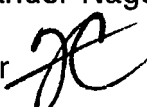


UNIVERSITY OF  
WISCONSIN  
MADISON

May 21, 1998

**TO:** Associate Dean Alexander Nagel  
**FROM:** F. Fleming Crim, Chair   
**SUBJECT:** Report on Assessment of the Graduate Program

Our report on the assessment of the graduate program in the Department of Chemistry accompanies this memorandum along with a copy of the original plan. Our Associate Chair, Professor Hans Reich, conducted the assessment and prepared the report with the help of our Executive Director, our Graduate Student Liaison Committee, and others in the Department. As we hoped, the study pointed to several points that we intend to pursue as part of an effort to improve our program. We also have plans to make the assessment a regular activity in the Department.

Please contact me or Hans if you have any questions or need further information.

**DEPARTMENT OF CHEMISTRY**  
College of Letters and Sciences  
University of Madison, Wisconsin

**Assessment Report**  
  
**of the**  
  
**Graduate Program in Chemistry**

May 10, 1998

**Introduction**

The Department of Chemistry has in place many assessment methods of individual students which effectively address important issues, such as knowledge of the scientific literature, writing ability, presentation skills, laboratory skills, skills in theoretical analysis, and skills in designing research projects. Thus all students present several seminars to groups ranging in size from 5 to 100, they develop and defend independent research proposals, and they write a series of preliminary exams. They receive oral and/or written feedback on their performance in these activities. The processes which address these issues are under almost continuous review within the Department, and are changed periodically.

All Faculty and graduate students in the Department of Chemistry are members of one the four divisions (Analytic, Inorganic, Organic, Physical). Although the various requirements leading to an MS or PhD degree are the same in broad terms, they differ substantially within the Divisions in detail. In view of the great diversity of research areas within the Department we made no attempt to assess the scientific knowledge of current or former students during the current round of assessments. What we did do is attempt to gauge the extent to which current students felt that the program was meeting their needs, and the extent to which former students felt that their education at UW had prepared them for their post-graduate careers. For this purpose two surveys were designed and distributed. Both were anonymous, so no follow-up mailings were possible to raise the response rates.

We were unable to complete three parts of the assessment plan in time for this report. (1) We do not currently have available numeric information about employment rates, employment destination and time to degree. (2) We have not gathered comments from industrial employers of our students as to how they view MS and PhD graduates. This can best be done during the fall semester when recruiters from major chemical companies visit the campus. (3) We have not conducted a survey of undergraduate institutions who have hired Chemistry graduates.

**Survey of Former Graduate Students in Chemistry**

To determine the extent to which the various activities of the MS or PhD degree actually turned out to be of value to students in their later careers we sent out a survey to two groups of graduates. One group received their degree approximately 15 years ago (admission to graduate school in 1976, 1977 and 1978), and a second who received their degree approximately 2-5 years ago (admission to graduate school in 1988, 1989 and 1990). A total of 261 questionnaires were sent (out of 273 students who received degrees during the time

periods selected). We received 59 replies (23%). Of these replies, 6 (10%) were from MS chemists, the remainder received PhD degrees. The analysis below combines both groups, but largely reflects the opinions of PhD chemists.

Although the low return rate must surely have involved a substantial element of self-selection, the surveys indicated a high level of satisfaction. On a scale where 5 is "very satisfied," 3 is "neutral" and 1 is "very dissatisfied," the average response on all questions was 3.89. The system of graduate courses (4.26), contact with students (4.34) and the major professor (4.20) received very high scores. Contact with professors other than the thesis advisor was less satisfactory (3.57), and suggests that some effort in this direction is warranted. The graduate alumni felt that their training in basic chemical knowledge (4.70), public presentations (3.97), use of instruments (4.16) and in designing experiments to solve problems (4.39) was exceptionally good. These numeric scores are also reflected in many written comments which indicated that the majority of our graduates felt that their training was superior to that of other chemists at their place of employment.

The Department received a relatively low score in the preparation it provided for choosing a graduate career (2.95). Many written comments amplified details behind this ranking. Some respondents felt that the program was too strongly aimed at preparing students for an academic career, and that the faculty either did not know or did not inform them about careers in the chemical industry and in other "non-traditional" careers (such as patent law or scientific journalism). Several suggested that the Department bring back former students to present seminars about what life is like in the "real world."

