

Guidelines for Serving
as a
Consultant
in the
Mathematical Sciences

A Report from the MAA
Committee on Consultants

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1 Introduction

One of the charges of the MAA Committee on Consultants is to develop resources to assist consultants with their duties. The purpose of this document is to provide a resource not only for colleagues who have served as consultants for the mathematical sciences community, but also for colleagues who are interested in becoming consultants.

Section 2, “Responding to a Need,” notes the need for consultants and gives an overview of what a consultant does. Section 3, “Preparing to Serve,” discusses the general role of a consultant and provides a list of important resources. Section 4, “Becoming Part of the Self-Study Process,” covers the planning stages of a campus visit, and Section 5, “Visiting the Campus,” covers the on-site visit. Section 6, “Putting It All Together,” contains some guidelines for writing a report and suggestions for follow-up activities to perform after the report has been submitted. The appendices contain a list of fundamental resources and a list of electronic resources. They also provide suggestions for how to deal with some thorny issues that might arise during a site visit, as well as a sample timeline for consultant activities.

This document is an outcome of two MAA Professional Enhancement Program (PREP) workshops that were organized by Nancy Baxter Hastings and Joanne Weissman and held at Dickinson College in the summers of 2005 and 2006. The participants in the 2005 summer workshop were experienced in undertaking departmental self-studies and serving as outside consultants. Although the goal of the 2005 workshop was to develop a set of training materials for external consultants, it quickly became evident that the effectiveness of an outside consultant is closely linked to a department’s self-study process. In particular, the self-study process helps strengthen a mathematics department, and consultants play an important role in this process. The brainstorming discussions that took place and the materials that resulted from the 2005 workshop became the basis for the workshop in summer 2006, which ran two concurrent sessions: one for developing self-studies and one for training consultants. The consultant-training materials developed for the workshop became the basis for this document.

We wish to thank our colleagues who attended the two PREP workshops and the members of the MAA Committee on Consultants for helping shape this document. We also wish to thank Henry Walker from Grinnell College, with whom many of us have enjoyed serving on a consultant team, for providing the TeX version of the template he uses to write consultant reports.

In addition to developing resources for consultants, the MAA Committee on Consultants seeks to identify individuals who are willing and well prepared to serve as departmental consultants. Upon request, the Committee also will provide a department with a list of potential consultants who appear to match its institutional needs. The form for applying to be a candidate for consultancy and the questionnaire for an institution that seeks a consultant team are available at www.maa.org/ProgramReview.

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2 Responding to a Need

The MAA *Guidelines for Programs and Departments in Undergraduate Mathematical Sciences* recommends that departments perform periodic reviews of their academic programs. Many departments conduct these self-studies as part of their institution’s assessment plan or in response to requirements of accreditation agencies. Other departments conduct self-studies as part of their strategic planning process. An important component of a department’s self-study process is obtaining input from a team of external consultants. The consultant team reviews the department’s self-study documents, makes an on-site visit, and writes a report detailing its findings and recommendations.

The Committee on Consultants believes there is a need for highly qualified professionals in the mathematical sciences to assist with general reviews or to consult on more specific issues. Mathematicians become consultants in order to serve their profession and to assist departments in their pursuit of excellence. The mission statement of a department in the mathematical sciences articulates goals of excellence, but charting a course to excellence is not an easy task. A consultant works to provide ideas and guidance to a department to help achieve its goals.

3 Preparing to Serve

3.1 Getting Ready

By definition, a “consultant” is an expert who provides advice or services to others. Consequently, *a consultant in the mathematical sciences needs to be familiar with fundamental literature relating to undergraduate mathematics education*. The following short list of resources should be on the shelf of anyone who serves as a consultant¹:

- *Assessment of Student Learning in College Mathematics: Towards Improved Programs and Courses*, edited by Bernard Madison, Association for Institutional Research, 2008. This volume includes 10 case studies, representing a sample of assessment activities in U.S. mathematics departments.
- *Guidelines for Programs and Departments in Undergraduate Mathematical Sciences, Revised Edition*, MAA, February 2003. Available at www.maa.org/guidelines. This is a must-read for both consultants and departments. It contains suggestions for undertaking a periodic review, guidelines for appropriate workloads, curricula and teaching, and so on.
- *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States (CBMS Survey 2005)*, by David J. Lutzer, Stephen B. Rodi, Ellen E. Kirkman, and James W. Maxwell, AMS, 2007. Available at www.ams.org/cbms. Every five years since 1965, the Conference Board of the Mathematical Sciences (CBMS) has compiled a report that examines the status of undergraduate mathematics and statistics in U.S. colleges and universities. The report contains detailed data on timely topics such as enrollments, bachelors’ degrees granted, available academic resources, and faculty demographics.

¹Appendix A, “Fundamental Resources,” contains a more comprehensive list of resources.

- *Towards Excellence (Leading a Doctoral Mathematics Department in the 21st Century)*, edited by John Ewing, AMS, 1999. Available at www.ams.org/towardsexcellence/. In particular, Chapter 15 discusses the ways deans and provosts view a department with respect to mission money and impact. Chapters 16–18 give the points of view of three department chairs. Chapter 20 specifically focuses on the self-study process and how to conduct an external review.
- *Undergraduate Programs and Courses in the Mathematical Sciences: CUPM Curriculum Guide 2004*, written by Harriet Pollatsek et al, MAA. Available at www.maa.org/cupm. This report by the Committee on the Undergraduate Program in Mathematics provides recommendations to guide mathematics departments in designing curriculum for their undergraduate students. It provides details relevant to particular audiences (general education, math majors, teacher education, majors in partner disciplines, and so on). Appendix 5 contains a summary of all the recommendations contained in the document and provides a useful list of criteria for evaluating a department. Appendix 6 contains sample questions for a department self-study.

