

Enhancing Graduate Education at UC Davis

A Report by Academic Planning and Development – A Committee of the Graduate Council at UC Davis

Endorsed by Graduate Council on July 6, 2006

Edited August 15, 2006

Nicole Baumgarth*, Laurel Beckett, Charles Bevins, Anne Britt, Axel Borg, Lori Lubin,
Mike Saler, Eric Smoodin and Yanhua Zhang

For comments and questions:
Nicole Baumgarth, DVM, PhD
Center for Comparative Medicine
Telephone: 530 – 754 5813
e-mail: nbaumgarth@ucdavis.edu

SUMMARY

In the academic year 2005/2006 Academic Planning and Development (APD) carried out an analysis of the most important concerns facing graduate programs, based on recent reviews. APD also quantified the degree of overlap and connectivity between programs. The rationale for these studies was that strategic planning decisions for graduate education must be reasoned from a detailed understanding of current challenges that face graduate education at UC Davis. Data were lacking on which such decisions could be based. APD's analysis identified weaknesses of core curriculum, lack of administrative support and infrastructure, and problems for students in accessing information as the most important concerns consistently identified for both departmental-based and non-departmentally-based graduate programs on campus. Increased resources specifically directed to graduate education are needed to address these problems. The connectivity between existing graduate programs that were identified in this report should help resources to be directed more efficiently, and provides a natural means for faculty in graduate education to share resources and work together to address these problems.

INTRODUCTION

In 2005/2006 Graduate Council and the Dean of Graduate Studies, Jeffery Gibeling, charged the Academic Planning and Development Committee (APD) with developing recommendations that could serve to increase the quality and effectiveness of graduate level education at UC Davis. APD felt that there was a lack of data available that could be used as a basis for recommendations. Therefore, APD first developed an analysis strategy in which the committee used available faculty membership lists for departments and graduate programs, information on student numbers and the last available graduate program review for each graduate program to judge the composition, connectivity and quality of graduate education currently offered on this campus. The following report summarizes APD's findings, which serve as a basis for the recommendations provided at the end of this document.

The administrative structure of graduate studies at UC Davis is somewhat unusual in that two types of graduate programs currently exist side by side. Thirty (36%) of the 83 graduate programs are directly connected to and administered by a department and are called "departmentally-based graduate programs." The majority of programs (53 programs, 64%) are "graduate groups" that have no direct departmental affiliation. Their administering department might change depending on the appointed Chair of the graduate group.

Currently 83 graduate programs exist on this campus that offer various Master's and/or Ph.D. degrees. Additional "Designated Emphasis" (DE) programs exist that bind together a number of these graduate programs. DE programs have not been studied as part of this report.

Arguably the most significant work of APD over the last academic year has been to identify the main recurring challenges that graduate programs face in their efforts to provide high quality graduate education at UC Davis. Based on these findings and analysis over the last year, APD has reached the overall conclusion that ***fundamental changes in the structure of resource allocations are necessary to enhance or even just maintain the quality of graduate education at its current level.***

The ever-pervasive lack of resources, particularly the insufficient numbers of faculty involved in graduate education, clearly has negative effects on the quality of education provided on this campus. As this campus, and indeed the entire UC system, is focused on enhancing graduate education, one main emphasis should be on providing a "place at the table" for graduate programs when decisions regarding faculty and staff hiring and resource allocations are made. Our analysis suggests that the strong growth that this campus has enjoyed over the last decade is beginning to show its negative effects on the quality of education provided on this campus in the face of ever diminishing resource allocations.

APPROACH

Connectivity Analysis

Data sets listing graduate degree granting programs at UC Davis, Academic Senate faculty members of each graduate program, and all Academic Senate faculty members and their department affiliation were provided by the Office of Graduate Studies. Data on Academic Federation faculty who are members of graduate degree programs were not available with sufficient accuracy for this study. Inconsistencies in format and spelling of program and faculty names required substantial data cleaning and checking. The spelling on the graduate program web site or home department faculty list was taken as authoritative. Current status as a departmentally-based graduate program or a graduate group was based on Office of Graduate Studies files, and checked against the program's web site.

A clustering or linkage diagram for graduate education was established, based on the degree to which two programs shared the same faculty members. Diagrams of hierarchical clustering among graduate programs illustrated visually which programs were closest, how close they were, and how close each successive cluster of programs was to another cluster.