The question "How satisfied were you with preparation for your postgraduate career" received a score of 3.56, and this only mildly positive score appears to reflect a feeling among some graduates that the narrow focus of the PhD program did not always prepare them for the very wide range of jobs taken by graduate chemists, and by the emphasis on group achievement in industry (compared with individual achievements during thesis work). It is also clear from the numeric score (3.66) but especially from written comments that a significant fraction of students felt that their training in writing skills (reports, research proposals, papers) was not outstanding.

### **Survey of Graduate Students Currently in the Chemistry Department**

A questionnaire was sent to all graduate students currently studying for the MS or PhD degree in the Department (206 students). We received 125 replies (61%), the vast majority of these (92%), indicated they were in the PhD program. The questionnaire (which is attached) was designed to identify the level of satisfaction with many aspects of the graduate experience, and provide an opportunity to suggest improvements in the operation of the program.

On the key question "How satisfied are you with the overall graduate experience" 72% of the students replied either "Satisfied" or "Very Satisfied" (3.82/5.00). Students also were very satisfied with the quality of the research facilities (4.30), contacts with the major professor (4.17), efforts by the advisor to secure financial support (4.02) and the opportunities for public presentations (3.90). Somewhat lower satisfaction was reported for opportunities to develop writing skills (3.26).

Only two questions received a response below "Neutral". As also found with the graduate

alumni survey, the students felt that the Department was not doing enough to provide information about career paths (2.80) and that the Teaching and Research Assistant stipends were less than satisfactory (2.81). The latter problem was exacerbated by the unequal paychecks resulting from the way tuition was deducted. The recent changes in tuition remissions for graduate students should alleviate this problem.

The written comments provided additional information about the experiences of Teaching Assistants in the Department. Many students feel that, although their experience as a TA was both a valuable career experience and enjoyable, the duties expected from TA's could often not be completed in the allotted time, and in addition varied substantially from one faculty member to another and from one course to another. A few students commented that some of the TA assignments provided little in the way of real teaching experience (for those interested in college teaching careers), since little or no classroom instruction was involved.

There were also written comments that the process of selecting and joining a research group, although generally satisfactory, could be improved to ensure a better match between advisor and student (for example, by instituting a rotation through two or three research groups prior to making a commitment).

## **Conclusions**

All three groups of students surveyed (long-ago graduates, recent graduates and current students) felt that the graduate experience was well managed, that the Department provides a positive atmosphere and excellent facilities for doing science, that the formal requirements are a valuable component of the graduate experience, and that management of the thesis research requirement was working well.

All groups felt that a wider range of information about possible career choices and about the skills needed for successful post-graduate careers would be valuable. The Department will consider either regularly inviting individuals to the Department who can provide insider career information, or steering existing seminar programs in this direction. It does not seem likely, however, that such visitors can be provided annually in anything but the top few career areas. (Only annual seminars are likely to be effective since most graduate students pay attentive to career issues mainly during the year or less that they are actively seeking employment). A number of industrial recruiters currently provide presentations to the graduating class when they visit campus. It seems likely that these presentations could be more generally used to provide career information.

All groups felt that more scientific writing opportunities and better feedback would be valuable. Such activities fall largely within the domain of individual research groups and Divisions within Chemistry, these will be encouraged to find ways to provide more extensive writing opportunities and constructive criticism thereof.

## Chemistry Current Graduate Student Survey Results 1998

Questionnaires were sent to all graduate students currently registered in chemistry (206 students). As of 4/30/98 we received 125 replies (61%), of which 24 were analytic, 26 were inorganic, 46 were organic and 27 were physical chemists.

For most of the questions: 5 = very satisfied; 4 = satisfied; 3 = neutral; 2 = dissatisfied; 1 = very dissatisfied; 0 = does not apply. For the other questions the choices are listed on the questionnaire.