Consultants need to understand the language of assessment and should be familiar with basic practices for assessing degree programs and curricula. Although a consultant may specialize in a particular area, it is still necessary to have a good grasp of these general resources. In addition, most self-study reports are replete with data collected to provide assessment on multiple aspects of a department's mission, and a consultant needs to have the ability to properly interpret this information.

A consultant needs to be able to objectively consider the merits and deficiencies of a department in its own context. An academic department is part of a larger institution that has its own opportunities and limitations. Moreover, each campus possesses its own ethos that has a strong influence on curriculum design and methods of course delivery. Consultants need to strive to understand the environment in which a department operates and to formulate recommendations that are appropriate for the resident situation. This is not to say that a consultant should withhold criticism or overlook deficient practices. After all, an important aspect of any review is to identify areas for improvement.

A consultant needs to have a broad perspective on the mathematical sciences and an appreciation of the diversity of roles that are part of the higher education profession. Professional societies provide a link to the mathematics community. Being active in professional societies, at the regional and national levels, provides a consultant both exposure and valuable experience.

A consultant should avoid making comparisons with specific institutions—especially, his or her own—in order to evaluate the performance or practices of an individual department. Any judgment or evaluation should be based on a national standard, such as the recommendations listed in the “Executive Summary” of the *CUPM Curriculum Guide 2004*. Guidelines such as these are designed to be flexible and to help guide the decisions of education professionals.

3.2 Being Part of a Team

Ideally, a program and/or departmental external consultant team should involve a team of two or three consultants, since it is difficult, if not impossible, for one person to effectively capture the

complexities of an entire review by him or herself. A good consultant team is greater than the sum of its parts and brings a greater wealth of expertise than any one individual can. A team will generally be more balanced in its observations and will benefit from a larger accumulation of wisdom. A team has the ability to provide more detailed analysis and more thoughtful feedback. Consequently, to ensure a high-quality review, an institution should fund a team of consultants, not a single individual.

One member of the team should be designated as the chair. The chair serves as the primary liaison between the institution and the consultant team. Although the team shares responsibilities regarding the review and shares in writing the report, the chair oversees the process. The chair is responsible for submitting the final version of the report, which is signed by all members.

3.3 Mission and Code

The mission of a consultant is to assist a department with its pursuit of excellence. In doing so, a consultant has an obligation of confidentiality in all aspects of the self-study process in which he or she participates. In particular, a consultant should adhere to the following guidelines:

1. A consultant should keep confidential the department's self-study documents, conversations with members of the department and administration, and the findings and recommendations in the final report.
2. Whenever a consultant is in a meeting with faculty, students, or administrators, a consultant should make it clear if the session is off or on the record.
3. If any member of a department is an acquaintance of a consultant, then the consultant needs to be especially careful to treat all faculty in an objective and impartial manner.
4. The consultant report becomes the property of the institution once the final version is submitted. Any use of the report by a consultant requires the permission of the institution.

3.4 Characteristics of an Effective Consultant

A consultant will interact with a wide variety of people during a campus visit. Consequently, strong communication skills are an essential trait for a consultant. An effective consultant is a careful listener and is good at asking probing questions. An effective consultant has the ability to assimilate information as part of the review process and to respond directly to the needs and concerns being expressed.

A consultant needs to be aware of any personal biases when it comes to his or her view of the profession and to be able to set these biases aside during the visit. An effective consultant is open-minded and unbiased and is able to immerse him or herself totally in the needs and concerns of a department.

Reviews can be a stressful time for a department. An effective consultant needs to possess the diplomatic skills necessary to gain a level of trust from the department and from the administration and to help put both faculty and students at ease.

On-site visits can be stressful not only for a department but also for a consultant. Conducting an on-site visit is frequently a grueling process, with days beginning with a breakfast meeting,

followed by one meeting after another with seemingly endless note taking, and culminating with a working dinner. An effective consultant is tireless.

In order to provide meaningful recommendations and guidance to a department, an effective consultant is well informed about current issues in the mathematical community and is able to draw upon a variety of personal experiences and observations.

4 Becoming Part of a Department's Self-Study Process

The visit of a consultant team to a campus is part of a larger, more important picture: the self-study process itself. As part of this process, a department conducts its own internal review prior to a campus visit by a consultant team. The department's self-study report is a product of this review and is the primary tool consultants use to familiarize themselves with the department prior to their visit. Self-studies are not standardized across the mathematics discipline. Every departmental self-study has unique features, and consequently, the role of a consultant is different with each campus visit.

Note: In the previous sections, this document speaks in general about being a consultant. Beginning with this section, it becomes a how-to manual and is addressed to the reader—that is, to you, a prospective consultant.

4.1 Responding to Being Asked to Serve

When first approached about the possibility of serving as a consultant, you need to determine if you are a good fit for the job and a good fit with the consultant team that is being recruited.

To make this determination, get an overview of both the department's situation and the institution's expectations by asking the following types of questions:

- What is the institution like? Is it public or private? Is it a research institution, comprehensive university, liberal arts, or two-year college? How large is it?
- What is the department like? What is its size in terms of faculty and majors? What degrees are offered?
- Why is the department undertaking this review?
- What major issues is the department trying to address by conducting this self-study?
- How is the department conducting its internal review? In other words, what is its self-study process?
- What is the timeline for the self-study?
- Who are the other members of the consultant team? What is the expertise of each member? Who will chair the team?
- What is the expected length of the on-site visit?

