ruoho), the current chairs of the Biology Curriculum and Tenure committees (Edward Bersu and Murray Clayton, respectively), and Thomas Sharkey. The committee was assisted by Lori Hayward.

### **State of cross-college undergraduate biology education at UW.**

The various activities examined in this report all appear to be vigorously successful and indeed a portion of the challenges they now face are a direct result in the growing undergraduate interest in the field of biology. This increasing interest has helped make more evident the organizational weakness of the entire area of cross-campus undergraduate biology education.

There appear to be two general challenges to maintaining excellence in cross-college biology education. The first problem is that, virtually by definition, these activities are not central to the mission of any single college or school. This creates problems in obtaining proper support even in the best of times, but the combination of growth and lean university budgets exacerbates the problem. It also means that future planning at a campus level is virtually non-existent. Essentially, there is no sense of ownership by an academic unit with budgetary authority. Secondly, many of these activities have been created and sustained through the individual efforts of a small number of faculty and staff. As a consequence, the activities are based on individual personalities and there is generally no institutional continuity. Because a meaningful reward system that would encourage the involvement of other individuals and departments has typically not been created, sustenance of these programs, particularly in an era of growth, has been difficult.

There have been several committee reports on the issues of biology and cross-campus teaching activities. Many, but not all, of these reports recognized the fundamental organizational problem, but proposed little in the way of concrete steps to address the issues. An analysis of these reports is in Appendix A.

### **Possible solutions**

The committee considered a range of possible solutions ranging from dramatic reorganization to *ad hoc* solutions. The creation of a new college or department was deemed too politically difficult for the possible gains in the narrow charge of the committee. *Ad hoc* solutions might well address the immediate problems, but would not institutionalize solutions, so that a new set of problems would soon materialize. Instead, the committee felt that the best solution was the creation of a modest administrative unit, with budgetary authority, to house and coordinate many of these cross-campus biology activities.

### **Proposal for an Institute for Undergraduate Biology**

The Institute for Undergraduate Biology would be responsible for the general organization and support of Center for Biology Education (CBE); the Biology, Molecular Biology and Biological Aspects of Conservation (BAC) majors; Biocore and Botany/Zoology 151/2. The Institute would have a half-time Director who would report to the provost and would have sufficient budgetary control to support these activities.

The Institute should be physically housed in a space that would allow the reasonable proximity of most if not all of the affiliated units. This would allow sharing of resources and provide a visible and comprehensive center for students and faculty.

The precise extent of the Institute's budget will need to be determined. It would be simplest if all aspects of the budgeting responsibility of these various activities were transferred to the Institute. However, this might prove politically difficult, so an alternate scheme would leave many aspects of the current budgeting process (such as certain staff and TA lines) in their existing departments and colleges, but where the Director would be given significant authority and oversight over the decision process. In this scheme it would also seem highly appropriate that the Director be made a permanent member of the Council of Biological Sciences Deans (BioDeans). In any event, it is essential that the Director be provided with sufficient budgetary authority to provide necessary staffing for the various offices and to recruit essential faculty involvement to various cross-campus activities.

Though the Institute will provide advantages in terms of physical, organizational and financial coordination, its primary feature is that it will provide the Director with sufficient visibility and credibility to serve as a bully pulpit for addressing present and future needs.

Issues raised in this summary are elaborated on in the following full report, with selected topics addressed in appendices.

## **Report of the *ad hoc* Biology Education Planning Committee on cross-campus undergraduate biology education**

In a March 6, 2002 memo from Provost Spear, in consultation with the Biological Sciences Deans (BioDeans), the BEPC was charged to:

Identify the strengths and weaknesses of cross-campus undergraduate biology education (including courses and programs such as Botany/Zoology 151/152, Biocore, the Center for Biology Education, and the cross-college biology major) at UW-Madison and recommend ways to improve it. This evaluation should include instructional, administrative, and physical resources for cross-college undergraduate biology education. A starting point should be reference to previous program reviews and reports on these and related issues. Please submit your report to me and the BioDeans by September 1, 2002.

### **1. Specific activities and challenges in cross-campus undergraduate biology education at UW - Madison.**

BEPC performed some interviews and other forms of fact-finding of the following cross-campus undergraduate biology activities at Madison, but this is not meant to represent an in-depth analysis of these.