### All Current Students 1998

How Satisfied are you with:	0	1	2	3	4	5	GPA	Count
1. The overall graduate experience	0	1	7	27	68	22	3.82	125
2. The graduate recruiting process	11	2	14	31	47	20	3.61	114
3. The quality of the info. you received about UW prior to coming here	4	2	14	35	51	19	3.59	121
4. Courses in major subject (required courses)	1	5	13	25	62	19	3.62	124
5. Chemistry courses outside major (optional courses)	15	3	10	30	50	17	3.62	110
6. The process of joining a research group	3	6	11	27	58	20	3.61	122
7. The usefulness of the cumulative or topic exams	7	6	9	24	53	26	3.71	118
8. Fairness of the cumulative or topic exams	7	2	14	18	69	15	3.69	118
9. Opportunities to develop writing skills	12	1	24	44	33	11	3.26	113
10. Opportunities for public presentations	10	0	6	28	53	28	3.90	115
11. Quality of the feedback about your public presentations	26	5	21	37	31	5	3.10	99
12. Opportunities to develop creative and original ideas	5	4	6	33	50	27	3.75	120
13. Research support facilities (instr. center, machine shop, etc)	3	1	2	7	61	51	4.30	122
14. Contacts with your major professor	1	2	5	13	54	50	4.17	124
15. Amount of contact with your advisor:	About Right: 100		Too Much: 4		Too Little: 21			
16. Approachability of your major professor	1	1	3	18	42	60	4.27	124
17. Contacts with faculty other than your advisor	1	7	12	30	52	23	3.58	124
18. Efforts by your advisor to secure financial support for you	6	8	8	11	39	53	4.02	119
19. Information about Departmental requirements	2	6	27	43	39	8	3.13	123
20. Best source	Newsletter: 16		Web: 6	Advisor: 9	Colleagues: 72	Div. Office: 14	Flyers: 8	
21. The level of financial support (TA or RA salary)	2	14	37	32	38	2	2.81	123
22. Opportunities to present and/or publish your research	19	1	7	28	53	17	3.74	106
23. Opportunities for scientific contacts outside the University	15	2	14	45	38	11	3.38	110
24. Quality of research seminars by visiting speakers	0	2	6	29	70	18	3.77	125
25. Information about career paths	12	11	33	41	24	4	2.80	113
<i>If you are currently looking for a position, how satisfied are you with:</i>								
26. Help from the Department for finding a job	88	3	3	15	12	4	3.30	37
27. Support from your advisor for finding a job	86	4	6	10	11	8	3.33	39
<i>If you were to start your graduate career again, would you select</i>								
28. The same university:	Yes: 83		No: 9		Don't know: 31			
29. The same field of study:	Yes: 87		No: 11		Don't know: 25			
30. The same advisor:	Yes: 86		No: 15		Don't know: 23			
31. Degree expected:	MS: 9		PhD: 113					
32. Year in grad school:	First: 32		Second: 16		Third: 27		Fourth or later: 48	
33. Division:	Analytical: 24		Inorganic: 26		Organic: 46		Physical: 27	
34. Career preference after you finish school:	Industry: 53		Government: 8		University: 20		College: 27	
							Other: 7	

## Chemistry Graduate Student Alumni Survey Results 1998

Questionnaires were sent to all graduate alumni (MS and PhD) who started graduate work in the years 1976, 1977, 1978, 1988, 1989, and 1990 for which we have addresses (260 out of 273). As of 4/30/98 we received 59 replies (23%), of which 11 were analytic, 7 were inorganic, 26 were organic and 13 were physical chemists (the numbers do not add up because 2 respondents did not give their divisional affiliation).

For all questions: 5 = very satisfied; 4 = satisfied; 3 = neutral; 2 = dissatisfied; 1 = very dissatisfied; 0 = does not apply.

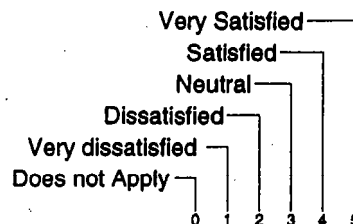
### ALL STUDENTS (59 received/260 sent)

<b>How satisfied were you with:</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>GPA</b>
1	Courses in major subject	1	1	1	6	24	26	4.26
2	Courses outside major	3	0	1	8	41	6	3.93
3	Contacts with other students	0	0	2	4	25	28	4.34
4	Contacts with your major professor	0	3	0	8	19	29	4.20
5	Contacts with faculty other than your advisor	1	2	8	14	23	11	3.57
6	Group seminars	1	1	7	8	23	19	3.90
7	Research seminars by visiting speakers	0	1	1	3	33	21	4.22
8	Preparation for choosing career pathways	1	5	19	14	14	6	2.95
9	Preparation for your postgraduate career	4	2	10	10	21	12	3.56
<b>How satisfied are you with your preparation in:</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
10	Knowledge of basic chemistry	1	0	0	1	29	26	4.70
11	Effective report writing	1	1	8	14	19	14	3.66
12	Effective public presentations	0	1	7	6	24	21	3.97
13	Developing research proposals	2	1	12	16	19	9	3.40
14	Problem solving	0	0	0	7	22	30	4.39
15	Designing experiments	1	1	3	8	23	23	4.10
16	Use of computational methods	9	3	7	19	17	4	3.24
17	Use of instruments	2	1	2	6	26	22	4.16
18	Underlying theory and relation to applications	0	1	0	10	37	11	3.97
19	Adapting to new projects or research areas	2	1	2	10	23	21	3.90
20	Performing collaborative research	7	3	7	16	16	10	3.44