Qualitative Analysis

Graduate programs at UC Davis undergo periodic reviews by the Program Review Committee (PRC) of the Graduate Council, which result in a PRC Report that includes a summary of key strengths and weaknesses of the program and recommendations to address the challenges facing the program. Programs are reviewed about every 7 years. APD used the latest PRC Reports from these reviews (conducted mainly in the time period from 1999 – 2005) to identify key problems/challenges that graduate programs faced which impacted the overall quality of the program. A list of 18 challenges was established. Pairs of APD members then tabulated the presence of those challenges for each program. The data are shown as absolute number of scores and the percent of total programs affected. Further analysis was done by separately studying departmental and non-departmentally-based programs and by analyzing the data as a function of year of review.

RESULTS

The UC Davis Faculty and Graduate Programs

Comparison of graduate program faculty membership lists with departmental membership lists showed that most individual Senate faculty members, among the just below 3,000 currently listed at UC Davis, are involved with usually between one and three graduate programs. Roughly 10% of the Senate faculty members (317) are not currently affiliated with any graduate program. Given the fact that participation in graduate programs is often not very tightly monitored, the figure of 90% Senate faculty members actively participating in graduate education is likely an overestimate. APD was unable to accurately assess the number of Federation faculty members involved in graduate education due to the lack of accurate information on their exact numbers and departmental affiliations. Because anecdotal evidence suggests an important role for Federation faculty in mentoring graduate students and participating in didactic graduate level education, a more thorough analysis of the contributions Federation faculty members make to graduate programs is of importance.

Connectivity between Graduate Programs

Further comparison of departmental faculty lists with graduate program membership lists was conducted to assess the level of “connectivity” between individual programs. Connectivity was measured by the number of faculty members shared between two or more programs. The rationale for this analysis was that determining connections between individual programs might help to identify clusters of programs that have natural connectivity with each other and thus form umbrellas that might be useful to consider for strategic planning decisions. Identification of larger clusters of programs that are thematically connected would also collectively point to programmatic strength on campus that might not be obvious when assessing each program individually on its own merits. Data analysis included normalization for program size to avoid over-emphasizing large overlaps between a very large program and a very small program.

The data showed that such connectivity was indeed apparent for all graduate programs. A dendrogram is provided that summarized the degree of connectivity between each graduate

program on campus. To enhance clarity two branches (Roots 2 and 3) of the dendrogram are shown separately, each identifying a large cluster of graduate programs (**Figure 1**). Ongoing data analysis is aimed at determining whether common challenges (see below) cluster among these groups of graduate programs. We provide a brief outline below, under "Recommendations," on how these data could be used for future strategic planning decisions.

Comparison of non-departmentally-based versus departmentally-based graduate programs showed that in general, non-departmentally-based programs (graduate groups) are drawing faculty from more diverse backgrounds, thus fulfilling their role as units that bridge across departmental barriers. Just under half (25) of the 53 non-departmentally-based programs had connections with more than 15 other graduate programs. In contrast, none of the departmentally-based programs had connections with more than 15 other programs. The *median number* of connections for non-departmentally-based groups was 18 (range: 35 - 3) and for departmental-based graduate programs 5.5 (range: 15 - 1; data not shown).

Existing Challenges to Graduate Education at UC Davis

A comprehensive analysis of the latest available summary review statements from the PRC Reports generated for most (77 out of 83) graduate programs at UC Davis was undertaken by APD during 2005/2006. The objective of this analysis was to identify key challenges and deficiencies in current graduate programs on campus. 18 recurring challenges were identified in a pre-review process of the summary statements. In a second round of analysis each review was then scored independently by two APD members for the presence/absence of recurring problems to graduate education. The results from this retrospective analysis spanning the years 1998 – 2005 are summarized in **Table 1**.

From the collected data, APD identified 3 broad categories of concerns: Curriculum/faculty concerns; infrastructure deficiencies; and student-based problems. Overall, the most frequently identified concerns regarded the lack of a strong core course curriculum (57%) and the lack of a cohesive program that projects a broader vision (42%). Additional concerns were identified that speak to the underlying causes of this deficiency, namely the lack of faculty availability (either due to lack of sufficient FTE (33%) or willingness to participate (30%). Student-related concerns also scored high. Particularly lack of fellowship support, both multiyear fellowship support as well as out-of-state tuition support (36% and 33%) and issues related to advising of students and access to graduate program related information (38%). A number of deficiencies in infrastructure were repeatedly mentioned such as lack of identified graduate program facilities (31%), adequate equipment (21%) and administrative and technical support (19%).