**Botany/Zoology 151/2:** Botany/Zoology 151/2 is broadly recognized as an excellent entry port for most biological science majors, but for years was restricted to only a fraction of appropriate students. Through the efforts of a variety of individuals and the support of CALS and L&S Botany/Zoology 151/2 has grown from 240 students/year to 880. This has required growth in staffing, TA support and faculty involvement, with new faculty coming predominantly from CALS. Approximately 55% of 151/2 instruction is still provided by the Botany and Zoology departments. Medical School and Pharmacy faculty contribute 5% each and CALS contributes 35% (based on timetables for Spring and Fall of 2002).

A major part of the success of these courses is due to the excellent staff. However, the ongoing challenge is the difficulty in recruiting outstanding faculty to teach in the course. Some faculty are involved because it was part of a hiring package or some other organizational agreement, but others serve simply as volunteers. The expansion of these courses has strained the ability of the volunteer system to provide sufficient instructors. A long-term problem is that not all appropriate students are served, though solution to this will require additional space.

**Biocore:** This continues to be an excellent course and has not faced the challenge of expansion in recent years. Staffing and S&E support are apparently reasonable. As with 151/2, recruitment of faculty is an ongoing challenge and one that will be exacerbated by the retirement of Dr. Ann Burgess as course director. Ann's credibility in the research community was useful in recruiting faculty and her replacement will likely not have that advantage. As above, a combination of reward mechanisms have provided some faculty but volunteers have also been essential.

**Biology major:** The Biology major was started in 1999 and has demonstrated remarkable growth to a current level of 800 majors, making it the largest biology major on campus.

The huge growth is consistent with the dramatic increase in undergraduate interest in the biological sciences, because that growth has not come at the expense of other majors in the biological sciences. The rapidity of this growth has created serious administrative problems. Even with a recent addition of another 50% PA2 position, the program is run with just 1 FTE staff. Space is also a serious problem, with only a single office available for both personal advising as well as all other organizational and information activities. Finally, the time burdens on the two co-directors are enormous, yet without apparent reward to either themselves or to their departments. Similarly, faculty involvement on the necessary program committees and for advising all these students is largely unrecognized at any level. The enthusiasm that has got this program off to such an impressive start has worn down through the intense effort required.

**Molecular Biology major:** This is a stable and successful operation with approximately 160 majors. It has become clear that the clientele for the Biology and Molecular Biology majors are distinct and there remains a strong need for both majors. Though the staff support is minimal (0.5 FTE), the stability of student interest has allowed the development of a system whereby that staff can provide an excellent service to the majors. The serious problems created in the Biology major have been avoided because of the relative stability of the student numbers in the program. Nevertheless, altruism serves as the basis for the involvement of the director and all other faculty.

**Biological Aspects of Conservation (BAC):** BAC had a few tumultuous years for the same reasons that are now threatening the Biology Major, specifically, lack of institutional support. This major has now found a home within the Zoology Department and is stable for the time being because of support from Zoology. This major is very popular among ecologically-minded students and often students double major in BAC and Zoology or Botany. The clientele for this major is again distinct from the Biology Major.

**Center for Biology Education:** CBE was the subject of a recent internal review (31 August, 2001) and we relied significantly on that information. The study was generally very positive about the role served by CBE, but called for a greater integration into the campus biology community. It also expressed a concern that the strength of CBE for innovation might be threatened by the needs to maintain and grow existing programs. The outstanding staff in CBE functions quite well on a day-to-day basis without close faculty involvement. However, faculty input through an executive committee continues to be extremely valuable and the unpaid faculty director has been critical in arguing for resources on campus and in supporting entrepreneurial efforts of CBE for external funding. We recognize that there is currently a search for a new half-time CBE director.

Obviously, CBE is in a very different situation, in terms of needs and "culture" from the other activities described here. Nevertheless, we believe that there are similarities in their dependence on the support of various administrative units and in the value to be gained from a greater integration into campus undergraduate activities, as proposed below.