After you understand the department's situation, you might ask yourself questions such as the following to determine if you are a good fit:

- Can I be objective in reviewing this department?
- Will my skill set and expertise be useful in the context of this particular review?
- Am I familiar with this type of institution and comfortable with this type of review?
- Do I feel I can work well with the other members of the consultant team?
- Do I have the time to do an effective job?

If you decide that you are a good fit for the review and that your schedule fits in the timeline, then you are ready to proceed with planning for the consultancy component of the department's self-study process. Good planning is essential for a productive campus visit.

4.2 Clarifying Expectations

Typically, you will be asked to serve as a consultant six months to one year ahead of the actual site visit. In addition to seeking answers to questions similar to the ones posed in the previous section (Section 4.1, "Responding to Being Asked to Serve"), you also need to clarify the expectations with respect to your role in the self-study process. There are a variety of stakeholders in a consultant site visit: the department, the institution, and the other members of the consultant team will all have expectations as to what your role in the self-study process should be, and it is important to clarify these expectations early in the process.

You should also determine the department's time schedule for preparing the self-study report and the extent of your participation in the department's self-study process. You should also clarify what role department faculty expect you to play on the consultant team and what issues they expect you to concentrate on as part of the team—for example, they may wish to have you focus on their teacher education program or their statistics program. You may find the following questions helpful in clarifying the department's expectations:

- What role does the department expect you to play in the self-study process?
- Will the self-study report be available two months prior to the site visit so that members of the consultant team can review the document and provide feedback? (See more on this in Section 4.3, "Preparing for the Site Visit.")
- After the consultant team has had an opportunity to review the self-study report, is the chair of the department willing to participate in a conference call with members of the team prior to their visit to discuss any questions, observations, or suggestions the members might have?

Expectations with regards to the consultant visit should be discussed in advance and possibly reiterated in writing. For instance, as early as possible, you should clarify details such as the following:

- What are the actual dates of the visit?

- Who will make travel and lodging arrangements?
- What is the reimbursement procedure for expenses?
- How much is the honorarium? (Note: It may feel awkward to discuss this ahead of time, but it can be more difficult after the campus visit, especially if the proposed stipend is minimal.)

It is also helpful to discuss institutional expectations for the consultant report and deadlines for submission of the report.

- What are the institution's expectations with respect to the size and scope of the report?
- How long after the site visit will the report be due? (Note: Keep in mind that it usually takes at least a month for a report to be written and approved by the members of the consultant team. If the institution wants the report sooner, you might explore the possibility of the institution paying the expenses for the team members to stay an extra day so they can work together to finish a first draft.)

4.3 Preparing for the Site Visit

*Read the department's self-study report **in advance** of your visit.* Although you may be tempted or pressed by lack of time to read a department's report on the plane on your way to the site visit, it is important that you read and re-read the report ahead of time. For the consultant team to be effective, the self-study report, or at least a fairly complete draft of the report, should be sent to all members of the team at least six weeks prior to the campus visit. This will give you time to review the report, ask questions, and make suggestions, thereby improving the self-study report and becoming an integral part of the department's self-study process.

A major portion of a departmental self-study report is descriptive and typically covers the following areas:

Curriculum — What majors does the department offer? What minors? What service courses does it give? What interdisciplinary fields does it support?

Teaching – Who are the faculty? What are their areas of expertise? What courses are taught, and how often, and by whom?

Learning – Who are the students? What are they expected to learn, and how does the department determine whether they have?

Faculty development – What kinds of faculty development and scholarship does the institution expect? What kind of support does the institution provide?

Service – What are the service activities of the department? of individual faculty? of students?

Resources – What is the state of the infrastructure? What web, library, and online resources are available? How is faculty development supported? What funding is available for departmental events, such as special lectures and career panels?

The appendices usually contain such background information as the following:

Curriculum vitae for the faculty

Course descriptions

Requirements for the major

Sample syllabi and exams for courses

Assessment tools and results

The report from the previous consultant team

The appendices and the descriptive portions of the report provide you with information about the department, its members, and its program. This is certainly important. However, the most important part of the self-study is the reflective aspect, since it provides you with insight into where the department has been, where it is heading, and where it would like guidance from you as a consultant. The report should contain answers to such questions as the following:

- What is the department's mission? What is the institution's mission?
- Does the department's mission support the mission of the institution?
- What is the department's strategic plan?
- What is the process for implementing the strategic plan?
- How does the department assess its progress on strategic goals? For instance, how, and to what extent, is the department assessing faculty teaching, student learning, service to other departments, effectiveness in carrying out its mission, and so on?
- What planning and actions have occurred over the years to help meet the long-term goals of the department?
- What actions has the department taken in response to the findings and recommendations of prior consultant reports?
- What is the focus of the current self-study?
- In what areas is the department looking for guidance from the consulting team? What specific issues and questions does the department want the consultant team to focus on?

As you read the report, ask yourself:

- Are there things in the report that aren't clear?
- Are data missing?
- Does the report raise unanswered questions?
- What additional information would be helpful?

Read prior consultant reports. Ask to see any prior reports that are available.

Research the institution. Learn as much as you can about the institution and the department by looking at the institution's web site, the department's web pages, the course catalogue, and admissions materials.