**3.89**

**The University of Wisconsin-Madison**  
**Department of Chemistry Graduate Student Survey**

*Please place additional comments about your assessment of the graduate program on the reverse side*



**How satisfied are you with:**

- 1. The overall graduate experience .....
- 2. The graduate recruiting process .....
- 3. The quality of the info. you received about UW prior to coming here .....
- 4. Courses in major subject (required courses) .....
- 5. Chemistry courses outside major (optional courses) .....
- 6. The process of joining a research group .....
- 7. The usefulness of the cumulative or topic exams .....
- 8. Fairness of the cumulative or topic exams .....
- 9. Opportunities to develop writing skills .....
- 10. Opportunities for public presentations .....
- 11. Quality of the feedback about your public presentations .....
- 12. Opportunities to develop creative and original ideas .....
- 13. Research support facilities (instr. center, machine shop, etc) .....
- 14. Contacts with your major professor .....
- 15. Amount of contact with your advisor: <sup>3</sup> about right <sup>4</sup> too much <sup>5</sup> too little
- 16. Approachability of your major professor .....
- 17. Contacts with faculty other than your advisor .....
- 18. Efforts by your advisor to secure financial support for you .....
- 19. Information about Departmental requirements .....
- 20. Best Source: <sup>0</sup> newsletter <sup>1</sup> web <sup>2</sup> advisor <sup>3</sup> colleagues <sup>4</sup> div. office <sup>5</sup> flyers
- 21. The level of financial support (TA or RA salary) .....
- 22. Opportunities to present and/or publish your research .....
- 23. Opportunities for scientific contacts outside the University .....
- 24. Quality of research seminars by visiting speakers .....
- 25. Information about career paths .....

**If you are currently looking for a position, how satisfied are you with:**

- 26. Help from the Department for finding a job .....
- 27. Support from your advisor for finding a job .....

**If you were to start your graduate career again, would you select**

- 28. The same university:             Yes             No             Don't know
- 29. The same field of study:        Yes             No             Don't know
- 30. The same advisor:                Yes             No             Don't know

Return to:  
 Dr. Matt Sanders  
 Department of Chemistry  
**By April 22.**

**Information about yourself:**

**31. Degree expected:**

- 1  MS
- 2  PhD

**32. Year in grad school:**

- 1  First
- 2  Second
- 3  Third
- 4  Fourth or later

**33. Division:**

- 1  Analytical
- 2  Inorganic
- 3  Organic
- 4  Physical

**34. Career preference after you finish school:**

- 1  Industry
- 2  Government
- 3  Academic - Univ.
- 4  Academic - College
- 5 Other: \_\_\_\_\_

Suggest one change in the graduate program at Wisconsin that would improve or simplify it.

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Comments on your experiences as a Teaching Assistant:

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Comments about any of the numbered questions on the other page (give numbers):

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Any other comments:

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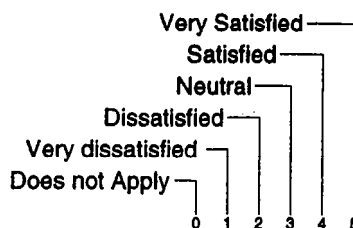
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**The University of Wisconsin-Madison  
Department of Chemistry Graduate Alumni Survey**

*Please answer the questions below, and place any additional comments on the reverse side.*



**How satisfied were you with:**

- 1. Courses in major subject .....
- 2. Courses outside major .....
- 3. Contacts with other students .....
- 4. Contacts with your major professor .....
- 5. Contacts with faculty other than your advisor .....
- 6. Group seminars .....
- 7. Research seminars by visiting speakers .....
- 8. Preparation for choosing career pathways .....
- 9. Preparation for your postgraduate career .....