Because the review process was by its nature retrospective and because there was considerable variation in the amount of information and depth of analysis provided with the summary reviews, APD next sought to obtain more uniform and up-to-date data on current challenges to graduate education at UC Davis. Therefore Graduate Council conducted a survey of all graduate programs (through their Chairs) in May of 2006. The graduate program Chairs (or relevant committees) were asked to rank the most serious problems among the 18 recurring problems and to identify additional challenges. The survey response rate as of June 19th was about 80% (66 of 83). Data analysis is awaiting further responses by the graduate programs. Preliminary analysis suggests that lack of available faculty to teach core curricula and participate in the governance of graduate programs on campus appears to score strongly for many programs (data not shown).

Departmental versus Non-Departmental Graduate Programs

We next sought to determine whether non-departmental and departmental-based programs differed in the degree to which they were affected. First, APD scored the overall quality of each program (1= weak; 2= good, significant improvement possible; 3 = excellent). From this analysis it appears that the overall quality of departmental versus non-departmentally-based programs were comparable with non-departmentally-based programs receiving an average score of 2.1 versus 2.0 for departmental-based programs.

Next, the frequencies of occurrence of the 18 identified key challenges were determined separately for those two types of graduate programs (**Figure 1**). The results show that both types of graduate programs face similar key problems. No problem scored only in one type of program and overall the relative frequency of occurrence of a particular problem was also similar. **Importantly, the lack of a strong, cohesive curriculum was noted as the single most frequently occurring problem.**

However there were some important differences worth noting. First, non-departmentally-based programs faced larger problems in involving faculty in their programs for teaching and administration of the groups compared to departmentally-based programs (39% versus 20%). This might explain at least in part the even larger problems related to vision/cohesiveness of the graduate groups (56% versus 25%) and in core course curriculum problems (65% versus 49%). A larger subset of non-departmental-based programs also cited lack of credit for graduate education as a problem (20% versus 9%), whereas the opposite was true for problems related to undergraduate teaching loads of faculty (7% versus 14%). Non-departmental-based programs also mentioned more frequently problems related to lack of technical and/or administrative support staff (26% versus 11%).

Problems that scored with higher frequency for departmental-based programs than for non departmental-based groups in the summary reviews were related to facility (space) concerns (42% versus 22%) and TA-ship assignments (24% versus 5%). The difference has likely to do with the fact that most non-departmental groups have neither dedicated facilities nor TA-ships. APD's analysis did not attempt to separate issues for graduate programs in the Humanities and those in the Sciences. It should be noted however that TA-ships are often the sole source of graduate student support for the humanities programs and challenges with TA-ships are therefore likely of particular concern for those programs.

Curriculum Challenges

Because problems associated with the core curriculum were the most frequently occurring problem for both departmental and non-departmentally-based graduate programs APD analyzed the review summary statements for information regarding the causes of those weaknesses. The data, summarized in **Table 2** suggest that many of the problems appear to be directly related to the lack of appropriate resources, in particular the lack of faculty available to teach or develop a strong core course offering. This is in line with the overall assessment of weaknesses (Table 1), in which lack of faculty or availability of faculty is a common recurring problem for many programs. Specifically for the curriculum, the most often cited problem was with regard to the range or number of offerings for both the core (44%) and electives (36%). This problem might have been due either to a total lack of offerings or that courses were not held with the necessary regularity to be most useful for students (28%). A second often cited problem had to do with the lack of a clearly developed coordinated and cohesive curriculum

(36%). Curricula with problems might for example show deficiencies in offering of appropriate courses for specific tracks (27%) or problems with excess of course requirements (9%).

Trends

The mean quality score for programs combined by year of analysis indicated a trend towards decreased quality (from 2.2 in 2000 to 2.0 in 2005); however these data were not statistically significant. In order to determine whether there was a correlation between the time period in which a review was conducted and the occurrence of certain problems, we analyzed the list of key challenges by year. The trend towards a reduction in quality of graduate programs was reflected in a clear increase in the frequency with which certain areas of concern were cited in summary statements (**Figure 2**). While this should not be overstated, the trend is towards an increase in challenges to graduate education with a resultant decrease in the overall quality of UC Davis graduate programs.