Arrange for a conference call between the members of the consultant team and the chair of the department. About a month prior to the site visit, ask the chair to arrange a conference call between him or herself and the members of the consultant team. This call provides an opportunity

for team members to ask questions arising from the self-study report, to ask for additional data, to make suggestions that would strengthen the self-study report, and to clarify their roles as members of the consultant team.

The conference call is a good time to inquire whether the consultant team will have a place to work together and to hold its own closed sessions while on campus. It is very important for the consultant team to have a private space in which to work. This will enable the team to be more productive during the visit and will improve the team's ability to conduct necessary meetings during the site visit.

Finally, the conference call also provides a good time to discuss the itinerary for the upcoming campus visit. You should discuss the list of faculty, administrators, stakeholders, and students with whom you will meet. You should review the list of facilities that you will tour and the classes you might attend. You should request that work time for the consultant team be built into the schedule, especially before the scheduled exit interview with an administrator or the final meeting with the department. (See Section 5, "Visiting the Campus.")

This leads to the final suggestion with regard to preparing for the site visit:

Set up a detailed itinerary for the site visit prior arriving on campus. Your schedule will be tight, and it will be difficult to add in items once you are on campus. Check out your itinerary ahead of time. Before you arrive, be sure you will be seeing whom you would like to see and what you would like to see, in the order in which you would like to see them.

5 Visiting the Campus

The self-study report is a comprehensive document with a vast amount of information and data, yet it cannot compare to the value of a good campus visit, which will provide you with an opportunity to immerse yourself in the culture of the campus and the department. Typically an on-site visit lasts two to two and a half days and is densely scheduled and very intense. (A word to the wise: Don't plan to do other work while you are there, since you will probably have very little time to yourself.)

5.1 Meetings

5.1.1 Meetings with the department chair and high-level administrator, such as the dean or provost

You should try to have separate meetings with the department chair and with a high-level administrator at the beginning of the campus visit. These meetings provide an opportunity to clarify any issues related to the purpose of the review and the administrative structure that governs the department. In particular, they provide an opportunity to ask the administrator the following questions:

- What issues are important from an institutional point of view?
- Who is the intended audience for the consultant report?
- Should the report have a specific format?

- To whom should a copy of the report be sent?

The meeting with the department chair gives the chair a chance to share any background information that might not be in the self-study report and to prioritize areas on which the consultant team should concentrate.

5.1.2 Meetings with other administrators

Depending on the department's concerns, it might be helpful to meet with the director of admissions, head of academic computing, head of the library, and so on.

5.1.3 Meetings with faculty members

Depending on the size of the consultant team and the size of the department, it may not be feasible to have individual conversations with every member of the department. However, you should try to meet one-on-one with as many full-time faculty members as possible, even if it means splitting up the consultant team. You can also meet with some clusters of faculty—for example, adjunct/part-time faculty.

You need to try to put each faculty member you interview at ease and help him or her feel comfortable talking openly about his or her views regarding the department's program. Make it clear that whatever is said during the session with a faculty member is off the record. It is useful to remind everyone that as a consultant, you are looking for patterns that emerge from your various conversations. Let them know that based on everyone's comments, you hope to develop a clear understanding of the department's program, to identify both its strengths and the areas in which it needs to be strengthened, and, in the process, to formulate a list of suggestions and recommendations that will help the department achieve its goals and assist it in its pursuit of excellence. Of course, you will want to ask questions that are directly related to the focus of the department's self-study, but to get started, you might ask such general questions as the following:

- What do you personally hope will be an outcome of this process?
- Which of the issues raised in the department's self-study are most important to you personally?
- To what extent do you think that your department's mission/vision is shared by you and your colleagues?
- Is there a sense of corporate ownership of the program?
- How much support does the department have from the administration?
- (For junior faculty especially) Are the expectations for advancement/tenure/promotion clear to you?
- (For junior faculty especially) What support does the department/institution provide for professional development?
- (For junior faculty especially) How supportive are your colleagues?
- (For junior faculty especially) Is there a mentoring mechanism?

5.1.4 Meetings with faculty in partner disciplines

In addition to the departmental faculty, you should meet the department's stakeholders—e.g., the heads of departments/programs that require their students to take mathematics courses, the chairs of the science departments (in particular, the chair of the biology department), and so on. Questions for members of this group include the following:

- If your department requires a mathematics or statistics course for its major, are your majors prepared to use the concepts they have learned in your courses? Is the mathematics department teaching what you need to have it teach?
- Is there any conversation with the mathematics department about the content of the required courses? If so, how often, and on what topics?
- Does the mathematics department work with other departments? Are there opportunities for collaboration on curriculum development, on student research projects or independent studies, or on degree programs?
- What do you believe are the strengths of the mathematics department? What do you think are the areas that could be improved?
- Is the mathematics department engaged with the campus community?
- What is the reputation of the mathematics department among the student population?

5.1.5 Meetings with students

You should also try to meet with students, without other faculty or administrators in attendance. One way to do this is to ask the department to arrange a lunch with student representatives, both majors and non-majors. Another possibility is for you to meet with the students in a particular class—say, for 15 minutes at the beginning or the end of the class period. A third possibility is for the department to hold a student reception, although there would have to be some sort of carrot to motivate students to come (food always helps, but the use of actual carrots might not be very effective). As with your conversations with individual faculty members, be sure to tell the students that although you are taking notes, anything they say is off the record and will not be attributed to a particular individual. Possible questions for students include the following:

- How do you view the mathematics major in comparison to other majors on campus? Is it harder/easier? Is it more/less time consuming?
- How do your fellow students who are not math majors view the mathematics program? What reputation does the department have within the institution?
- Why did you decide to take courses in the department?
- Why did you decide to major in the department?
- What about the department turns you off?