**How satisfied are you with your preparation in:**

- 10. Knowledge of basic chemistry .....
- 11. Effective report writing .....
- 12. Effective public presentations .....
- 13. Developing research proposals .....
- 14. Problem solving .....
- 15. Designing experiments .....
- 16. Use of computational methods .....
- 17. Use of instruments .....
- 18. Underlying theory and relation to applications .....
- 19. Adapting to new projects or research areas .....
- 20. Performing collaborative research .....

**Mail to:**

Dr. Matt Sanders  
Department of Chemistry  
1101 University Avenue  
University of Wisconsin  
Madison WI 53706

**Information about yourself at Wisconsin:**

**Degree:**

- MS
- PhD

**Year of degree:**

\_\_\_\_\_

**Division:**

- Analytical
- Inorganic
- Organic
- Physical

**Area of specialization:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Information about your current situation:**

**Current position:**

**Industry:**

**University:**

**Government:**

- Research Scientist
- Group Leader
- Research Director

- Post-Doctoral
- Academic Staff
- Faculty

- Research Scientist
- Group Leader
- Research Director

Other: \_\_\_\_\_

Details: \_\_\_\_\_

\_\_\_\_\_

What was the most valuable part of your graduate experience at Wisconsin?

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What part of your graduate experience at Wisconsin most needed strengthening and improvement?

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Compare your preparation in graduate school with others you know in your current position.

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Suggest one change in the graduate program at Wisconsin that would improve or simplify it.

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Comments about any of the numbered questions on the other page (give numbers):

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**DEPARTMENT OF CHEMISTRY**  
College of Letters and Science  
University of Wisconsin-Madison

**PLAN FOR ASSESSMENT**

**OF THE**

**GRADUATE PROGRAM**

June, 1997

**Introduction**

The Department set as its first goal assessment of the Graduate Program in Chemistry. We are focusing on this area because we have already recognized the need to assess the scholarly efforts and future directions of our Department. Assessment of the Graduate Program is essential to a serious consideration of our scholarship since the two are closely intertwined. Our Long Range Planning Committee has just completed a draft report to the Department on its scholarship and its reflection in the recent National Research Council assessment of the quality of graduate programs. Our program was again rated as being among the top ten, corresponding to the top 7%, but we are eager to improve and secure that standing. The Long Range Planning Committee has worked to identify crucial issues and make proposals to the Department. This document will be a useful part of our internal assessment and point to some of the questions that we want the full assessment to address.

A complication to developing an assessment for the undergraduate major at this time is the presence of substantial undergraduate curriculum reform efforts in our Department, one of which is part of a carefully constructed project funded by the National Science Foundation. This continuing effort has produced and is producing a great deal of assessment information on its own. Further probing of that activity does not seem particularly productive now. We expect the assessment of our undergraduate program to include much of what we learn from our curriculum studies. We plan to consider and prepare an assessment plan for our undergraduate major during the coming year.

**Educational Goals and Objectives**

The goal of our Graduate Program in Chemistry is to prepare individuals to function as professional chemists by guiding them to a mastery of a portion of our very broad discipline at a level where they are able to create new knowledge. The detailed implementation of these goals is complicated by at least two factors: the *diversity* within the discipline and the *range of professional goals* of our students. The *diversity* of the field has always been large and has grown tremendously in the last few decades. The science in our graduate program, all fitting into the discipline of Chemistry, ranges from studies of small molecules

found in interstellar space to the details how signaling occurs in living cells. In between, we find studies of the human genome, molecules striking the surfaces of liquids, the nature of silicon surfaces used in semiconductor devices, the interaction of light with matter, the properties of catalysts, the motions of polymers, both biological and synthetic, the synthesis of complex biologically active molecules and many other topics. The *range of goals* is not as difficult to describe but is large. In general, our students aspire to positions as faculty in research universities, as faculty in primarily undergraduate institutions, or as researchers in industry and government laboratories.

The last category is particularly important, as most of our Ph.D. graduates take positions in industry. We have strong historical and current connections to industries employing chemists. Indeed talk of the changing role of the Ph.D. chemist in industry is a strong motivator for a careful assessment of our graduate training.