## **2. General challenges**

We perceive that there are a number of real and important challenges in maintaining successful cross-college teaching activities:

- a. Virtually by definition, these activities are not central to the mission of any single college or school. This creates problems in obtaining proper support even in the best of times, but the combination of growth in student interest and lean university budgets exacerbates the problem. It also means that future planning at a campus level is virtually non-existent. Essentially, there is no sense of ownership by an academic unit with budgetary authority.
- b. Many of these activities have been created and sustained through the individual efforts of a small number of faculty and staff. As a consequence, the activities are based on individual personalities and there is generally little institutional continuity. Because a meaningful reward system that would encourage the involvement of other individuals and departments has typically not been created, sustenance of these programs, particularly in an era of growth, will continue to be a challenge.
- c. Multiplicity of funding sources for a given activity creates many problems. The individual responsible for that activity must typically seek funding from multiple colleges. Obviously, it is in the interest of each college to "have someone else" pay for the shared activity. This typically means an enormous time drain for the individual, and for the associate deans, all of whom certainly have better things to do. Importantly, this is a powerful disincentive for individual faculty and staff to take on these responsibilities.
- d. The current balkanization of these activities, both budgetarily and geographically, means that there is little opportunity for sharing resources or information, or for the generation of a sense of community.
- e. These activities are run largely on the basis of altruism, at individual, departmental and college levels. While altruism is a powerful force, it is not a sound basis for support of such broadly important activities. The rewards and incentives necessary to significantly improve faculty involvement in these activities are not enormous, but such incentives must send a message to individuals and departments that the institution recognizes their effort.

### **3. Previous analyses**

Since 1991 there have been four analyses at UW-Madison that touch on the issue of cross-college instruction. The "Review of the Biological Sciences" or Hearn Report, 1991, focused primarily on research, but addressed teaching and "cross-college" issues as well. "Managing the Matrix," a 1995 report by a subcommittee of the Council of Deans, addressed the issues of cross-college activities. Finally, two other reports, "Planning for the Future of Interdisciplinary Teaching," a 1997 from a committee in the Provost's office, and "Interdisciplinary Teaching at UW-Madison," a 1998 report from the Office of Quality Improvement, tangentially addressed cross-college issues as well. Our analysis of these reports is in Appendix A, but is briefly summarized here.

The first two reports generally recognize the problems and challenges inherent in cross-college activities and are consistent with our views noted in the previous section. The Hearn report suggested the notion of a Strategic Planning committee with budgetary authority, as a mechanism to institutionalize solutions, but such a committee has never been implemented. The second report suggested no obvious institutional changes.

The other two reports focus on "interdisciplinary" rather than "intercollege" activity, but there are some obvious parallels. These reports, however, suggested that the problems were small and that there was no need to encourage faculty involvement in such activities, but rather simply remove some impediments to participation. Essentially these reports view altruism as sufficient at all levels. For reasons described in our analysis, we find this view unpersuasive.

We have therefore agreed with the problems noted in the first two analyses and have asked ourselves if there were mechanisms that would institutionalize solutions to these problems. We were also cognizant that our charge was narrow, being restricted to cross-college, undergraduate biology matters. Finally we believe in the "art of the possible," so we have focused on solutions that would be relatively easy to put into place.

#### **4. Possible solutions**

##### **a. A new college, school or department of Biology**

BEPC discussed the possibility of some larger reorganizations of faculty into new academic units, as a means of solving the problems in undergraduate biology. It is clear that certain possibilities in this category would address many of the current issues. However, BEPC is cognizant that such dramatic restructuring would have a large variety of ramifications beyond our narrow charge of cross-campus undergraduate education. We also feel that the optimal organizational structure for undergraduate biology at UW-Madison is unlikely to be optimal for graduate education and research, so such recommendations would require a committee with more time and a broader mandate. Finally, the committee recognizes the importance of proposing a solution that can be implemented in a timely fashion. We therefore take no position on the desirability of a new academic structure except to note that the proposal provided below would be compatible with such an eventual change.

**b. A collection of *ad hoc* solutions**

At the other end of the "feasibility" spectrum would be to propose very specific solutions to each of the current problems. The very serious disadvantage with this approach is that the solutions themselves would not be institutionalized nor would the mechanisms for solution of future problems. In a sense, the fundamental problem that we face is the lack of institutionalization of responsibility and reward for cross-campus biology issues (for both teaching and research).

**c. A new organizational structure for focusing on undergraduate biology: an Institute for Undergraduate Biology**

In order to address present and future problems, there must be a "champion" of undergraduate biology, with the resources and the mission of monitoring activity and solving problems. While this might come from a large new academic unit as noted above, the narrow set of cross-campus undergraduate biology issues could also be addressed by a properly chosen and supported individual. We therefore propose creation of an Institute of Undergraduate Biology, as described below, and that the director of that Institute would serve as the desired champion.