- If you were interviewing a perspective student for your college or university who is interested in majoring in math, what would you tell the student about the program? What would you say to the student to help him or her make a decision about whether or not to come here?
- Which class that you have taken has had the biggest impact on your feelings about your major, and why?
- Describe the academic advising program.
- Comment on the topics and frequency of the department's advanced courses.
- Comment on your opportunities to do internships, independent studies, and research projects.
- Are there areas in which the department and/or the degree could be improved? If so, what is the single most important thing you would change?
- What activities does the department organize outside the classroom? Which of these do you find most valuable, and why?
- What does the department not do that you wish it would do?
- What do you like most about the department and/or the degree?

5.2 Classes

If the department's self-study focuses on a particular set of courses, such as the introductory calculus sequence, or on a particular pedagogical approach, such as the use of computer labs, then you should arrange to sit in on a class or lab session. In addition, if the department teaches some innovative classes or is using an innovative teaching style, you might want to visit one of these classes, at least for part of the class period.

5.3 Tours

If courses have a computer laboratory component, then you should plan to tour the computerized classrooms and labs. Things to look for include the following:

- Is the hardware and software up to date?
- Do the software resources adequately support the curriculum?
- Is there adequate tech support?
- Are student monitors available outside of class time—for example, in the evening?
- Are student assistants available to help with classroom laboratory sessions?
- If the lab is used as a classroom, is it laid out in a way that is amenable to teaching?

You should also tour the library holdings and investigate the institution's internet access to scholarly works.

- Do the institution's libraries and internet access support its expectations for faculty scholarly activity and student-faculty research?
- Do they support student research projects?

5.4 Social Events

To help get to know the members of the faculty and to see how they interact with one another, it is useful to meet with them in a more social setting (such as a luncheon, a dinner, or a reception) early on in your visit.

5.5 Exit Sessions

At the conclusion of the site visit, there are usually two exit sessions: one with the members of the department and the other with the high-level administrator with whom you spoke at the start of your visit. During these sessions, you will be expected to give an informal overview of your findings and recommendations. Finding time to get your thoughts together after a whirlwind set of meetings is difficult unless time is built into the consultant schedule for members of the team to meet and reflect on their observations prior to these final two meetings.

You should talk openly with both department members and the administrator so that the consultant report will not contain any major surprises. You should strive to balance your comments with both positive observations and areas of concern. The faculty will be anxious to hear what you have to say. When you meet with them, you need to be aware of how you might respond to what you are saying if you were a member of their department.

The exit meeting with the administrator will have a different tone. An administrator has a broad perspective of the institution and is more likely to seriously consider recommendations that make sense from an institutional point of view. The types of recommendations that he or she is most likely to support are not only ones that strengthen the department but also ones that have some meaningful impact beyond the department and connect to the overall objectives of the institution's strategic plan. In addition, administrators have to juggle limited resources to help meet the needs of all the institution's programs. Consequently, trying to fix a department's problems by advocating for more resources than the institution can afford is not acceptable. Finally, administrators want to know what the faculty is thinking. You can make the administrator aware of issues that came up in your conversations, but be careful not to rail against administrative policies that are not in favor with the faculty.

6 Putting It All Together

An effective report is one that earns the support of both the faculty and the administration. Concerns should be expressed diplomatically, and recommendations must be feasible from the point of view of both the department and the institution. Moreover, an administrator will take more notice of a report that places the review in the context of the institution.

6.1 Writing the Consultant Report

A popular quote from Einstein suggests, “Everything should be made as simple as possible, but not simpler.” This provides a good suggestion for how to write your report. Keep your report to the stated purposes of the review, and focus on your main points. Remember that a consultant’s role is to help guide the department, not to solve all its problems based on a short visit.

Consultant reports may run from fewer than 10 to over 20 pages in length. In other words, there is no set length. There are several factors that influence the length of the report: the complexity of the department, the number of programs supported by the department, the breadth of the focus of the review (does it focus on a particular aspect of the department, such as the department’s program in undergraduate research, or on the department as a whole?), the depth of analysis, the size of the consultant team, and, we are sorry to have to acknowledge, the amount of the stipend.

Your findings and recommendations should represent the entire team. Any statements that are not supported by all the members should be removed, or the lack of consensus of the team should be noted. It is the job of the team chair to resolve differences or find statements on the issue with which everyone agrees.

Some institutions have a preferred format for a consultant report. If you do not know whether this is the case, you should ask the administrator with whom you meet at the outset of your visit. The remainder of this section provides two generic “sample” formats for the report in the hope that the collective experience and background of your consultant team, coupled with the history of the institution, will provide additional structure for the format you develop.

Template A²

1. Overview

The overview states the purpose of the review, reflects on the mission statement of the institution, and describes the department’s role relative to the school’s mission. It lists the members of the consultant team and briefly summarizes the review process. The overview concludes with a summary of the key findings of the review relative to the stated purpose of the review.

2. Definitions

If the report uses acronyms, such as CUPM, MAA, AMS, CRAFTY, or NCTM, it is helpful to others who read the report to insert a small table listing and defining these acronyms.