The means of accomplishing our objective are embedded in the requirements and patterns of earning a Ph.D. degree in Chemistry. They are

- Course work in a subdiscipline of Chemistry along with course work in supporting areas, such as, for example, biology or physics.
- Completion of admission to candidacy examinations that serve to consolidate course work and awareness of new developments. An important component of the admission to candidacy is completion of an *original research proposal* outside the immediate area in which the candidate is conducting research.
- Completion of original research almost invariably concluding with a set of contributions to the scientific literature.
- Preparation and defense of the Ph.D. thesis.

The primary goal of our assessment work is to discover (1) how effectively we prepare our graduates for their subsequent careers, (2) how our approaches to graduate training affect the perception of the scholarship of our Department, and (3) how well we are participating in new intellectual opportunities in chemistry and related fields.

### **Methods of Assessment**

The Department constantly engages in implicit and explicit assessment. We constantly ask ourselves two questions: are our graduates able to function as professional chemists and scholars and are they competing successfully for first-rate positions in industry and academia? Much of our assessment is designed to answer those questions from the point of view of potential employers, of recent graduates, of graduates who are established in their careers, and of the faculty. We hope to obtain information from all of these sources,

primarily by asking them what they think. In addition, we have available or can obtain quantitative data about positions of our graduates. We intend to obtain the following information.

- Rankings of our graduate program, employment rates of our graduates, types of employment of our graduates, length of time to degree, and other related numerical information about both the students and the Department.
- Comments on the program from students in the program. (We have a group, the Graduate Student - Faculty Liaison Committee, in place to help us identify the issues to probe.) We are eager for advice from the College about obtaining assistance in constructing questionnaires.
- Comments on the program from individuals in industry and academia completing the program in the last five years and from individuals completing the program more than five years ago. Constructing the questionnaire is the crucial issue here. We hope to involve an external expert and the Long Range Planning Committee.
- Comments on the program from potential industrial employers of our graduates. We expect to contact those companies with whom we have long standing contacts and who often interview in our Department. Because we have an on going relationship, they are likely to be the most forthcoming even if they have not hired our graduates recently. Because the companies that interview on campus tend to be large established ones, we will also use contacts through our graduates to obtain information from smaller companies.
- Comments about our graduates from undergraduate teaching institutions. These may be the hardest data to obtain, but we expect to use contacts through our graduates and through individuals the faculty know at such institutions.

We intend to use these data to identify the most important features of our graduate training and identify the aspects we do well and those we must improve. We hope that the assessment will allow us to proceed in the development of our training, scholarship, and hiring with an eye toward remaining one of the major players in training graduate chemists and creating new chemical knowledge.

### **Timetable for Implementation**

We intend to begin constructing our measurement instruments during the Fall of 1997. If that process goes well, we will seek responses during the Spring and plan on having the material in hand for an assessment report late in the semester. Depending on the time and cost of constructing reasonable instruments and obtaining responses, we may be overly optimistic.

**College of Letters and Science  
Assessment Report**

Department or Program Name: Chemistry

**Abstract:** The Department of Chemistry conducted an assessment of its Graduate Program by developing a set of questionnaires and conducting surveys of three groups: PhD and MS students who graduated approximately 15 years ago (admission to graduate school in 1976, 1977 and 1978), those who received their degree approximately 2-5 years ago (admission to graduate school in 1988, 1989 and 1990), and all graduate students currently registered in the Department. All three groups felt that the graduate experience was well managed, that the Department provides a positive atmosphere and excellent facilities for doing science, that the formal requirements are a valuable component of the graduate experience, and that management of thesis research was working well. All groups felt that a wider range of information about possible career choices and about the skills needed for successful post-graduate careers would be valuable, and the Department will take steps to provide additional information through seminars and improved contacts with industrial interviewers. There was also a general feeling that, whereas the opportunities for developing oral communications skills was good, more scientific writing opportunities and better feedback would be valuable. Individual research groups and the Divisions of Analytic, Inorganic, Organic and Physical Chemistry will be encouraged to address this issue.

Assessment Tools Used:

*Direct Indicators*

	Undergraduate Major	Graduate Program
National Exams	_____	_____
Local Exams	_____	_____
Capstone Course(s)	_____	_____
Embedded Testing	_____	_____
Student Portfolios	_____	_____
Review theses & dissertations	_____	_____
Performance Evaluations	_____	_____
Pre and Post Testing	_____	_____

*Indirect Indicators*

Student Surveys	_____	1998
Exit Interviews	_____	_____
Alumni Surveys	_____	1998
Employer Surveys	_____	_____
External Reviews	_____	_____