The implementation of this proposal would be relatively easy and inexpensive, but would have broad impact, assuming a director of high caliber is identified. A detailed description of the Institute follows.

**5. Description of the Institute of Undergraduate Biology (IUB)**

***General organization***

The IUB should be administered by a half-time faculty Director and should have an administrative assistant. The Director should oversee and be substantially responsible for CBE; the Biology, Molecular Biology and BAC majors; Biocore and Botany/Zoology 151/2. Each of those activities would continue to have a director, coordinator, or chair, as they do now, though it is reasonable that the day-to-day activities of CBE should be organized by the Associate Director, with the IUB director serving as nominal CBE director.

To create a situation where the Director would be empowered to properly administer these activities, we envision two scenarios. In the first, the Director would directly administer and control all funds relevant to these activities. This would require movement of budget lines from a number of existing colleges and departments to the IUB. In the second scenario, the Director would report to the Provost and serve as a permanent member of the BioDeans. Most of the budget lines for the IUB activities would remain where they are currently and not be transferred to IUB. However, the Director should also have sufficient budgetary authority to provide responsibility, authority and flexibility in dealing with problems within IUB. In this case, budget lines relevant to IUB activities, but not formally assigned to IUB, should be protected in some way from the competing interests of colleges and schools.

The Institute should be physically housed in a space that would allow the reasonable proximity of most if not all of the affiliated units, to provide both sharing of resources, as well as provide a visible and comprehensive center for undergraduates.

*Rationale:* Many of the current problems stem from the challenge in obtaining resources for any of these activities, since it typically involves the chair or director of that activity going "hat in hand" to a variety of administrative units, all of which have a strong incentive to have the need solved by someone else. The first solution obviates that problem as the Director would already control all relevant funds. In the second proposed organization, the Director would be provided with credibility and opportunity as a member of the BioDeans to bring these issues directly to the assembled deans for resolution. The centralization of various activities under a single Director would also provide significantly more oversight on expenses, because it would be in the interest of the IUB director to maintain credibility.

The physical co-localization of the affected units would provide efficiencies through staff cooperation and sharing of equipment and resources; would improve staff morale through the creation of a small community focused on undergraduates, and would aid undergraduates by providing a visible and centralized facility.

#### *Impact on specific activities*

**CBE:** In the proposed organization scheme, the outreach portion of CBE would be run by the associate director (academic staff), much as now, and the current role of CBE director would be filled by the IUB director. (We note that there is currently a search for a new CBE director that is not consistent with this plan.) The future CBE function would certainly include the current outreach staff. That portion of the CBE staff currently involved in undergraduate education might be well-served in CBE or in a separate section of IUB. As for the CBE budget, it has apparently not been a problem that it is administered through CALS. While it would seem to make much more sense to have that transferred to IUB itself, this should not serve as a stumbling block.

*Rationale:* This proposed organization would maintain the strengths of CBE and provide it with a director with campus-wide influence. Because of the co-localization of CBE with these other activities, CBE would have a higher profile among undergraduates, as well as with graduate students and faculty interested in its activities. The co-organization would eliminate whatever walls exist between CBE and these client groups, though there is of course the danger of it creating new barriers with other groups.

It is important to recognize that there are significant differences in the culture of CBE and these other activities. Because of that, the IUB director must be supportive of the entrepreneurial activity of CBE and this activity must be seen as central to the mission of the IUB. There would continue to be an important role for a faculty executive committee to advise and support CBE.

**Biology, Molecular Biology, and BAC majors:** In the case of each major, there needs to be some modest reward for the faculty in charge (termed "chairs" for this discussion). We envisioned that one month of summer salary (together with the adequate staff support) would seem appropriate. The academic staff who actually run each major should be appropriate to the number of students. Having their staffs proximally located should provide time, equipment and resource sharing. Academic staff, supporting hourly and supplies would all be part of the Institute budget.

As with CBE, it would seem simplest if all relevant budgets mentioned were directly under the control of the IUB director. Without significant budgetary authority and responsibility, there is the potential for problems should it be necessary for the Director to make changes. Budgetary control also solves the dilemma of having staff supervised by faculty chairs, who have no formal budgetary authority over them (at present, the actual budgeting of these staff is through specific departments and is largely through historical accident). On the other hand, as long as the Director, in coordination with the faculty chairs, has sufficient control over the relevant budgets, the system would work. The different majors will continue to function as faculty-governed units, with their actions substantially based on the decisions of executive committees formed within each major. Therefore some degree of negotiating among the IUB Director, the faculty chairs and the program executive units is inevitable and appropriate.

It is less clear how to reward faculty serving as program committee members and advisors, though improved support for the Biology staff would relieve much of the current burden on faculty in the program. Quite possibly some sort of credit-follows-instructors mechanism could be implemented.

*Rationale:* These three programs have similar needs and goals, so having them physically housed together under a single administrator is clearly reasonable. Having the IUB Director be responsible for staffing and other organizational matters relieves the separate program chairs of this responsibility, yet provides clear organizational and budgetary authority. Any problems that arise in any program can either be solved by the IUB Director or, where that is not possible, the Director will have access to appropriate administrators for a resolution of the problem in a manner that is efficient for all concerned.

**Biocore and 151/2: Staff, S&E and TAs**

Organizationally, both of these courses are in good shape. The staff are excellent and the facilities, supplies and TA support are adequate. Part of the present importance of Botany/Zoology 151/2 to undergraduate biology is because of its substantial expansion, which came about through the support of both L&S and CALS, and this was an example where the current system worked.

As above, it would be optimal if the budgets for these courses were under the IUB, but this might be politically contentious. Should Botany and Zoology (and others) continue to have budgetary authority on matters critical for these courses, the IUB Director will need to have clear authority over expenditures.

Similarly, the TA lines associated with these courses are currently distributed only within L&S, where they serve a significant role in faculty and graduate student recruiting. It would be problematic for these departments to completely disrupt this arrangement, which generally works well. However, the allocation of TA positions in part rewards certain faculty for teaching involvement, and it must be recognized that faculty outside of L&S are not similarly rewarded.

We therefore see the role of the director as one of monitoring the state of these courses through close interaction with the course directors and staff. The Director should also be primarily responsible for budgetary or staffing decisions. Given the role of the Director in monitoring these teaching activities, it is obvious that that person must have a background with demonstrated success as an instructor, in order to appreciate the challenges and opportunities.

*Rationale:* Having a single spokesperson for verifying and addressing these needs would, by itself, be a significant advance for all concerned. Giving that person the budgetary authority to solve their own problems would seem to be simplest and most efficient, though the political challenges to creating this situation should not derail the creation of the Institute.

#### **Biocore and 151/2: faculty involvement**

There has been an ongoing challenge to recruit faculty as instructors for these courses. The problem is that there is often little incentive for faculty to become involved because it is perceived as providing little reward for them or, just as importantly, their departments.

The participation of some faculty has already been secured when faculty lines have been given to departments with an understanding that the hire or another replacement from that department will provide a certain level of teaching effort in a given course. Similarly, TA lines are distributed in part to reward faculty involvement. However, it appears that other mechanisms for reward have been less successful. The Medical School MAMA model, for example, provides relatively little incentive for faculty to become involved, because of the low weighting for undergraduate teaching. Several Basic Science departments in the Medical School have substantial undergraduate teaching missions and a greater programmatic and physical integration of Medical School faculty in the undergraduate biology education would further promote the culture and value of undergraduate teaching. The CALS policy is to consider these teaching efforts in building departmental budgets, but the process is sufficiently indirect and is poorly understood by faculty and departments.

We recognize that this is a challenging problem and that no single reward scheme will necessarily work for faculty in all colleges. We further recognize that part of the problem has been the very slow reimplementation of "credit follows instructor," which is necessary if reward is to similarly follow the instructor (as in the MAMA model). Nevertheless, if there is to be a significant involvement of Medical School faculty, there needs to be a way of meaningfully affecting the departmental budgets. One possibility would be by assigning the Director a budget for this very purpose (as an example, we estimate that \$10-15,000 would be a reasonable reward for teaching one-third of Botany/Zoology 151). Where appropriate this would be transferred to the budget of the faculty instructor's department. Alternatively, the Director might work with the Dean of the Medical School to reach an agreement about alternate means of reward. The situation in CALS and other schools is different, but either the Director needs to have sufficient budgetary authority to supply these courses with high-quality instructors, or the ability to work with deans to ensure that they use their good offices toward this end.