3. Departmental Mission and Strategic Planning

In the case of a review of a department as a whole, the report typically states the mission of the department and then uses this statement as a basis for observations and recommendations. If the mission statement lacks the structure to be a guide for the report, then this might be a useful fact to mention.

4. Self-Study Process

This section gives a general summary of the self-study process. It describes the evidence that was useful and the overall themes that are in the self-study report (or that can be read

²See Appendix B, “Electronic Resources,” for an example of a report using this format.

between the lines). Note: The self-study report is the main body of evidence supplied to the consultant team and should be a fruitful source of support for the team's recommendations.

5. Campus Visit

This section gives an overview of the campus visit and again cites the evidence that will support the recommendations made in the report. It describes the discussions the consultant team participated in and includes the team's impressions of facilities and infrastructure.

6. Conclusions and Recommendations

Keep in mind that the recommendations in the report are not restricted just to areas of concern. In this section, the report should state areas of concern (along with evidence to support the findings)—but it should also recognize department strengths and applaud areas of success. Moreover, the report should strive to make specific helpful suggestions for addressing problems and concerns, while keeping in mind that often even suggestions that seem simple can actually be helpful.

7. Final Signatures

All members of the consultant team should sign the report.

Template B³

1. Introduction

The introduction identifies the main themes of the report and sets the tone for what follows. Often, the introduction starts with the mission statement of the department, which can provide a context for the elements of the review that follows. The introduction also commonly comments on the audiences served by the department. It clarifies the structure of what follows by giving an overview of each section and listing the appendices.

2. Overview of Department/Program Strengths

Positive statements at the beginning provide a solid foundation for the report. Almost any department can boast several strengths. In this section, document these areas of success. What does the department do well? What are its strengths? What do the students value and appreciate? In the sections that follow, the report will provide feedback on current programs, recommend changes, and identify possible new directions; hence, the report might seem rather negative. The feedback in the report should be considered in the context of a department that is basically strong.

The remainder of the report contains one section for each finding. The findings are based on the charges to the consultant team given in the self-study report and on the team's observations while on campus. The findings have titles such as "Departmental Structure," "The Statistics Program," "Strategies Regarding Enrollments," "Relationships of the Department to Other Disciplines," "Topics for Curricular Discussion," and so on. Interspersed with the dialogue for each finding are recommendations linked to the finding. Each recommendation

³This consultant report template was developed by Henry M. Walker of Grinnell College. See Appendix B, "Additional Resources," for a TeX version of this template, as well as macros for inserting recommendations.

is numbered to reflect the section in which it appears; for example, “Recommendation 3.2” would be the second recommendation in Section 3.

The remainder of this template suggests a possible outline for the consultant team’s findings and associated recommendations.

3. Comments Regarding the Entire Department

Since a department functions as an overall academic unit, a consulting team normally identifies some observations that relate to the department as a whole. In many reports, these can be divided into a few subsections.

3A. Goals

Departmental goals provide some high-level perspectives and often provide a fruitful framework for examining major elements within the overall department. The functioning of a department may support the high-level goals, but sometimes, practices seem counterproductive, which can lead to recommendations for change.

3B. General Education, Facilities, Assessment Plans, etc.

4. The Department within the Institutional Environment

A campus visit frequently involves meetings with majors, non-majors, and faculty from other departments.

4A. Student Perspectives, Community and Audience

Majors and non-majors can both provide vital perspectives on how students view the department.

4B. Public Relations

Even if a department has truly wonderful programs, few students will enroll or major if they do not know about these programs.

4C. Outreach to Other Departments

Mathematics departments should understand the needs and interests of client departments.

5. The Mathematics Program

A discussion of the mathematics program often considers both introductory-level and upper-level courses. Specifics depend upon the details of the department and the institution.

5A. Introductory-Level Mathematics

Distribution requirements may force students to take an initial mathematics course, but students likely will take further courses only if these experiences go well.

5B. Upper-Level Mathematics

In addition to preparing students for work in client departments, upper-level courses should give majors a strong background in a range of mathematical areas.

6. The Computer Science Program

Computer science is misunderstood on many campuses. In such cases, this report can help educate administrators, as well as provide guidance for a joint department in mathematics

and computer science. Thus, a first subsection often presents a general introduction to computer science within the liberal arts. Later subsections consider various components of the curriculum.

- 6A. Computer Science and the Liberal Arts⁴
 - 6B. Introductory Computer Science
 - 6C. The Computer Science Curriculum
 - 6D. Recruitment, Visibility, and Public Relations
- 7. Relationships with Administrative Departments
Consultants might schedule meetings with a range of administrative offices and departments, such as the Office of Admissions, the Department of Information Technology Services, and an office of tutoring or academic advising.
 - 8. Coda
This final section highlights a few key points and again expresses appreciation to all of the parties involved with the review.
 - 9. Final Signatures
All members of the consultant team should sign the report.
 - 10. Appendices
 - A. Bibliography
 - B. Recommendations

Following Up Typically, the submission of the final review report signifies the end of a consultant's job. However, it would be helpful for all parties involved to have a follow-up mechanism. One simple way to accomplish this is for the chair of the consultant team to contact the department chair and inquire as to the status of the department and the actions that have resulted from the review. In addition, the department chair can provide feedback on what was helpful from the review and what areas could have benefited from additional clarification. This feedback can then be shared informally with members of the consultant team to assist them in performing future reviews. It may be possible to develop a more formal process for conducting an assessment of your role as a consultant. For example, you could develop a survey form, or you could request that the department chair write some comments.