RECOMMENDATIONS

The data collected by APD and provided in this report identify the increasing need for faculty FTE in enhancing and strengthening existing graduate programs at UC Davis. Other resource needs include the need for increased administrative and technical support. Many of the identified key challenges would be overcome if additional faculty and/or support staff members were available to take on graduate education related issues. This is particularly evident in the often-identified lack of a strong curriculum. Larger numbers of educators could provide more and better classes and could invest some time in developing a cohesive curriculum and a vision for the graduate program. They could also act to enhance the mentoring/advising experience for graduate students. Increased administrative support could help with many identified challenges to act as advisors for administrative problems students face and to develop and maintain databases and websites for faculty and students.

The need for increased financial support for both intrastate and out-of-state (national and international) students to cover tuition and fellowship support has been pointed out as a major concern throughout the UC System. APD has not focused on this issue, but strongly endorses the efforts of the UC Senate and Administration to reduce or eliminate NRT costs.

APD realizes that in the current financial environment it is unlikely that strong increased funding can or will be made available solely for graduate education. Below is a list of our recommendations that we believe if implemented could be used to enhance graduate education without additional resources. We would like to stress however, that many of the issues described above (such as student support) could not be addressed without a serious financial commitment from the State Legislature. Similarly, other factors that severely affect the quality of the student's experience (including lack of administrative and technical support) will require additional investment by the University.

Use the Connectivity Data to Help Strategic Resource Allocations

Allocation of state funding for faculty FTE is made based on the number of enrolled students. Similarly, graduate student numbers result in FTE resource allocations to the Dean of a particular College or School, but no mechanism is currently in place to ensure that those resource allocations are benefiting graduate education. APD therefore recommends that a certain number of faculty (and administrative) FTE's are made available explicitly to fulfill the needs of graduate education.

A number of graduate programs that are connected by subject matter and shared faculty might be able to identify their most urgent needs with regard to programmatic faculty hiring. APD recommends that the connectivity data provided with this report (Figure 1) are used to facilitate meetings of the Chairs and relevant committees with closely connected programs. Those graduate programs could form loose alliances to lobby directly (or via the Dean of Graduate Studies) to the Provost for FTE's or other resource allocations. Given the fact that the Provost recently devoted a number of faculty FTE directly to *new* initiatives, this approach could greatly strengthen graduate education through a systematic and strategic "bottom up" approach in which *existing* graduate programs are strengthened.

An additional benefit of such alliances could be that over time these graduate programs might develop into more closely connected umbrella structures with shared administrative support staff and possibly partial overlapping core courses. It is likely that this would happen most efficiently when graduate programs with similar interests are brought together. Our data provide an unbiased measure of connectivity that could help to initiate this process.

Curriculum Requirements

1. Based on the collected data it is clear that limited resources, in particular the lack of faculty available to teach graduate level classes, play a very large part in the deficiencies identified in the curriculum of many graduate programs. Because the non-departmentally-based graduate programs lack significant influence in faculty recruitment and resource allocations, more graduate groups are having problem with core course offerings compared to departmental-based graduate programs (65% versus 50%). APD therefore urges Graduate Council to continue lobbying the campus for a stronger voice for graduate program needs, particularly in the allocations made for faculty FTE recruitment and retention. The above outlined mechanism provides one way to enhance the role of graduate programs in resource allocations. In the end, it is hard to see how significant improvements can be made without additional resource allocations.

2. In addition, APD has concluded that materials for appropriate review of existing course offerings and guidance for the development of a strong curriculum should be made available to graduate programs by Graduate Studies. This could help programs in a self-review process and provide ideas for enhancing their programs by focusing on the overall needs of graduate students. Development of such material should be based on and guided by the *objectives for graduate education* as developed by APD in 2004/2005 and approved by Graduate Council on March 28, 2005 (see **Appendix 1**) as a guiding principle.