Any solution to this problem must allow the director, together with the course chairs, to recruit excellent instructors and, importantly, to remove poor ones. Budgetary authority would certainly address this, since the reward could be withdrawn. A responsibility to supply excellent instructors might also be achieved if departmental positions were released in part to serve this need, with the understanding that the department, rather than necessarily the new hire, would be responsible for the instruction and that poor performance would necessarily impact replacement of future open positions. Previous teaching success by the Director would be critical experience as well as valuable for credibility with faculty.

*Rationale:* The director, in collaboration with the course chairs, needs a tool for recruitment of outstanding instructors. While rewards for individuals might work, rewards at the departmental level, which presumably will positively affect the individual, are far more appropriate in a university and the director needs a mechanism to create that reward. Departmental-level rewards are crucial because the goal is to change the departmental culture toward these courses, rather than merely solve a short-term need by individual reward.

## **Appendix A**

### **UW-Madison studies on cross-college teaching activities since 1991.**

#### ***Review of the Biological Sciences, 1991. Report of the Hearn Committee***

This report addressed a variety of issues in biology, of which undergraduate teaching played a rather minor role. Nevertheless, several issues were raised.

Teaching and training: 6. Strong Introductory Courses in Biology. "(iii) The Vice Chancellor for Academic Affairs with the Divisional Committees and the Deans will develop a mechanism, with the assistance of the Center for Biology Education, to recruit faculty, develop the courses and allocate the necessary resources. Participation in teaching competes for faculty research time and it is therefore extremely important that outstanding teachers be rewarded for excellence in teaching."

The Hearn report also suggested (under "Teaching and Training") that greater flexibility in biology majors be created, that all students in biology receive mentorship by their second or third semester and that undergraduates receive opportunities to perform research. While laudable, there was no consideration in the report on how to actually encourage faculty to make the *additional* effort that all of these require. The result is seen in the various problems with the Biology major, as an extreme example.

To our knowledge no such mechanism of reward has been developed. In fact, involvement is largely based on altruism on the part of specific faculty and departments, to the extent that departments distribute merit on this basis. As a consequence, recruiting of faculty becomes a very time-consuming task for the coordinators of the relevant courses (Biocore and 151/2), which will be exacerbated in the former case when Ann Burgess retires.

The Hearn report also saw a proposed "Strategic planning committee" (Recommendation 1) as an important aspect of planning and coordination in both research and teaching. As envisioned, this committee would have had substantial budgetary authority. Not surprisingly, a committee with this authority was never formed. It remains unclear to our committee if a rotating faculty group *should* have this authority, but it is also true that the complete absence of budgetary authority outside of existing administrative units causes problems for cross-administrative activities.

*Managing the Matrix. A report by the Subcommittee on Cross-College Activity (of the Council of Deans) dated March 28, 1995*

This brief but useful report identified most of the key challenges that we face, though it was less successful in identifying solutions.

The key problems are noted on pages 4-5 on "Strengthening the horizontal axis":  
(1) "...Activity outside the discipline and department may go unnoticed or even penalized.... But it is extremely difficult to maintain effective horizontal reward structures across college boundaries. To make the matrix system work, we must change the structure of rewards and the control of resources. Units in the horizontal axis must have more control over the rewards that motivate faculty. If necessary, resources for this purpose must be reallocated from the vertical axis."

(2) "... Effective governance of academic activities requires the integration of academic policies and academic resources.... This can be done within a college... But when the programs operate across college boundaries, there is no structure in place... Moreover, since all such areas will involve several Deans, APCs and faculties, it may be hard to get agreement on the needed measures. In such situations, responsibility must fall on the several Deans to work together to ensure that cross-college learning communities can function effectively. These Deans must serve as citizens of the university, not advocates for their own units."

Then, as Recommendations:

"1. Reallocate resources to support horizontal efforts.

Cross-college units must have control over resources....colleges should be expected to contribute resources from their existing budgets. Horizontal units should have their own budgets: when housed within a single college they should have a line item in the college budget."

"3. Give Deans of schools and colleges campus-wide responsibilities.

Except where we now have a horizontal Dean or Director, the Deans of the vertical schools and colleges should provide administrative leadership in the governance of cross-college activities. There are two ways this can be done. In some cases, one college alone may be asked to perform cross-college responsibilities for the campus and that unit's Dean asked to manage it for the benefit of all ("trustee dean"). In others, an interdisciplinary area may involve faculty and units in several colleges and the area may require constant cooperation of several Deans. In that case unless a horizontal Dean/Director is available, a committee of Deans should be appointed to oversee governance and interact with faculty. One member of the committee should be designated chair and have the overall responsibility for the cross college unit ("managing dean"), possibly on a rotating basis. All Deans with cross-campus responsibilities, whether horizontal, trustee, or managing Dean, should be given clear responsibilities for the learning community that administer and shall be accountable to the Chancellor and Provost."