7 Conclusion

The long-term health and prosperity of an institution in higher education are rooted in its ability to be successful in a variety of settings: inside the classroom, outside the classroom, in its pursuit or encouragement of scholarly activity, in its performance of community outreach, in its commitment

⁴See the electronic version of this template for a slightly edited version of this material written by Henry M. Walker for a review of Willamette University, 28 November 2007, used with permission.

to the professional development of its faculty and students, and in its maintenance of infrastructure, to mention just a few areas that are vital to success. It is also important for academic departments to effectively develop and implement their roles in each and every academic year, but true success comes from their ability to evolve over time. Department reviews are crucial opportunities for departments to study their past and plan for the long-term future.

An effective consultant team can help individual departments in their pursuit for excellence. However, a rich professional community of consultants can provide a catalyst for innovation in education at the national level. Even a small positive change at the curriculum level of a department could have a ripple effect for the entire institution and impact the education of thousands of students. To provide this type of benefit at a national level could serve the best interests of the entire mathematics community. Service by just a handful of consultant teams could have a large-scale benefit. The possible benefits that consultants can bring to the mathematics discipline are only limited by the number of people willing to serve.

A Fundamental Resources

Sometimes a review will require expertise in a particular area. This section presents resources that can help with a variety of issues.

A.1 General Resources

- Annual Survey of the Mathematical Sciences (AMS-ASA-IMS-MAA-SIAM). Available at www.ams.org/outreach/.
- “Assessment of Research Doctoral Programs,” a National Research Council Report. This document contains helpful statistics on average faculty sizes, average number of publications by discipline, and much more. Available at www7.nationalacademies.org/resdoc.
- “Conducting an External Review of a Mathematics Program and Department,” by Kyle Riley, PRIMUS [13], no. 4, pp 373–383, 2003. Available at www.findarticles.com/p/articles/mi_qa3997/is_200312/ai_n9338090.
- *Guidelines for Programs and Departments in Undergraduate Mathematical Sciences*, Revised Edition, MAA, February 2003. Available at www.maa.org/guidelines.
- MAA Basic Library List. Available through MAA Reviews or directly at mathdl.maa.org/mathDL/19/?pa=content&sa=viewDocument&nodeId=959.
- *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States (CBMS Survey 2005)*, by David J. Lutzer, Stephen B. Rodi, Ellen E. Kirkman, and James W. Maxwell, AMS, 2007. Available at www.ams.org/cbms.
- *Undergraduate Programs and Courses in the Mathematical Sciences: CUPM Curriculum Guide 2004*, by Harriet Pollatsek et al, MAA. Available at www.maa.org/cupm.

A.2 Sister Disciplines (often within the department)

A.2.1 Computer Science

- “A 2007 Model Curriculum for a Liberal Arts Degree in Computer Science,” by the Liberal Arts Computer Science Consortium, *Journal on Educational Resources in Computing* (JERIC) [7], no. 2, June 2007, article 2.
- ABET-CSAC resources. For guidance on assessment planning, see www.abet.org/assessment.shtml. For accreditation criteria, see www.abet.org/forms.shtml#For_Computing_Programs_Only. For information on assessment of student learning, see programassessment.blogspot.com/.
- ACM/IEEE Task Force on the Curriculum, *Computing Curricula 2001*, ACM and IEEE Press, 2002.
- “A Revised Model Curriculum for a Liberal Arts Degree in Computer Science,” by H. M. Walker and G. M. Schneider, *Communications of the ACM*, December 1996, pp. 85–95.
- “A Model Curriculum for a Liberal Arts Degree in Computer Science,” by N. Gibbs and A. Tucker, *Communications of the ACM*, March 1986, pp. 202–210.

A.2.2 Statistics

- *Guidelines for Assessment and Instruction in Statistics Education (GAISE): College Report*, 2005. Available at www.amstat.org/education/gaise. Endorsed by the American Statistical Association and the American Mathematical Association of Two-Year Colleges.
- “Examples of Statistics Undergraduate Minors/Concentrations/Tracks/ Programs,” by Mary Parker et al, July 29, 2002. Available at www.ma.utexas.edu/users/parker/minors/topexamples.htm.
- “Mathematics and Statistics: Tension and Cooperation,” by George W. Cobb and David S. Moore, *American Mathematical Monthly*, August-September 2002, pp. 615–630.
- “Mathematics, Statistics, and Teaching,” by George W. Cobb and David S. Moore, *American Mathematical Monthly*, November 1997, pp. 1–14.
- “Survey on Statistics within the Liberal Arts,” by Thomas Moore and George Cobb. Available at www.math.grinnell.edu/mooret/reports/LASurvey2003.pdf.

A.2.3 Teacher Preparation

- *The Mathematical Education of Teachers*, Conference Board on Mathematical Sciences, Issues in Mathematics Education [11], 2001. Available at www.cbmsweb.org/MET_Document.
- *Preparing Mathematicians to Educate Teachers* (PMET). PMET is an MAA project funded by the National Science Foundation. The PMET web site contains a comprehensive list of national reports, textbooks, books, bibliographies, web links, and so on. Available at www.maa.org/PMET/resources.html.
- *Principles and Standards for School Mathematics*, National Council of Teachers of Mathematics (NCTM), 2000. Available at www.nctm.org/standards.