3. APD recommends that certain course offerings be provided to more than one graduate program. Examples are the need for graduate level classes in applied statistics and scientific writing across a broad range of the sciences programs. A list of such classes should be developed for both the humanities as well as the sciences that would be of broad use to large numbers of graduate students. The linkage analysis provided by the analysis of faculty membership in graduate programs has provided a natural structure that exists among graduate programs at UC Davis. APD recommends that these natural "Umbrella structures" are used to identify programs with overlapping needs in core courses.

Providing Advice and Information to Graduate Students

A lack of sufficient resources is very apparent in the often-cited lack of sufficient information available to students with regard to class and unit requirements, processes necessary to prepare for and put together a committee for the qualifying exam etc. There is also a lack of

resources for faculty (and advisors) to provide this information to the students. The decentralized nature of administration of graduate programs obviously contributes to this problem and of course each program has different requirements and expectations.

In order to overcome this challenge, APD recommends that Graduate Studies provide each graduate program with a blueprint for their individual websites so that the specific information for each graduate program can be easily filled in. This would allow each program to have a well-designed functional website without the need to hire web-designers or other administrative support personnel for each graduate program, or to take up much of the (already under-allocated) time of the existing administrative support personnel. While each graduate program on this campus is different, APD believes that a list of requirements and information that each student needs to navigate through graduate school on this campus are sufficiently similar that a general list of needed information and common websites structures could be developed.

Monitoring the Quality of Graduate Education at UC Davis

The list of identified key challenges to graduate education could serve as a means to monitor each program by similar criteria. APD has concluded that the continuing survey of these key impediments would be an effective means of monitoring the quality of graduate education on this campus. It would also provide a means to ensure that the same key areas of potential concern are addressed in each summary review statement. The survey could then serve as an important data set for the next review. It would also serve Graduate Council and the Dean as one indicator to continuously monitor excellence in graduate education and identify newly emerging new problems earlier than they otherwise might be recognized. Therefore, APD recommends that the attached survey (**Appendix 2**) will become part of each graduate program review, included in the summary review statement and that the results be compiled in an ongoing database.

OVERALL CONCLUSION

The recent efforts by various entities at the University of California, including the Senate and Administration at UC Davis, to reduce and eventually eliminate non-resident tuition fees is a very positive sign that the University is committed to tackle the serious problems graduate education is currently facing. Enhancement of the quality of existing graduate programs and creation of additional programs requires careful strategic planning decisions that identify the most appropriate and most beneficial resource allocations directly to graduate programs. These planning decisions should be based on solid data and recommendations made by the involved faculty. Because of the large number of existing graduate programs at UC Davis, it is likely that identifying the combined needs of clusters of programmatically connected programs, rather than studying needs of individual programs, provides the most logical means to achieving this.

Table 1 Challenges to Graduate Education at UC Davis

Key Weaknesses ¹	Number of occurrences (of 154 total) ²	Occurrence (%)	Place on the List
A. Curriculum/Faculty			
Core courses	88	57	1
Vision/cohesiveness	64	42	2
Faculty participation	46	30	9
Lack of sufficient faculty FTE	50	33	6
Availability of electives	44	29	10
Lack of credit for graduate education	22	14	15
Undergraduate teaching loads	16	10	18
B. Infrastructure deficiencies			
Facilities-space	48	31	8
Program size	27	18	13
Facilities-equipment	32	21	11
Tech support	29	19	12
C. Student related concerns			
Multiyear fellowships	56	36	4
Advising/Access to graduate group related information	58	38	3
NRT support	51	33	5
Mentoring/Career development	50	33	6
TA-ship availability	23	15	14
TA-ship assignments	21	14	16
TA-ship training	19	12	17

¹Key weaknesses were chosen based on initial review of 77 graduate programs independently by 2 members of APD. Weaknesses that seemed to appear multiple times were listed and each graduate program was then assessed again based on those criteria

² Number of times individual programs scored a weakness (2 possible hits for each program)

Table 2 Challenges with Graduate Level Courses

Challenges¹	Occurrence	% of total
Range/number of core courses	56	44
Availability of electives	46	36
Coordination/cohesiveness	46	36
Regularity of courses held	35	28
Appropriate Curriculum for Tracks	34	27
Too many course requirements	11	9
Access to class offerings (upper division)	7	6
Options to “test out”	5	4

¹ 77 Graduate Program summary review statements were scored by two APD members for the presence of the shown recurring challenges to the curriculum