"4. Departments should be rewarded when they make substantial contributions." (to interdisciplinary efforts)." There should be institutional rewards for departments that contribute to cross-college goals and accommodate interdisciplinary appointments. Departments need better information on the value of interdisciplinary units to their activities and on the interdisciplinary roles played by their faculty..."

This document raises most of the critical issues that underlie the current situation. It notes the dilemma that is caused by activities that fall outside the boundaries of existing colleges and departments and suggests some general solutions. Unfortunately, these solutions ignore the harsh reality. The claim that "These Deans must serve as citizens of the university, not advocates for their own units", is well-meaning, but not realistic. The various Deans must certainly have a primary function of addressing those needs most central to their colleges and, virtually by definition, cross-administrative areas cannot fall into that category. The problem is exacerbated in periods of steady or eroding funding. Basing the funding and support of cross-administrative units on altruism of Deans makes as much (or as little) sense as basing the efforts on the altruism of individual departments and individual faculty, but that is precisely the present situation. Somehow, a situation must be created whereby it is in the interests of the Deans, colleges, departments and faculty to address needs that are not "central to their mission" but are "central to the mission of the University."

This was therefore a valuable document for identifying problems inherent in existing administrative structures, but provided little clarity on how to solve or ameliorate those problems.

*Planning for the Future of Interdisciplinary Teaching , October 16, 1997 from a committee in the Provost's office*

While this report was formally on "interdisciplinary teaching" (and is therefore not strongly directed to the "disciplinary, but inter-administrative" issues in biology), it touches on many of the same themes. The general thesis of this report is that rewards for participation in interdisciplinary teaching are not necessary, but that the problem was one of eliminating barriers.

At one point it asks "Is there an appropriate way to account for participation in interdisciplinary programs for the purpose of maintaining resources, without at the same time creating additional barriers for the creation of such programs?" And later: "Based on campus-wide interviews of people currently doing interdisciplinary teaching, the greatest incentive for interdisciplinary teaching would be to simplify/reduce complexity and barriers."

Consistent with the view that no rewards are necessary for participants in such teaching, the report later states that "Engineering's Freshman Design Course is one example where no teaching credits are awarded. This seems to be offset by: the commitment of the faculty to the purpose of the course and the college's demonstration of support of efforts with flexibility, resources and backup instructional support. Almost without exception everyone we interviewed participated in some way that counted against them. There is much to be learned about the power of this commitment. It appears that incentives are not needed; however, barriers to complexity need to be cleared."

Among the problems of this analysis is that they only considered individuals, very often staff, who were already involved, so the notion of "getting involved" was not relevant. Not surprisingly, for those already "committed," then the barriers are those that interfere

with that continuing effort. However, this ignores the much larger issue of all of the people who happen not to be involved and for whom there is no apparent incentive to do so. To suppose, as this report does, that altruism is a sufficient organizational force seems unrealistic.

BEPC therefore agrees with the thoughtful responses of the various divisional committees to this report. The Biological Sciences noted the absence of systems for monitoring these efforts and for rewarding them. The Physical Science response also recognized the key issues of resource allocation, but makes the assumption that deans will be supportive of resource allocation if only an appropriate measure of effort is identified. That might well be correct for an interdisciplinary effort *within* a college, but it immediately founders when those rewards require the cooperation of several deans. The Social Studies division had a short response that also pointed out the serious flaw in assumptions over resources. Only the Arts and Humanities division appeared to be generally supportive of the notion that resources were not important in the issue at hand.

*Interdisciplinary Teaching at UW-Madison March 5, 1998 from the Office of Quality Improvement*

Like the preceding document, this document avoided the issues of reward and responsibility that we perceive to underlie the problem. For example, there is a page on assigning teaching credit to faculty, but this assumes that colleges will move resources to departments that perform this work and that departments will therefore encourage their faculty to participate. While this might be true in some colleges and schools, it does not appear that cross-campus teaching is afforded the same level of reward as more standard forms of instruction. The section on "Structures" suggests some organizational possibilities, but again avoids the central issue of resources and rewards.