A.3 Partner Disciplines

- *Curriculum Foundations Project: Voices of the Partner Disciplines*, edited by Susan Ganter and William Barker, MAA, 2004. This is a CUPM project to identify needs and trends in other disciplines. The report is often referred to as the “Curriculum Renewal Across the First Two Years” or “CRAFTY” project. Available at www.maa.org/cupm/crafty.
- *Math & Bio 2010: Linking Undergraduate Disciplines*, edited by Lynn Arthur Steen, MAA, 2005. This volume explores linkages between mathematics and what some are calling the “new biology,” which is increasingly more quantitative, computational, and mathematical. See www.maa.org/mtc for project reports and additional references.

A.4 Preparing Students for the Workplace

- The Society for Industrial and Applied Mathematics (SIAM) Report on Mathematics in Industry (MII), 2008. The findings of this report involve both mathematics as a discipline and mathematicians as practitioners of that discipline. See www.siam.org/about/mii/report.php.

This web site also contains information and data about the roles of mathematics within nonacademic organizations, applications of mathematics, and opportunities for mathematics. See www.siam.org/about/mii/roles.php.

A.5 Departmental Chairs

- *Leading the Mathematical Sciences Department: A Resource for Chairs*, edited by Tina Straley, Marcia Sward, and Jon Scott, MAA Notes #64, MAA, 2005.
- *Towards Excellence (Leading a Doctoral Mathematics Department in the 21st Century)*, edited by John Ewing, AMS, 1999. Available at www.ams.org/towardsexcellence.

A.6 Assessment

- *Assessment of Student Learning in College Mathematics: Towards Improved Programs and Courses*, edited by Bernard Madison, Association for Institutional Research, 2008.
- *Assessment Practices in Undergraduate Mathematics*, edited by Bonnie Gold, Sandra Keith, and William Marion, MAA Notes #49, MAA, 1999. Available at www.maa.org/saum/maanotes49.
- “CUPM Guidelines for Assessment of Student Learning.” See www.maa.org/saum/cases/cupm-guidelines1105-saum.pdf.
- The Indicators Project. See www.mste.uiuc.edu/indicators. This is a project funded by the NSF; the principal investigator was Kenneth Travers. The main purpose of the project was to develop statistical measures to assist departments in assessing their undergraduate mathematics courses.
- Supporting Assessment in Undergraduate Mathematics (SAUM). See www.maa.org/saum. The SAUM web site contains a comprehensive list of assessment references, including an assessment bibliography organized by the categories “Assessment Web sites”; “Assessment of Mathematics: Policy and Philosophy”; “Assessment of Mathematics: Case Studies”; and “Postsecondary Assessment: Policy and Best Practices.”
- *Supporting Assessment in Undergraduate Mathematics*, edited by Lynn Arthur Steen, MAA, 2006. See www.maa.org/saum/cases.

A.7 Research Councils

- Council on Undergraduate Research (CUR): Learning through Research. See www.cur.org. The mission of CUR is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship.
- National Research Council (NRC). See www.nas.edu/nrc. The mission of the NRC is to improve government decision making and public policy, increase public education and understanding, and promote the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health.

B Additional Resources on the Web

The following electronic resources are available through www.maa.org/ProgramReview (see, in particular, the link to “Additional Resources for Program Review”).

- Sample Consultant Report
- Consultant Report Template
- Questionnaire for Consultant Candidates
- Questionnaire for Institutions Seeking a Consultant Team

C Troubleshooting

There are some things that can make for a difficult consultant experience. This section lists a few possible problems and attempts to provide a few suggestions for addressing each situation.

1. Conflict among the members of the consultant team

Members of a consultant team may come from distinct backgrounds, and their views and opinions might be quite different. It is the job of the team chair to resolve any disputes, and the entire team should be mindful that they are members of a team. Careful diplomacy will rule the day, and if everyone is willing to be a bit flexible, then solutions can be found.

2. Problems with the resident department head

The consultant team will have a great deal of interaction with the department head. Department heads can be very helpful to a consultant team by providing support and organization for the campus visit, quick responses to requests for information, and helpful insight on institutional organization. However, department heads can also act as obstacles to departmental reviews. It is important to build trust early in your interactions with the department head and to encourage him or her to view the review as an opportunity to gather valuable input. The old adage that you will get out what you put into a self-study is an important point to make.

3. Communication problems requiring “marriage counseling”

An institution may have a major problem with communication. This problem might be encapsulated inside a department, with the faculty split up into factions, or the faculty sitting at odds with their department chair—or an entire department may be in opposition to the administration. A consultant team might help provide the catalyst to break down barriers in communication and get the opposing sides to talk with each other. Dysfunction that has been in place for several years will not be erased in two days, but utilizing an impartial third party can provide a strong start.

4. Serious problems with the self-study report

A self-study report should provide the information you need to conduct your review, and it should be the product of the department’s internal review. A good self-study report provides the following information: the proper background on the institution; clear goals for what the department would like to accomplish; assessment relevant to the review; and action items that the department is either considering or implementing. Hopefully, the department will provide its report months before the campus visit. This will give you an opportunity to provide guidance to the self-study process to make it more effective.

5. The difference between what you say and what you write

The final report should be a thoughtful document that makes recommendations that you can solidly support. However, your informal discussions can seek to be a bit more inquisitive. It may be the case that you can stimulate a department to action more through asking carefully considered questions during your campus visit than through making a conservative recommendation in your final report.

D Sample Timeline

Juggling the schedules of the resident institution and the individual schedules of the review team does require a substantial amount of flexibility. However, it might be helpful to summarize the events surrounding a campus visit by providing a suggested timeline:

